Managerial Economics

ECO 625, DIPLOMA IN BUSINESS ADMINISTRATION, D.B.M

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Kings University,
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Learning Outcomes

At the end of this course, the student will be able to understand the scope, concepts and applications of Managerial Economics. The course material aims to cover Demand Forecasting, National Income Analysis, Market Structure and Pricing Strategies.

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INTRODUCTION TO MANAGERIAL ECONOMICS

Success in the business world, no matter how you slice it, means winning in the marketplace. From CEOs of large corporations to managers of small, privately held companies—and even non-profit institutions such as hospitals and universities, managers of any of these kinds of organizations cannot expect to make successful business decisions without a clear understanding of how market forces create both opportunities and constraints for business enterprises. The manager's understanding or lack of understanding of fundamental economic relations usually accounts for thedifference between success and failure in business decisions. While it is certainly true that managers must constantly be aware of new developments in the marketplace, a clear understanding of the economic way of thinking about business decision making is a valuable and timeless tool for analysing business practices and strategies.

Managerial economics, formerly known as Business Economics is the application of economic theory and quantitative methods (mathematics and statistics) to the managerial decision-making process. The subject offers powerful tools and techniques for managerial policy making. An integration of economic theory and tools of decision sciences works successfully in optimal decision making, in face of constraints. A study of managerial economics enriches the analytical skills, helps in the logical structuring of problems, and provides adequate solution to the economic problems.

Managerial economists have defined managerial economics in a variety of ways: According to E.F. Brigham and J. L. Pappar, Managerial Economics is "the application of economic theory and methodology to business administration practice."

To Christopher Savage and John R. Small: "Managerial Economics is concerned with business efficiency".

Milton H. Spencer and Lonis Siegelman define Managerial Economics as “the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.”

In the words of Me Nair and Meriam, “Managerial Economics consists of the use of economic modes of thought to analyse business situations.”

D.C. Hague describes Managerial Economics as “a fundamental academic subject which seeks to understand and analyse the problems of business decision making.”

In the opinion of W.W. Haynes “Managerial Economics is the study of the allocation of resources available to a firm of other unit of management among the activities of that unit.”

According to Floyd E. Gillis, “Managerial Economics deals almost exclusively with those business situations that can be quantified and dealt with in a model or at least approximated quantitatively.”

The above definitions emphasise the interrelationship of economic theory with business decision making and forward planning.

Nature of Managerial Economics

Managerial economics aims at providing help indecision making by firms. It is heavily dependent on microeconomic theory. The variousconcepts of micro economics used frequently in managerial economics include Elasticity of demand; Marginal cost; Marginal revenue and Market structures and theirsignificance in pricing policies. Macro economy is used to identify the level of demand atsome future point in time, based on the relationship between the level of national incomeand the demand for a particular product. It is the level of national income only that thelevel of various products depends. In managerial economics macroeconomics indicatesthe relationship between (a) the magnitude of investment and the level of nationalincome, (b) the level of national income and the level of employment, (c) the level ofconsumption and the level of national income. In managerial economics emphasis is laidon those prepositions which are likely to be useful to management.

Scope of Managerial Economics

Since managerial economics is a newly formed discipline, no uniform pattern is adopted and different authors treat the subject in different ways. However, the following topics have been regarded as the scope of the subject, managerial economics:

I. ***Managerial economics- Is it positive or normative:***

Positive economics is descriptive in character. It describes economic activities as they are. According to Prof. Lionel Robbins economics is a positive science and he believed that economist, should be 'neutral'' between 'ends' and he cannot pronounce on the validity o ultimate judgments of value.

While normative economics passes judgments of value. Managerial economics draws from descriptive economics and tries to pass judgments of value in the context of the firm. Managerial economics is mainly normative in nature.

II. ***Area of study:***

Broadly speaking, managerial economics deals with the following topics:

- **Demand analysis and forecasting:**

Accurate estimation of demand by analysing the forces acting on demand of the product produced by the firm forms the vital issue in taking effective decisions at the firm level. Demand analysis attempts at finding out the forces of determining sales. This has two main managerial purposes.

1. Forecasting sales and 2. Manipulating demand.

The demand analysis covers the topics like demand determinants, demand distinctions and demand forecasting.

- **Cost and production analysis:**

In decision-making, cost estimates are very essential. Production planning, profit planning etc depends upon sound pricing practices and accurate cost analysis. Production analysis deals with physical terms of the product, while cost analysis deals with the monetary terms. Cost analysis is concerned with cost concepts, cost-output relations, economies of scale, production function and cost control.

- **Pricing decisions, policies and practices:**

Pricing forms the core of managerial economics. The success or failure of a firm mainly depends on accurate price decisions to effectively compete in the market. The important aspects of the study under this are price determination under different market conditions, pricing methods and police product line pricing and price forecasting.

- **Profit management:**

All business enterprises are profit making institutions. The success or failure of a firm is measured only in terms of profit it has made and the percentage of dividend it has declared. Hence, profit management, profit policies and techniques. Profit planning like break-even analysis is studied under this category.

- **Capital management:**

Capital management is the most troublesome problem for the management of business involving high-level decisions. Capital management deals with planning and control of capital expenditure. Cost of capital, rate of return and selection of project etc.

- **Linear programming and theory of games:**

Linear programming and theory of games have come to be regarded as part of managerial economics, as there is a trend towards integration of managerial economics and operations research.

III. Profit: The central concept in managerial economics:

Generally, profits are the primary measure of the success of any business. It is the acid test of the economic strength of the firm. Economic theory makes a

fundamental assumption that maximizing profit is the basic aim of every firm. This assumption is by and large true, though in modern society this may not always hold good. Modern firms pursue multiple objectives such as welfare, obligations to society and consumers etc. However, profit maximization receives top priority, if not sole objective. Consequently, profit maximization continues to be the objective of the firm and the study of firm in managerial economics has centered on the concept of profit.

The maximization of profits is the main objective of any firm and the survival of the firm depends on the profits it earns. Profits are the main indicator of a firm's success. It is the index of business efficiency. Further, the concept of profit maximization is very much useful in selecting the alternatives in making a decision at the firm-level.

IV. Optimization:

Another important concept used in managerial economics is 'optimization'. This aims at optimizing a given objective. The aim of linear programming is to aid the process of optimization and choice. It offers numerical solutions to the problem of making of optimum choices. This point of optimization emerges when they are constraints optimization is basic to managerial economics in decision-making.

Relationship of managerial economics with other disciplines:

Managerial economics is closely related to other subjects like micro economic theory, macro economic theory, mathematics, statistics, accounting and operations research. Managerial economics," as using the logic of economics, mathematics and statistics to provide effective ways of thinking about business decision problems".

Managerial economics and micro economics:

Managerial economics is mainly micro economic in character, making use of many of the concepts and tools provided by micro-economic theory. The concept of

elasticity of demand, marginal cost, market structures, the theory of the firm and the theory of pricing of micro-economics are fully made use of by managerial economics. Hence the study of micro economics is essential for the better understanding of managerial economics. All micro economic theories which can be applied in business are made use of in managerial economics.

Managerial economics and macro economics:

Macro economics is concerned with aggregates and macro economics concepts are used in managerial economics in the area of forecasting general business conditions. The theory of the firm, pricing policies etc have to be viewed in the broad frame work of the economic system and it is essential that the business executives should have some knowledge of the entire economic system. Macro economic concepts like national income, social accounting, managerial efficiency of capital, multiplier, business cycles, fiscal policies etc have to be studied in managerial economics for forecasting the business conditions.

Both micro and macro economics are closely related to managerial economics. Managerial economics draws from micro and macro economics, so that it can apply these principles to solve the day-to-day problems faced by businessmen.

Managerial economics and mathematics:

Managerial economics is becoming increasingly mathematical in character. Businessmen deal with various concepts which are measurable. The use of mathematical logic provides clarity of concepts. It also gives a systematic frame-work within which quantitative relationship maybe analysed. Mathematics, therefore, is of great help to managerial economics. The major problem confronting businessmen is to minimize cost or maximize profit or optimize sales. To find out the solution for the overall problems, mathematical concepts and techniques are widely used. Mathematical techniques like linear programming, games theory etc help managerial economists to solve many of their problems.

Managerial economics and statistics:

Statistics is a science concerned with collection, classification, tabulation and analysis of data for some specified purpose. Managerial economics and statistics are closely related as businessmen deal mainly with concepts that are quantifiable for example: demand, price, cost of operation etc.

Statistics is useful to managerial economics in many ways:

a. Managerial economics requires marshalling of quantitative data to find out functional relationship involved in decision-making. This is done with the help of statistics.

b. Statistical methods are used for empirical testing in managerial economics.

c. The business executives have to work and take decisions in an uncertainty frame-work. The theory of probability evolved by statistics helps managerial economists for taking a logical decision.

Thus statistical methods provide sound base for decision-making and help the businessmen to achieve the objective without much difficulty. Statistical tools are extensively used in the solution of managerial problems. Managerial economists make use of various statistical techniques like the theory of probability, co-relation techniques, regression analysis etc. in various business situations.

Managerial economics and accounting:

Accounting is concerned with recording the financial operations of a business firm. Accounting information is one of the primary sources of data required for managerial economists for the decision-making purpose. The information it contains can be used by the managerial economist to throw some light on the future course of action.

Managerial economics and operations research:

Operations research is the," application of mathematical techniques in solving business problems". It deals with model building that is construction of theoretical-

models that help the decision-making process. Though the roots of operations research lie in military studies, it is now largely used in business administration, planning and control. Linear programming and allied concepts of operations research are used in managerial economics.

The Objective of a firm

The function of management is the efficient direction of a business organization. Managerial team almost always faces the problems of scarcity and choice. There is no simple method of determining goals of a firm. They wish to maximize profits, while at the same time minimize costs, maximize sales and so on.

Managerial Theories of Firm

The members of the board of directors are aspects of the shareholders. They monitor the decisions of executive's manager.

The main argument of managerial theories is that in modern large firms, ownership and control are divorced. Managers therefore have a primary role in the effective control of the firm. While in the managerial theories it is the maximization of managerial utility. Different managerial theories of the firm view managerial utility as a function of different combinations of variables like, salary, power, status, growth and job security. Managerial theories may be broadly classified into three categories.

1.Sales Revenue Maximization model by Baumol.

2.Managerial utility model

3.Growth maximization models

Sales Revenue Maximization model by Baumol:

According to Baumol, the oligopolistic firms aim at maximizing their sales revenue. The reasons for this are the following:

- Financial institutions judge the health of a firm largely in terms of the rate of growth of its sales revenue.

- There is evidence that slack earnings and salaries of top management are correlated more closely with the firm's sales then with its profits.
- While increasing sales revenue over time provides prestige to the top management, profits go to shareholder.
- Growing sales help in keeping a healthy personnel policy, thus keeping employees happy by giving them higher salaries and better terms and vice versa.
- Large and growing sales by maintaining or increasing the market share of the firm increases competitive power of the power.

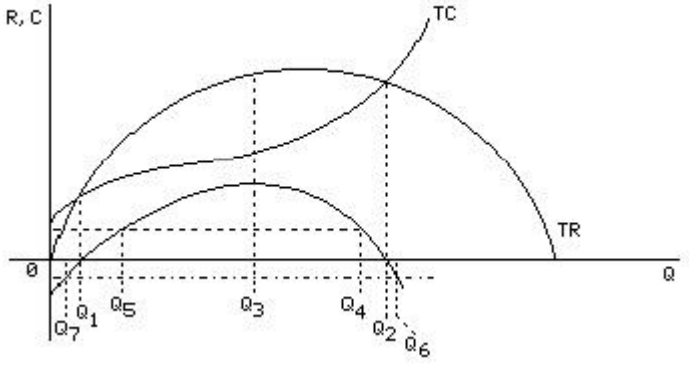
The firm while purchasing the goal of sales maximization cannot completely ignore the shareholders. The goal of the firm is the "maximization of sales revenues subject to a minimum profit constraint"

The assumptions of the model are

- Goal of the firm is sales maximization subject to minimization profit constraint.
- Advertisement is a major instrument of the firm as non-price competition is the typical form of competition in oligopolistic markets.
- Production costs are independent of advertising.
- Price of the product is assumed as constant.

Single-period model

It is only after the profit constraint has been satisfied that profits became subordinate to sales in the firm's hierarchy of goals.



Rationalization of the Sales Maximization Model

- There is evidence that salaries and other earnings of top managers are correlated more closely with sales than with profits.
- The banks and other financial institutions keep a close eye on the sales of firms and are more willing to finance firms with large and growing sales.
- Personnel problems are handled more satisfactorily when sales are growing. The employees at all levels can be given higher earnings and better terms of work in general.
- Large sales, growing over time, give prestige to the managers, while large profits go into the pockets of shareholders.
- Managers, prefer a steady performance with satisfactory profits to spectacular profit maximization projects. If they realize maximum high profits in one period, they might find themselves in trouble in other periods when profits are less than maximum.

Managerial utility Models:

There are at least two main versions of the firm. The modern large corporations are asked to influence the goal of the firm and not go along wholly pursuing the goals of the owners. Managerial utility models divided into two types.

They are:

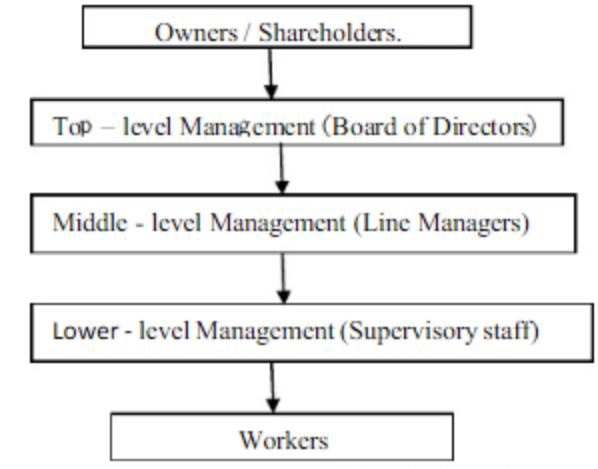
- Berlet-Means- Galibraith model of 'Corporate Power Structure'
- O. Williamson's model of Managerial Discretion

Berle-Means-Galibraith model of 'Corporate Power Structure'

In their book The Modern Corporation and Private Property in 1932, Berle and Means suggested for the first time the important implications of the separation of ownership and management in a modern corporation. According to them, while owners are interested in maximizing profits, the managers have their own desires, need and motivations.

In recent times, Galbraith has provided several variation of the Berle-Means approach.

According to Galbraith the traditional viewpoint of management of a corporation may be depicted in terms of the vertical corporate power structure where shareholders hold the ultimate power.



Corporate Power Structure: traditional Viewpoint

In large modern Industrial Corporation, the ownership and managerial control generally happen to be in the hands of two separate sets of people- shareholders and managerial team. The traditional viewpoint has been shareholders are ultimate power.

Williamson's Theory of Managerial Discretion

O. Williamson evolved a more useful model of managerial utility better known as the 'Model of managerial Discretion'. As per the basic concepts of the model, managers are free to pursue their own self-interest once they have achieved a level of profit that will pay satisfactorily dividends to the shareholders and still ensure growth. The manager's self-interests depend upon many other things besides salary. Further, so far as the goodwill of the firm serves their own ends and ambitions, the managers would be concerned about it, else they would try to bypass it.

Like Baumol, Williamson also adopts in following assumption in his model:

- Market is non-perfectly competitive.

- Ownership of the firm and management of the firm are divorced from each other.
- A minimum profit constraint is imposed on the managers by the capital market (or shareholders) which cannot be ignored by the management.

Framework of the model

Williamson conceives of manager's as having their own utility functions, i.e., a set of factors while giving raise to managerial satisfaction. Their policies maximize their own utility rather than aiming at maximize profits. Profit in fact, acts as a constraint to managerial behaviour. The managerial satisfaction takes certain aspects of the management task, like responsibility, status, prestige, dominance, salary, security etc., of these only salary is measurable, other aspects being non- pecuniary.

Williamson uses measurable variables like staff expenditure, managerial emoluments and discretionary investment in the utility function of managers on the assumption that these are the sources of the job security and reflect power, prestige, status and professional achievements of managers. Williamson puts the utility function of the managers as follows:

$$U = f (S, M ID)$$

Growth maximization Model

Growth of the firm is obviously the cornerstone of corporate strategy rate of growth and potential of growth ate generally used as yardsticks to measure corporate success. Growth of a firm must be financed either from retained earnings or from market borrowings or both.

Internal funds can, however, grow only through profit-maximization. The decision to maximize growth therefore, is necessarily a decision to maximize profit.

This one is classified as three types, they are:

- Baumol's model of Growth maximization
- Marris model of managerial enterprise
- Penrose's theory of the firm.

Baumol's model of Growth maximization

Growth is needed primarily to increase profitability. According to him the firm aims to find the optimal short-run growth will contribute the most to long-run profitability. Baumol's states that total cost rises faster than total revenue at higher rates of growth because., Capital markets are imperfectly competitive Construction and expansion costs income exceptionally high Fixed investments start yielding decreasing returns Business risk increase.

Marris model of managerial enterprise

Marris's hypothesis is that, executive actions are limited by the need for management to protect itself from dismissal or take-over raids in the event of failure. Marris tried to improve upon Baumol's model. He offered a variation of Baumol's model that stressed the maximization of growth subject to the security of management's position.

Marris approach is also based on the fact that ownership and control of the firm is in the hands of two different set of people. Like Williamson, Marris suggests that managers have a utility function in which salary, status power, prestige and security are important variables. Owners of the firm (shareholders) are however, more concerned about profits, market share, output etc. The utility function of managers (Um) and that of the owners (Uo) may, therefore, be defined as:

Um = f (salaries, power, status, job security)

UO = f (Profits, market share, output, capital, public esteem).

Robin Marris believes that most of the variables entering into the utility function of manager's owners are strongly correlated with single variables: the size of the firm. He, therefore states that the managers would be mainly concerned about the rate of growth of size.

In Marris model, there are two constraints:

- The managerial team constraint
- The job security constraint

The managerial team constraint

Marris is of the view that the capacity of the top management is given at any one-time period. Since management is a team work, hiring new managers does not expand the managerial capacity immediately.

New managers take time to get integrated in the team which is extremely essential for the efficient working of the firm.

The Job Security Constraint:

Their desire for security is reflected in the preference for service contracts, generous retirement benefits and their dislike for policies which may result in their dismissal. Job security is assumed to be attained by pursuing a prudent financial policy which requires that the three crucial financial ratios must be maintained at optimum levels.

Ratios:

To judge the prudence of a financial policy, Marris proposes the concept of financial constraint (i) which is mainly determined by the risk attitude of the top management. A risk-loving management would prefer a high value of a, while a risk averting management would prefer a low value of Marris defines 'a' as the weighted average of the following three ratios:

Liquidity Ratio (a1) =Liquidity Assets/Total Assets

Leverage Ratio (a2) = Value of Debts/Total Assets

Profit - Retention Ratio (a3) = Retained Profits/Total Assets

The low liquidity ratio, that is, the ratio of liquid assets to total assets increases the risk of solvency. Likewise, a high leverage / debt ratio, that is, the ratio of debt to value of total assets, poses the firm to a high degree risk of bankruptcy. A high retention ratio which refers to the ratio of retained profits to total profits, contributes most to the growth of the firm's capital.

Penrose's Theory of the Firm

The preoccupation of Penrose's analysis is to examine the managerial constraint on growth of the firm. Though her theory is not directly concerned with the objectives of the firm, she focuses on the role of managers in the growth of the process of the firm.

The firm is both a profit and a growth maximize and there is no conflict in these two objectives. Her emphasis that growth depends upon managerial services within the firm. The incentive for growth comes from the underutilized skills and capacities of the managerial staff.

Model of the Firm

Penrose's divided managerial roles into two categories.

a. To conduct operations and activities according to plan

b. To plan and carry out activities related to expansion.

However, the growth of the firm is likely to be slow with unchanging managerial staff. A faster growth rate requires the employment of additional managers. It is true that larger the size of managerial staff, higher would be the growth rate of the firm. Penrose further postulates that the increase in the number of managers trends to decrease the growth rate of the firm, because more and more of existing managers time is taken up with training new manager's leaving less and less time for their own work.

Drawbacks

- The concepts, issued to be raised and significant, though she excludes many other constraints on growth of the firm.
- The main problem is that it is difficult to measure the variables which are central to her thesis's of limits of growth.

Behavioural theories of the firm

Behavioural theories combine industrial economics and organization theory, unlike managerial theories, behavioural theories view firm as engages in non-maximizing behaviour.

According to behavioural theories, the firm's sub-optimal behaviour arises from uncertainty and conflicting goals of various groups within the firm. Behavioural theories analyse the organization of the firm, the way in which decisions are made and the intergroup conflicts within the organization.

Simon's satisfying model

H.A. Simon proposes an alternative model to the profit maximizing one as he believes that the relevant information with the managers is far from compute. The managers take decisions for future on the basis of incomplete information. Management realizing the complexity of calculation, inevitable uncertainties of future and the imperfections of the data.

The satisfactory behaviour holds that a manager will aim for:

- A satisfactory level of profit maximization.
- A satisfactory level of cost rather than cost minimization.

If the satisfactory aspiration level is an achieved easily, the expiration level is revised upwards, and if the satisfactory aspiration level is not achieved or upward as well as downward revisions, the management

indulges in 'search behaviour' to find the reasons for the deviations from the aspiration

level Simon suggests that if the satisfactory state is not achieved even by lowering the aspiration level and the search behaviour. The behaviour pattern of managers becomes that of apathy or aggression.

The model is positive in the following manner:

- The model explains certain real-world situation. For example, the firms generally use make-up pricing to generate reasonable profits rather resort to marginal cost pricing to maximize profits.
- Model is consistent with the theory of motivation where human action is a function of derives and it terminates when derives are satisfied.

However, there are serious flaws with the theory of satisfying behaviour as given below:

- The model lacks correctness and complete information. It does not identify the types of information that are sought by a firm and nature of 'incompleteness' the information suffers from.

- » The model fails to appreciate the difference between information about conditions and information about changes in conditions. It is the information regarding changes in conditions that is vitally more important.
- » Satisfactory level' is a subjective concept. It depends of many factors like industry one is talking about, the economic situation, the nature of top management, the perception of the decision-making manager etc. in each a case the comparison of managerial behavioural becomes a problem.

Cyert and March's behavioural theory of firm

The behavioural model of the firm, propounded by Simon, has subsequently been elaborated by Cyert and March in the behavioural theory of firm (1963). The behavioural theory of Cyert and March focuses on the way decisions are made in the modem, large multi-product firm under uncertainty in an imperfect market. They explain the difference in reactions of different firm, to the same set of extremely forces in terms of the differences in internal organisational factors.

R.M. Cyert and J.E. March consider the firm as a multi-goal, multi decision organizational coalition. Coalition consists of the various groups associated with the firm like managers, workers, shareholders, customers, suppliers, bankers, lawyers, accountants and so on each group has its own set goals. Cyert and March point out that the most significant groups in the decision making are: shareholders and workers.

Goals of the firm: Satisfying behaviour

The behaviour theory of the firm starts with a recognition that individual members of the coalition-firm have different goals to that of the organization coalition. According to Cyert and March goals of the firms are determined by the demands of individuals in coalition. The top management in the mode corporate firm enjoys the ultimate authority to act the goals of the firm.

According to Cyert and March there are five major goals of term as under:

- ✓ Production goal- is set by the production unit of the firm.
- ✓ Inventory goals- is set by the inventory unit of the firm.
- ✓ Salary of the market goals- is set by the sales unit of the firm
- ✓ Share of the market goals- is set by the sales unit of the firm

- ✓ Profit goals- is set by the top management keeping in view the expectations of the shareholders, bankers and other financial institution. It is the ultimate goal of each firm.

Like goals of individuals, the goals of the firm also undergo change overtime. As the number of goals of the firm increases, the decision-making process becomes increasingly complex and consequently the efficiency of decision-making decreases. The goals of the firm are ultimately decided by the efficiency of decision-making decreases. The goals of the firm are ultimately decided by the top management through continuous bargaining between the groups of coalition.

The top management tries to accommodate as many of the conflicting demands as possible. Cyert and March model is also a satisfying organization and not a maximizing organization like Simon's model. It compares its performance with the set goals. In case the goals have not been met a search activity begins to find out the reasons for the non-fulfilment of the target. If it is found that non-fulfilment was due to factors outside the control of the firm, a downward revision of the goals likely for the next period is made. In the organization-coalition if there is often a conflict of goals it needs to be overcome.

Cyert and March suggests two ways in which the conflict can be avoided:

Conflict may be phase out overtime in the sense that they are dealt with one by one, as they arise. Conflicts may be segregated to diffuse their impact on the whole organization. Each conflict may be localized into its respective department and decisions taken accordingly. For smooth working in the organization, there is some decentralization of decision making. However, at the lower administrative levels managerial staff follows standard procedures stated in blue prints. Rules of the thumb aim at ensuring working that is consistent with the goals set by the top management.

The following controversial points create doubts about the merits of the behavioural theory:

- ✓ Investment decisions are usually based on long term considerations which this theory ignores in its eagerness to avoid role of uncertainty in decision making.

- ✓ An adjustment of aspiration levels when costs and demand adjustment fail, implies that any performance of the firm can be considered satisfactory. This is a questionable proposition because downward revision of the goals to lower satisfying levels may not be acceptable to various groups despite the firm's claim that it did its best under the circumstances.
- ✓ By constant revision in the satisfying level, the criterion on which the top management sets the goals of the firm lose its relevance. (iv) Estimates of costs and rules of their upward or downward adjustment are simplistic and mechanical. (v) Forecast of demand in the current period are simply extrapolation of the demands in the previous periods in estimating current demand, no allowance is made for future uncertainty.

Optimization Techniques

Optimization techniques are probably the most crucial to managerial decision making. Given that alternative course of action are available, the manager attempts to produce the most optimal decision, consistent with stated managerial objectives. The first step in presenting optimization techniques is to examine ways to express economic relationship.

Methods of expressing economic relationship.

Economic relationship can be expressed in the form of equations, tables of graphs. When the relationship is simple, a table and or graph may be sufficient. When the relationship complex however expressing the relationship in equational form to may be necessary. Expressing an economic relationship equational form is also useful.

Total, Average and Marginal relationship.

The relationship between total, average and marginal concepts and measures is crucial in optimization analysis. We examine the relationship between total cost, average cost and marginal cost. The revenue concepts examined in the previous section, will be utilized in the next section to show how a firm maximizes profits.

Optimization analysis

Optimization analysis can best be explained by examining the process by which a firm determines the output level at which it maximizes total profits.

Optimization by marginal analysis

While the process by which the firm maximized total profit was determined above by looking at the total revenue and total cost curves, it is more useful to use marginal analysis. MA is important in managerial economics in general in optimization analysis in particular.

Differential Calculus

Marginal analysis was introduced as one of the fundamental concepts of economic decision making. In the marginal analysis framework, resource-allocation decisions are made by comparing the marginal benefits of a change in the level of an activity with the marginal costs of the change. A change should be made as long as the marginal benefits exceed the marginal costs. By following this basic rule, resources can be allocated efficiently and profits or shareholder wealth can be maximized. When the relationship between the decision variables and criterion can be expressed in algebraic form, the more powerful concepts of differential calculus can be used to find optimal solutions to these problems.

Relationship between Marginal Analysis and Differential Calculus

Relationship between Marginal Analysis and Differential Calculus Initially, let us assume that the objective we are seeking to optimize, Y, can be expressed algebraically as a function of one decision variable, X, Y = f (X), Recall that marginal profit is defined as the change in profit resulting from a one-unit change in output. In general, the marginal value of any variable Y, which is a function of another variable X, is defined as the change in the value of Y resulting from a one-unit change in X.

Process of Differentiation

The process of differentiation — that is, finding the derivative of a function — involves determining the limiting value of the ratio $\Delta Y / \Delta X$ as ΔX approaches zero. Before offering some general rules for finding the derivative of a function.

Rules of Differentiation

Fortunately, we do not need to go through this lengthy process every time we want the derivative of a function. A series of general rules, derived in a manner similar to the process just described, exists for differentiating various types of functions.

Constant Functions

A constant function can be expressed as Y = a. where a is a constant (that is, Y is independent of X). The derivative of a constant function is equal to zero: dy/dx=0

Power Functions

A power function takes the form of Y = aXb where a and b are constants. The derivative of a power function is equal to b times a, times X raised to the (b _ 1) power:

$dy/dx= b.a.X^{(b-1)}$

Sums of function

The derivative of a sum (difference) is equal to the sum of the derivatives of the individual terms. $Y=f_1(x)+f_2(x)$, the derivative of y with respect to x is found by differentiate each of the separate function and then adding these results.

$$dy/dx = df_1(x)/dx+df_2/d(x)$$

Product of two functions

Expressions is equal to the first expression multiplied by the derivative of the second, plus the second expression times the derivative of the first.

Y = U*V

Quotient of two functions

The derivative of the quotient of two expressions is equal to the denominator multiplied by the derivative of the numerator minus the numerator times the derivative of the denominator all divide by the denominator. Y = U/V

Function of a function rule – Y = f(U) and U =g(x)

Rules for differentiating functions

Function	Derivative
1. Constant function y=a	dy/dx = 0
2. Power function rule $y = ax^b$	$dy/dx = b*a*x^{(b-1)}$
3. Sums rules y = u+v	dy/dx =du/dx+dv/dx
4. Product of two functions y = u*v	dy/dx = U dv/dx+Vdu/dx
5. Quotient of two functions y = u/v	$dy/dx = V(du/dx) - U(dv/dx)/V^2$
6. Function of a function rule y = f(u)	dy/dx = dy/du*du/dx

Optimization with calculus

The reason for studying the process of differentiation and the rules for differentiating functions is that these methods can be used to find optimal solutions to many kinds of maximization and minimization problems in managerial economics.

Determining a maximum or a minimum by calculus

Optimization often requires finding the maximum or the minimum value of a function. For a function to be at its maximum or minimum, the function must be zero. Geometrically, this corresponds to the point where the curve has zero slope.

Distinguishing between maximum and a minimum

Second Derivatives and the Second-Order Condition Setting the derivative of a function equal to zero and solving the resulting equation for the value of the decision variable does not guarantee that the point will be obtained at which the function takes on its maximum value. In other words, setting the derivative to zero is only a necessary condition for finding the maximum value of a function; it is not a sufficient condition. Another condition, known as the second-order condition, is required to determine whether a point that has been determined from the first-order condition is either a maximum point or minimum point of the algebraic function.

Minimization problem

In some decision making situations, cost maximization may be the objective. As in profit maximization problems, differential calculus can be used to locate the optimal points.

New management tools for optimization

During the past two-decades many new management tools have revolutionized the way firms are managed. The most important of these tools are: Benchmarking, Total quality management, Reengineering and the learning organization. The ideas and examine how they are related to the traditional functional areas of managerial economics.

- ***Benchmarking***

It refers to the finding outs in an open and aboveboard way, how other firms may be doing something better so that your firm can replicate and possibly improve on its technique. Benchmarking is usually accomplished by field trips to other firms. The technique has now become a standard tool for improving productivity and quality at a large number of American firms, including IBA, AT&T, Du Pont and Xerox.

Benchmarking requires the following: - Picking a specific process that your firm seeks to improve, identifying a few resources that do a better job and Sending the people on a benchmarking mission. Benchmarking can result in dramatic cost reductions.

- ***Total Quality Management***

It refers to constantly improving the quality of products and the firm's process so as to consistently deliver increasing value to customers. TQM constantly asks, "How can we do this cheaper, faster or better"? It involves worker teams and benchmarking. In broader sense, TQM applies quality improvement methods to all firm process from production to customer service, sales and marketing and even finance. By improving quality and reducing costs in all these areas, HP achieved spectacular results. In recent years, the TQM model way extended to include innovation, knowledge and themanagement of partnerships in order to make it more relevant in today's rapidly globalizing world of business and now a new extension called Six Sigma has just been added to the TQM vocabulary.

- ***Reengineering***

Reengineering was the hottest trend in management in the mid-1990s. Reengineering seeks to completely reorganize firms. It asks, "If this were an entirely new firm, how would you organize it?" It requires restructuring the firm to conform

to that vision. It involves the radical redesign of all of the firm's processes to achieve major gains in speed, quality, service and profitability.

While TQM seeks how to do something faster, cheaper or better reengineering asks first whether something should be done at all, and so it is more likely than TQM to come up with novel solutions. There are two reasons to reengineer:

- Fear that competitors may come up with new products, services or ways of doing business that might destroy your firm.
- Greed, if you believe that by reengineering, your company can obliterate the competition.

Reengineering involves reorganizing the firm horizontally around cross-functional core processes managed by teams that seek to maximize customer 's satisfaction. Profits are likely to be maximized at dramatically higher levels in the long run if the reengineering is successful. Although reengineering makes a great deal of sense on paper and is easy to understand in principle, it is extremely difficult to carry out and not all firms are capable of reengineering or need to reengineer. Even companies that have been successful have not completely eliminated functional specializations. That is there will always be a need for experts in production, finance, marketing, HR development and so on.

- ***The learning organization***

The learning organization may be the hot management tool for the decade. A learning organization values continuing learning both individual and collective and believes that competitive advantage derives from and requires continuous leaning in our information age.

According to Peter Senge, its intellectual and spiritual champion, a learning organization is based on five basic ingredients.

- ✓ ***New mental model*** by putting aside old ways of thinking and being willing to change.
- ✓ ***Personal mastery*** by learning to be open with others and listen to them rather than telling them what to do.
- ✓ ***System thinking*** or an understanding of how the firm really works.
- ✓ ***Shared vision***or a strategy that the entire firm's employees share.

- ✓ ***Team learning***or seeing how all of the firm's employees can be made to work and learn together to realize the shared vision and carry out the strategy of the firm. For now, the learning organization is mostly a management vision of the future. It is possible, however that the content may storm corporate America in the next decade as TQM did in the 1980's reengineering in the 1990's.

Other management tools.

Other recent management tools or ideas are

- **Broad banding-**the elimination of multiple salary grades to foster movement among jobs within the firm, increasing labour flexibility and lowering costs.
- ***Director business model***- the situation in which a firm deal directly with the consumer, eliminating the cost of third party distribution.
- ***Networking***- the forming of temporary strategic alliances to allow each firm to contribute its best competency, as in the case of the virtual corporation.
- ***Pricing power***- the ability of a firm to raise prices faster than the rise in its costs or to lower its costs faster than the fall in the prices at which the firm sells, thus increasing its profits.
- ***Small world model***- the ideal or theory that a corporate giant can be made to operate like a small firm by linking well connected individuals from each level of the organization.
- ***Virtual integration***- the traditional boundaries and roles between the manufacturer and its suppliers on the one hand and the manufacturer and its customer on the other in the value chain by treating suppliers and customers as if they were part of the company.

DEMAND ANALYSIS & FORECASTING

Meaning of Demand

It is of vital importance for any firm to have an understanding of the demand for its products. Demand relationships determine revenues and indirectly affect output and costs; they thus have a fundamental impact on profits. An understanding of demand is also relevant for planning purposes, involving production, transportation, inventory, sales, marketing and finance functions. The identification of factors affecting demand and the precise effects that these have is therefore a core element in managerial economics.

Unfortunately, the word 'demand' can be used in a variety of senses, which often causes misunderstanding and errors of analysis. We can talk about demand curves, schedules, functions, equations, relationships or points. When economists use the single word 'demand' they are referring to the relationship that is frequently called the demand curve. In this sense, demand refers to the quantities that people are or would be willing to buy at different prices during a given time period, assuming that other factors affecting these
quantities remain the same.

It is worth noting that this definition incorporates three important concepts:

- It involves three parameters – price, quantity and time.

- It refers to quantities in the plural, therefore a whole relationship, not a single quantity.
- It involves the ceteris paribus (other things being equal) assumption, which is a very common one in making statements in economics.

The second of the above concepts, in particular, tends to cause misunderstandings, since it is common in both business and marketing to refer to demand as a single quantity. For example, consider the following statement: the demand for Coke is 80 cans per day at the price of 50 pence per can. First of all, there are issues of definition and measurement. Whose demand is being considered? Does 'Coke' include Diet Coke and different flavours? What is the size of the can? How do we include bottles? However, even if these issues are clarified, the statement is still technically incorrect from an economist's standpoint. The statement refers to a quantity demanded, not to demand/Itit is vital to distinguish between these two concepts, as otherwise errors in analysis will occur. It is now useful to consider the different ways of expressing the demand for a product since this is helpful in illustrating this distinction.

Types of Demand

Till now we may specify demand in the form of a function. Much of this specification and its form depend on the nature of demand itself; its type and determinants. From this standpoint, we can talk about a few other distinct concepts of demand:
Direct and Derived Demands: Direct demand refers to demand for goods meant for final consumption; it is the demand for consumers' goods like food items, readymade garments and houses. By contrast, derived demand refers to demand for goods which are needed for further production; it is the demand for producers' goods like industrial raw materials, machine tools and equipment. Thus the demand for an input or what is called a factor of production is a derived demand; its demand depends on the demand for output where the input enters. In fact, the quantity of demand for the final output as well as the degree of substitutability / complementary between inputs would determine the derived demand for a given input. For example, the demand for gas in a fertilizer plant depends on the amount of fertilizer to be produced and substitutability between gas and coal as the basis for fertilizer production. However, the direct demand for a product is not contingent upon the demand for other products.

Domestic and Industrial Demands: The example of the refrigerator can be restated to distinguish between the demand for domestic consumption and the demand for industrial use. In case of certain industrial raw materials which are also used for domestic purpose, this distinction is very meaningful. For example, coal has both

domestic and industrial demand, and the distinction is important from the standpoint of pricing and distribution of coal.

Autonomous and Induced Demand: When the demand for a product is tied to the purchase of some parent product, its demand is called induced or derived. For example, the demand for cement is induced by (derived from) the demand for housing. As stated above, the demand for all producers' goods is derived or induced. In addition, even in the realm of consumers' goods, we may think of induced demand. Consider the complementary items like tea and sugar, bread and butter etc. The demand for butter (sugar) may be induced by the purchase of bread (tea). Autonomous demand, on the other hand, is not derived or induced. Unless a product is totally independent of the use of other products, it is difficult to talk about autonomous demand. In the present world of dependence, there is hardly any autonomous demand. Nobody today consumes just a single commodity; everybody consumes a bundle of commodities. Even then, all direct demand may be loosely called autonomous.

Perishable and Durable Goods' Demands: Both consumers' goods and producers' goods are further classified into perishable/non-durable/single-use goods and durable/non-perishable/repeated-use goods. The former refers to final output like bread orraw material like cement which can be used only once. The latter refers to items likeshirt, car or a machine which can be used repeatedly. In other words, we can classifygoods into several categories: single-use consumer goods, single-use producer goods,durable-use consumer goods and durable-use producer's goods. This distinction is useful because durable products present more complicated problems ofdemand analysis than perishable products. Non-durable items are meant for meetingimmediate (current) demand, but durable items are designed to meet current as well asfuture demand as they are used over a period of time. So, when durable items arepurchased, they are considered to be an addition to stock of assets or wealth. Because ofcontinuous use, such assets like furniture or washing machine, suffer depreciation andthus call for replacement. Thus durable goods demand has two varieties: replacement ofold products and expansion of total stock. Such demands fluctuate with businessconditions, speculation and price expectations. Real wealth effect influences demand forconsumer durables.
New and Replacement Demands: This distinction follows readily from the previous one. If the purchase or acquisition of an item is meant as an addition to stock, it is a newdemand. If the purchase of an item is meant for maintaining the old stock of capital/asset,it is replacement demand. Such replacement expenditure is to overcome depreciation inthe existing stock. Producers' goods like machines. The demand for spare parts of amachine is replacement demand, but the demand for the latest model of a particularmachine (say, the latest generation computer) is a

new demand. In course of preventivemaintenance and breakdown maintenance, the engineer and his crew often express theirreplacement demand, but when a new process or a new technique or anew product is tobe introduced, there is always a new demand. You may now argue that replacementdemand is induced by the quantity and quality of the existing stock, whereas the newdemand is of an autonomous type. However, such a distinction is more of degree than of kind. For example, when demonstration effect operates, a new demand may also be aninduced demand. You may buy a new VCR, because your neighbour has recently boughtone. Yours is a new purchase, yet it is induced by your neighbour's demonstration.

Final and Intermediate Demands: This distinction is again based on the type of goods:final or intermediate. The demand for semi-finished products, industrial raw materialsand similar intermediate goods are all derived demands, i.e., induced by the demand forfinal goods. In the context of input-output models, such distinction is often employed.

Individual and Market Demands: This distinction is often employed by the economistto study the size of the buyers' demand, individual as well as collective. A market isvisited by different consumers, consumer differences depending on factors like income,age, sex etc. They all react differently to the prevailing market price of a commodity. Forexample, when the price is very high, a low-income buyer may not buy anything, thougha high income buyer may buy something. In such a case, we may distinguish between thedemand of an individual buyer and that of the market which is the market which is theaggregate of individuals. You may note that both individual and market demandschedules (and hence curves, when plotted) obey the law of demand. But the purchasingcapacity varies between individuals. For example, A is a high income consumer, B is amiddle-income consumer and C is in the low-income group. This information is usefulfor personalized service or target-group-planning as a part of sales strategy formulation.

Total Market and Segmented Market Demands: This distinction is made mostly on the same lines as above. Different individual buyers together may represent a given market segment; and several market segments together may represent the total market.For example, the Hindustan Machine Tools may compute the demand for its watches inthe home and foreign markets separately; and then aggregate them together to estimatethe total market demand for its HMT watches. This distinction takes care of differentpatterns of buying behaviour and consumers' preferences in

different segments of themarket. Such market segments may be defined in terms of criteria like location, age, sex,income, nationality, and so on.

Company and Industry Demands: An industry is the aggregate of firms (companies). Thus the Company's demand is similar to an individual demand, whereas the industry'sdemand is similar to aggregated total demand. You may examine this distinction from thestandpoint of both output and input. For example, you may think of the demand forcement produced by the Cement Corporation of India (i.e., a company's demand), or thedemand for cement produced by all cement manufacturing units including the CCI (i.e.,an industry's demand). Similarly, there may be demand for engineers by a single firm ordemand for engineers by the industry as a whole, which is an example of demand for aninput. You can appreciate that the determinants of a company's demand may not alwaysbe the same as those of an industry's. The inter-firm differences with regard totechnology, product quality, financial position, market (demand) share, market leadership and competitiveness---- all these are possible explanatory factors. In fact, a clear understanding of the relation between company and industry demands necessitates anunderstanding of different market structures.

Law of Demand

Amongst the entire factorsthat determine the demand, price is the most important one; because of a commodity is apoint at which the demand and supply forces equate each other at a particular level ofquantity. For e.g. You have to buy a two wheeler, then a part from other factors like taste, habits, availability of substitutes; ultimately the price of a particular bike will determinethe demand.

Assume that you wanted to buy 6 dozens of mangoes at Rs.100 per dozen. If the price of themangoes increases to Rs200/, how much would you then buy? It would definitely be lesser than the 6 dozen you originally intended. Sothere is an inverse relation that exists between the demand and the price.

The law of demand states that "Ceteris paribus (other thingsremaining the same), higher the price, lower the demand and vice versa. "The law isstated primarily in terms of the price and quantity relationship. The quantity demanded isinversely related to its price. Here we consider only two factors i.e. price and quantity demanded. All the other factors which determine are assumed to be constant. Let's discuss those factors.

Assumptions

- Income of the consumer is constant.

• There is no change in the availability and the price of the related commodities (i.e. Complimentary and substitutes)
• There are no expectations of the consumers about changes in the future price and Income.
• Consumers' taste and preferences remain the same.
• There is no change in the population and its structure.

Characteristics of Law of Demand

So by observing a demand curve the chief characteristics are
• Inverse relationship between the price and the quantity demanded. This is shown by the downward sloping demand curve.
• Price is an independent variable and the demand is dependent. It is the effect of price on demand and not vice versa.
• Reasons underling the law of demand- this inverse relationship can be explained in terms of two reasons, viz.
1) Income effect: The decline in the price of a commodity leads to an equivalent increase in the income of a consumer because he has to spend less to buy the same quantity of goods. The part of the money left can be used for buying some more units of commodity. For e.g. - suppose the price of mangoes falls from Rs.100/- per dozen to 50/- per dozen. Then with the same amount of 100/- you can buy one more dozen, i.e., 2 dozen at Rs. 50/-
2) Substitution effect: When the price of a commodity falls, the consumer tends to substitute that commodity for other commodity which is relatively dearer. For e.g. suppose the price of the Urad Dal falls, it will be used by some people in place of other pulses. Thus the demand will increase.

Elasticity of Demand

This concept and measure of demand elasticity has a lot of practical use for business manager. Statistically estimated, empirical demand functions give us information on Elasticities. Such management information lies at the root of corporate planning and business policy decisions.

Meaning of Elasticity:A demand function explains the nature of relationship between
demand for a commodity and its determinants. The concept of elasticity in economics is actually borrowed from physics. In physics, it is supposed to show the reaction of one variable with respect to a change in the other variable on which it is dependent. Elasticity is an index of reaction. In economics, we define the demand elasticity of a commodity with respect to its price because demand depends on

price. It indicates the extent to which demand changes when price of the commodity changes.

Formally, it is defined as the ratio of the relative variations in the price. In other words, price elasticity of demand is a ratio of two pure numbers; the numerator is the percentage change in quantity demanded and the denominator is the percentage change in the price of the commodity.
In fact, instead of percentage change, one can also take proportionate change. Denoting elasticity by, we have

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

Where Δ represents any incremental change in Q and P.
Here P = price and Q = quantity demanded.

There are three points which must be noted at this stage:
1. You may observe that price elasticity e thus becomes a ratio of marginal demand dQ/dP to average demand Q/P should we say that elasticity is an extension of our concepts of incremental and marginal .

2. Elasticity is a unit-less or dimensionless concept. It is just a pure number. Here it can be pointed out that one can use the slope of the demand curve to express how quantity changes when price changes, since the slope measures the rate of change of one variable in relation to another variable. But slope is not a pure number. It is dependent on the units in which the variables are measured. If we change the unit of measurement of the variable, the slope will change (for instance kg. changed into gms.). Hence one cannot use the slope of demand curves to compare across commodities, when they are measured in different units. We need a measure which is free from the units of measurements; elasticity is such a measure.

3. The coefficient of elasticity is ordered according to absolute value as opposed to algebraic value. Hence an elasticity of –2 is greater than an elasticity of –1 even though algebraically the opposite would be true.
Why does Elasticity have a Negative Sign?

If the demand curve slopes downwards from left to right, it follows that if P is greater

than zero (i.e. price increases), demand, e will always have a negative value. If you keep this in your mind, you can ignore the negative sign.

Calculation Elasticity Coefficients

There are two measures of elasticity:
- Arc Elasticity
- Point Elasticity

Arc Elasticity: If the data is discrete and therefore incremental changes are measurable.
Point Elasticity: If the demand function is continuous and therefore only marginal changes are calculable.

For Example: Let's see how one can calculate elasticity when the price change is finite (i.e. elasticity measured over a finite stretch of demand curve). The price and quantity situation are given in the following table. We want to calculate elasticity when price changes from Rs.4 to Rs.3 per unit.

Price of Commodity X (in Rs.)	Quantity demanded of Commodity X (in Kg.)
5	10
4	16
3	25
2	30
1	34

When price changes from Rs. 4 to 3, Δ P= Rs. 3 – Rs. 4 = - Re. 1.00 (i.e. the price change is negative since it is a price fall). The change in quantity demanded is Δ Q = 25-16=9 (Quantity change is positive).

$$e = \frac{\Delta Q/Q}{\Delta P/P} = \frac{9/16}{-1/4} = -9/4 = -2.25$$

Now if we calculate the elasticity when price increases from Rs. 3 to Rs. 4 we find that for the same stretch of the demand curve, elasticity would be different.

$$e = \frac{\Delta Q/Q}{\Delta P/P} = \frac{9/25}{-1/3} = -9/25 \times 3 = -27/25 = -1.08$$

ΔP/P +1/3 25

Here the question arises, how different demand responses for the same range of price change? The answer is that our initial quantity demanded and price has been different. When we calculate for price fall, they are 16 for initial quantity demanded and Rs. 4 for initial price. When we calculate it for price rise they are 25 for initial quantity demanded and Rs. 3 for initial choice. Hence elasticity tends to depend on our choice of the initial situation. However, demand response should be the same for the same finite stretch of the demand curve. To get rid of this dilemma created by the choice of the initial situations, we take the arithmetic mean of the two quantities Q and the mean of the two prices P.

This gives us a concept of ARC elasticity of demand.

$$\text{ARC elasticity} = \frac{\Delta O}{Q0 + Q1} \cdot \frac{P0 + P1}{\Delta P}$$

$$\text{Or, } e = \frac{\Delta Q}{\Delta P} \cdot \frac{P0 + P1}{Q0 + Q1}$$

Where Q0 and Q1 are the two quantities corresponding to the points on the demand curve. Similarly, P0 and P1 are the two prices.

ARC elasticity is based on the notion of average. When we make the ARC small (for non linear demand curves). The arc elasticity tends to point towards elasticity (the elasticity which we considered to start with).

In other words, the limit of are elasticity as ΔP tends to zero IS point elasticity.

$$\text{i.e. Limit}_{\Delta P \to O} \frac{\Delta Q}{\Delta P} \cdot \frac{Q0 + Q1}{P0 + P1} = \frac{dQ}{dP} \cdot \frac{P}{Q}$$

For an infinitesimal (very very small) change in price we use point elasticity. However

for a finite change in price (however small that change may be). One must always use are elasticity formula.

Types of Elasticities

Price Elasticity of Demand:It is the degree of responsiveness of the demand for a commodity to a change in price. This concept was introduced by Alfred Marshall. It is defined as the ratio of the percentage of change in the quantity demanded to a change in
price. Symbolically it is expressed as follows: Ed = percentage change in quantity demanded / percentage change in price.

Income Elasticity of Demand:This measures the degree of responsiveness of quantity
demanded of commodity or goods with respect to a change in the level of income of a
consumer, other things remaining constant (like prices etc.) It is given by the ratio ΔQ /
ΔR. Where R stands for total income (expenditure). It is the ratio of percentage (or proportionate) change in quantity demanded to a percentage (proportionate) change in
consumer's income. For a finite change in income we use are elasticity formula, and for
an infinitesimal change in income point elasticity is used.

$$\text{Income elasticity } er = \frac{\Delta Q}{Qo + Q1} \quad \frac{Ro + R1}{\Delta R}$$

Few points about income elasticity must be noted:
Unlike the price elasticity of demand which is always negative, income elasticity is always positive except for inferior goods.

Income Elasticity:

• Income elasticity shows the responsiveness of change in demand to change in income. It is denoted by EIThe co-efficient of EI tells us about the nature of commodity
• If $0<EI \leq 1$ the commodity is a Normal /necessary one EI <0, the commodity is an Inferior good EI >1, the commodity is a superior or Luxury good.
40

Income elasticity and decision making

• During periods of expansion firms selling luxury items find their demand increase at a rate that is faster then the rate of income growth. At the time of recession demand for these goods decrease rapidly
• Basic necessities –food/fuel – sellers of it not benefited as much during periods of economic prosperity, but will also find their markets somewhat recession proof. That is, the change in demand will be less than that in the economy in general.
• Knowledge of income Elasticities can be useful in targeting marketing marketing efforts.
• Consider a firm specializing in expensive men's colognes. Because such goods are luxuries, those in high-income groups would be expected to be the prime customers. Thus the firms should concentrate its marketing efforts on media that reach the wealthier segments of the population. E.g., advertising dollars should be spent on space in Esquire and the New Yorker rather than the National Enquirer and Wrestling Today.

Cross Elasticity

• Demand is also influenced by prices of other goods and services.
• The responsiveness of quantity demanded to changes in price of other goods is measured by cross elasticity, which is defined as the % change in the quantity demanded of one good caused by a 1% change in the price of some other good.
• For large changes in the price of Y, Arc cross elasticity is used.
• Point cross elasticity are analogous to the point elasticity
• Cross price elasticity for Substitutes: Negative
• Cross price elasticity for complementary goods is: Positive

Cross Elasticity and Decision Making

• Many large corporations produce several related products. Gillette makes both razors and razor blades. Kinetic sells several competing makes of automobiles. Where a company's products are related, the pricing of one good can influence the demand for another
• Information regarding cross Elasticities can aid decision-makers in assessing such impacts.
• Cross elasticity are also useful in establishing boundaries between the industries.

Promotional (Advertising) Elasticity of Demand

Salient features of relationship between advertising and sales are the following:

• Some sales are possible even if there are no advertising
• Beyond the minimum level of sales, there is a direct relationship between advertising expenditure and sales (sales increase with increase in advertisement expenditure and decrease with decrease in advertisement sales)
• Consumers generally need a minimum level of advertisement before they take notice of the presence of the product. So sales do not respond to the same extent as advertisement expenditure. Beyond this initial stage of advertising expenditure, the resulting increase in the sales will be more than proportionate to the increase in advertisement expenditure. As advertisement expenditure is continued to increase, it will eventually result in less than proportionate increase in sales, and later a stage comes when no further increase in sales is possible with the help of advertisement. If we plot the amount of advertisement expenditure and corresponding sales level, we get an S- shaped curve. How far the demand for a product will be influenced by advertisement and other promotional activities may be measured by advertising elasticity of demand. Some goods are more responsive to advertising, e.g., cosmetics. Advertising elasticity of demand measures the response of quantity demand to change in expenditure on advertising and other sales promotional activities.

The point formula for calculating advertising elasticity of demand is: Ea= dq/q da/a

Arc Formula

$$Ea = \frac{(q2-qi)\,(a2+a1)}{(q2+q1)\,(a1-a2)}$$

Factors Influencing Advertising Elasticity of Demand

1. Stage of product Market:
    - It is different for new and old products
    - Also different for established Market and growing Markets
2. Effect of advertising in terms of time:
    - Time lag in response to advertisement varies
    - It may be delayed in some cases, depending upon the general economic environment and the media chosen.
    - It may also depend upon type of product; It takes long for the durable articles;

    Advertisement by various media and by various firms may have a cumulative effect after some time
3. Influence of advertising by rivals:
    - Ea Depends upon effectiveness of advertisement

• How much additional output this firm can sell by resorting to advertisement depends upon its own media and the level of advertisement vis-à-vis those of its rival

Determinants of Elasticity

So far we have been mainly concerned with the definition and properties of various concepts of elasticity and their measurement. We now discuss the factors which determine the value of a given elasticity. About the determinants of this elasticity, the following factors are relevant.

The Extent of Substitutability between Goods: Larger the number of substitutes available to a product, the more will be the elasticity of demand; the smaller the number, the less elastic the demand. For example, consider T.V. set for the first type and salt for the second type.

The Nature of the Goods: The demand for luxury goods in general is more elastic than the demand for necessary goods. For example, consider car in the first category and sugar in the second category.

The Importance of the Goods:A product which accounts for a high percentage of consumer's total expenditure is characterized by high elasticity. You may now examine why salt is inelastic.

The Price of the Product itself: Highly priced goods tend to have elastic demand, while lower-priced goods have less elastic demand. The expression 'highly priced' is normally taken to mean a price at which the quantity that the consumer plans to buy is close to zero. For example, consider a product like refrigerator.

Price Expectation of Buyers: When the price of the goods has fallen and the buyers expect it to fall further, then they will postpone buying the goods and this will make demand less responsive. On the other hand, if they expect price to go up then they will speed up purchase, which will increase elasticity.

Time Allowed for Making Adjustment in Consumption Pattern: In the short-run, it is very difficult to change habits. Hence the short-term demand is less responsive to price change. The longer the time allowed for making adjustment in consumption pattern, the greater will be the elasticity. The consumers in the long-run would look for better substitutes. Hence the elasticity increases in the long-run.

Managerial Uses of Elasticity Concepts

Regarding the importance of the concept of elasticity of demand, it must be pointed out that the concept is useful to the business managers as well as government managers. Elasticity measures help the sales manager in fixing the price of his product. The concept is also important to the economic planners of the country. In trying to fix the production target for various goods in a plan, a planner must estimate the likely demand for goods at the end of the plan. This requires the use of

income elasticity concepts. The price elasticity of demand as well as cross elasticity would determine the substitution between goods and hence useful in fixing the output mix in a production period. The concept is also useful to the policy makers of the government, in particular in determining taxation policy, minimum wages policy, stabilization program for agriculture, and price policies for various other goods (where administered prices are used). The managers are concerned with empirical demand estimates because they provide summary information about the direction and proportion of change in demand, as a result of a given change in its explanatory variables. From the standpoint of control and management of external factors, such empirical estimates and their interpretations are therefore, very relevant.

Demand Forecasting

Meaning:

Forecast is becoming the sign of survival and the language of business. All requirements of the business sector need the technique of accurate and practical reading into the future. Forecasts are, therefore, a very essential requirement for the survival of business. Management requires forecasting information when making a wide range of decisions.

The sales forecast is particularly important as it is the foundation upon which all company plans are built in terms of markets and revenue. Management would be a simple matter if business was not in a continual state of change, the pace of which has quickened in recent years.

It is becoming increasingly important and necessary for business to predict their future prospects in terms of sales, cost and profits. The value of future sales is crucial as it affects costs profits, so the prediction of future sales is the logical starting point of all business planning.

A forecast is a prediction or estimation of future situation. It is an objective assessment of future course of action. Since future is uncertain, no forecast can be percent correct. Forecasts can be both physical as well as financial in nature. The more realistic the forecasts, the more effective decisions can be taken for tomorrow.

In the words of Cundiff and Still, “Demand forecasting is an estimate of sales during a specified future period which is tied to a proposed marketing plan and which assumes a particular set of uncontrollable and competitive forces”. Therefore,

demand forecasting is a projection of firm's expected level of sales based on a chosen marketing plan and environment.

All forecasts are built on one of the three information bases:
What people say?
What people do?
What people have done?

Types of Forecasting:

Forecasts can be broadly classified into: (i) Passive Forecast and (ii) Active Forecast.

Under passive forecast prediction about future is based on the assumption that the firm does not change the course of its action. Under active forecast, prediction is done under the condition of likely future changes in the actions by the firms.

From the view point of 'time span', forecasting may be classified into two, viz.,:(i) Short term demand forecasting and (ii) long term demand forecasting.

In a short run forecast, seasonal patterns are of importance. It may cover a period of three months, six months or one year. It is one which provides information for tactical decisions. The period is chosen depends upon the nature of business. Such a forecast helps in preparing suitable sales policy. Long term forecasts are helpful in suitable capital planning. It is one which provides information for major strategic decisions. It helps in saving the wastages in material, man hours, machine time and capacity. Planning of a new unit must start with an analysis of the long term demand potential of the products of the firm.

They can also be classified as:(i) External or national group of forecast, and (ii) Internal or company group forecast.

External forecast deals with trends in general business. It is usually prepared by a company's research wing or by outside consultants. Internal forecast includes all those that are related to the operation of a particular enterprise such as sales group, production group, and financial group. The structure of internal forecast includes forecast of annual sales, forecast of products cost, forecast of operating profit, forecast of taxable income, forecast of cash resources, forecast of the number of employees, etc.

At different levels forecasting may be classified into:

(i) Macro-level forecasting,
(ii) Industry- level forecasting,
(iii) Firm- level forecasting and
(iv) Product-line forecasting.

Macro-level forecasting is concerned with business conditions over the whole economy. It is measured by an appropriate index of industrial production, national income or expenditure. Industry-level forecasting is prepared by different trade associations.

This is based on survey of consumers' intention and analysis of statistical trends. Firm-level forecasting is related to an individual firm. It is most important from managerial view point. Product-line forecasting helps the firm to decide which of the product or products should have priority in the allocation of firm's limited resources.

Forecast may be classified into (i) general and (ii) specific. The general forecast may generally be useful to the firm. Many firms require separate forecasts for specific products and specific areas, for this general forecast is broken down into specific forecasts.

There are different forecasts for different types of products like:
(i) Forecasting demand for nondurable consumer goods,
(ii) Forecasting demand for durable consumer goods,
(iii) Forecasting demand for capital goods, and
(iv) Forecasting demand for new-products.

Non-Durable Consumer Goods:

These are also known as 'single-use consumer goods' or perishable consumer goods. These vanish after a single act of consumption. These include goods like food, milk, medicine, fruits, etc. Demand for these goods depends upon household disposable income, price of the commodity and the related goods and population and characteristics. Symbolically,

$Dc = f(y, s, p, p_r)$ where

Dc = the demand for commodity c

y = the household disposable income

s = population

p = price of the commodity c

p_r = price of its related goods

(i) Disposable income expressed as Dc = f (y) i.e. other things being equal, the demand for commodity c depends upon the disposable income of the household. Disposable income of the household is estimated after the deduction of personal taxes from the personal income. Disposable income gives an idea about the purchasing power of the household.

(ii) Price, expressed as Dc = f (p, p_r) i.e. other things being equal, demand for commodity c depends upon its own price and the price of related goods. While the demand for a commodity is inversely related to its own price of its complements. It is positively related to its substitutes.' Price Elasticities and cross Elasticities of non-durable consumer goods help in their demand forecasting.

(iii) Population, expressed as Dc= f (5) i.e. other things being equal, demand for commodity c depends upon the size of population and its composition. Besides, population can also be classified on the basis of sex, income, literacy and social status. Demand for non-durable consumer goods is influenced by all these factors. For the general demand forecasting population as a whole is considered, but for specific demand forecasting division of population according to different characteristics proves to be more useful.

Durable Consumer Goods:

These goods can be consumed a number of times or repeatedly used without much loss to their utility. These include goods like car, T.V., air-conditioners, furniture etc. After their long use, consumers have a choice either these could be consumed in future or could be disposed of.

The choice depends upon the following factors:

(i) Whether a consumer will go for the replacement of a durable good or keep on using it after necessary repairs depends upon his social status, level of money income, taste and fashion, etc. Replacement demand tends to grow with increase in the stock of the commodity with the consumers. The firm can estimate the average replacement cost with the help of life expectancy table.

(ii)Most consumer durables are consumed in common by the members of a family. For instance, T.V., refrigerator, etc. are used in common by households. Demand forecasts for goods commonly used should take into account the number of

households rather than the total size of population. While estimating the number of households, the income of the household, the number of children and sex-composition, etc. should be taken into account.

(iii)Demand for consumer durables depends upon the availability of allied facilities. For example, the use of T.V., refrigerator needs regular supply of power, the use of car needs availability of fuel, etc. While forecasting demand for consumer durables, the provision of allied services and their cost should also be taken into account.

(iv) Demand for consumer durables is very much influenced by their prices and their credit facilities. Consumer durables are very much sensitive to price changes. A small fall in their price may bring large increase in demand.

Forecasting Demand for Capital Goods:

Capital goods are used for further production. The demand for capital good is a derived one. It will depend upon the profitability of industries. The demand for capital goods is a case of derived demand. In the case of particular capital goods, demand will depend on the specific markets they serve and the end uses for which they are bought.

The demand for textile machinery will, for instance, be determined by the expansion of textile industry in terms of new units and replacement of existing machinery. Estimation of new demand as well as replacement demand is thus necessary.

Three types of data are required in estimating the demand for capital goods:

(a) The growth prospects of the user industries must be known,

(b) the norm of consumption of the capital goods per unit of each end-use product must be known, and

(c) the velocity of their use.

Forecasting Demand for New Products:

The methods of forecasting demand for new products are in many ways different from those for established products. Since the product is new to the consumers, an intensive study of the product and its likely impact upon other products of the same group provides a key to an intelligent projection of demand.

Joel Dean has classified a number of possible approaches as follows:

(a) Evolutionary Approach:

It consists of projecting the demand for a new product as an outgrowth and evolution of an existing old product.

(b) Substitute Approach:

According to this approach the new product is treated as a substitute for the existing product or service.

(c) Growth Curve Approach:

It estimates the rate of growth and potential demand for the new product as the basis of some growth pattern of an established product.

(d) Opinion-Poll Approach:

Under this approach the demand is estimated by direct enquiries from the ultimate consumers.

(e) Sales Experience Approach:

According to this method the demand for the new product is estimated by offering the new product for sale in a sample market.

(f) Vicarious Approach:

By this method, the consumers' reactions for a new product are found out indirectly through the specialized dealers who are able to judge the consumers' needs, tastes and preferences.

The various steps involved in forecasting the demand for non-durable consumer goods are the following:

(a) First identify the variables affecting the demand for the product and express them in appropriate forms, (b) gather relevant data or approximation to relevant data to represent the variables, and (c) use methods of statistical analysis to determine the most probable relationship between the dependent and independent variables.

Forecasting Techniques:

Demand forecasting is a difficult exercise. Making estimates for future under the changing conditions is a Herculean task. Consumers' behavior is the most unpredictable one because it is motivated and influenced by a multiplicity of forces. There is no easy method or a simple formula which enables the manager to predict the future.

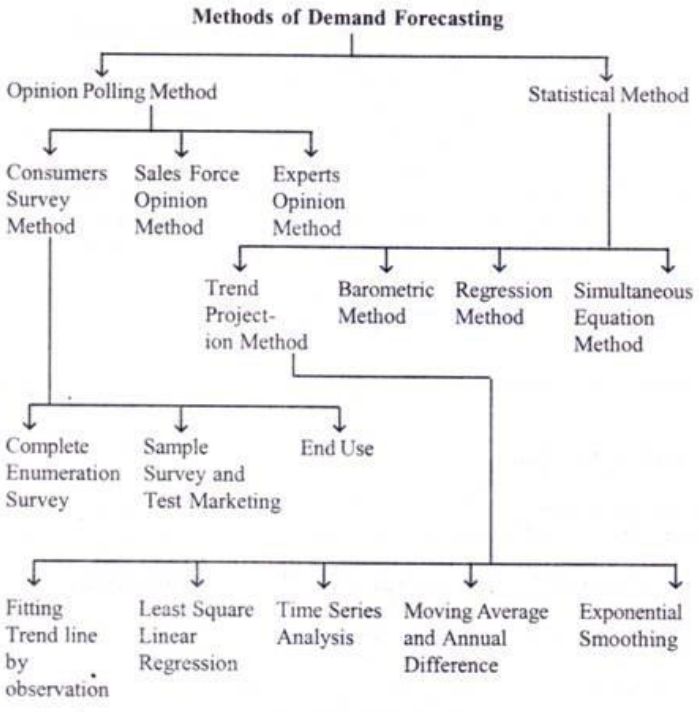
Economists and statisticians have developed several methods of demand forecasting. Each of these methods has its relative advantages and disadvantages. Selection of the right method is essential to make demand forecasting accurate. In demand forecasting, a judicious combination of statistical skill and rational judgment is needed.

Mathematical and statistical techniques are essential in classifying relationships and providing techniques of analysis, but they are in no way an alternative for sound judgment. Sound judgment is a prime requisite for good forecast.

The judgment should be based upon facts and the personal bias of the forecaster should not prevail upon the facts. Therefore, a mid way should be followed between mathematical techniques and sound judgment or pure guess work.

The various methods of demand forecasting can be summarized in the form of a chart as shown in Table 1.

Table 1.



1. Opinion Polling Method:

In this method, the opinion of the buyers, sales force and experts could be gathered to determine the emerging trend in the market.

The opinion polling methods of demand forecasting are of three kinds:

(a) Consumer's Survey Method or Survey of Buyer's Intentions:

In this method, the consumers are directly approached to disclose their future purchase plans. I his is done by interviewing all consumers or a selected group of consumers out of the relevant population. This is the direct method of estimating demand in the short run. Here the burden of forecasting is shifted to the buyer. The firm may go in for complete enumeration or for sample surveys. If the commodity under consideration is an intermediate product, then the industries using it as an end product are surveyed.

(i) Complete Enumeration Survey:

Under the Complete Enumeration Survey, the firm has to go for a door to door survey for the forecast period by contacting all the households in the area. This method has an advantage of first hand, unbiased information, yet it has its share of disadvantages also. The major limitation of this method is that it requires lot of resources, manpower and time.

In this method, consumers may be reluctant to reveal their purchase plans due to personal privacy or commercial secrecy. Moreover, at times the consumers may not express their opinion properly or may deliberately misguide the investigators.

(ii) Sample Survey and Test Marketing:

Under this method some representative households are selected on random basis as samples and their opinion is taken as the generalized opinion. This method is based on the basic assumption that the sample truly represents the population. If the sample is the true representative, there is likely to be no significant difference in the results obtained by the survey. Apart from that, this method is less tedious and less costly.

A variant of sample survey technique is test marketing. Product testing essentially involves placing the product with a number of users for a set period. Their reactions to the product are noted after a period of time and an estimate of likely demand is made from the result. These are suitable for new products or for radically modified old products for which no prior data exists. It is a more scientific method of estimating likely demand because it stimulates a national launch in a closely defined geographical area.

(iii) End Use Method or Input-Output Method:

This method is quite useful for industries which are mainly producer's goods. In this method, the sale of the product under consideration is projected as the basis of demand survey of the industries using this product as an intermediate product, that is, the demand for the final product is the end user demand of the intermediate product used in the production of this final product.

The end user demand estimation of an intermediate product may involve many final good industries using this product at home and abroad. It helps us to understand inter-industry' relations. In input-output accounting two matrices used are the transaction matrix and the input co-efficient matrix. The major efforts required by this type are not in its operation but in the collection and presentation of data.

(b) Sales Force Opinion Method:

This is also known as collective opinion method. In this method, instead of consumers, the opinion of the salesmen is sought. It is sometimes referred as the "grass roots approach" as it is a bottom-up method that requires each sales person in the company to make an individual forecast for his or her particular sales territory.

These individual forecasts are discussed and agreed with the sales manager. The composite of all forecasts then constitutes the sales forecast for the organization. The advantages of this method are that it is easy and cheap. It does not involve any elaborate statistical treatment. The main merit of this method lies in the collective wisdom of salesmen. This method is more useful in forecasting sales of new products.

(c) Experts Opinion Method:

This method is also known as "Delphi Technique" of investigation. The Delphi method requires a panel of experts, who are interrogated through a sequence of questionnaires in which the responses to one questionnaire are used to produce the next questionnaire. Thus any information available to some experts and not to others is passed on, enabling all the experts to have access to all the information for forecasting.

The method is used for long term forecasting to estimate potential sales for new products. This method presumes two conditions: Firstly, the panelists must be rich in their expertise, possess wide range of knowledge and experience. Secondly, its conductors are objective in their job. This method has some exclusive advantages of saving time and other resources.

2. Statistical Method:

Statistical methods have proved to be immensely useful in demand forecasting. In order to maintain objectivity, that is, by consideration of all implications and viewing the problem from an external point of view, the statistical methods are used.

The important statistical methods are:

(i) Trend Projection Method:

A firm existing for a long time will have its own data regarding sales for past years. Such data when arranged chronologically yield what is referred to as 'time series'.

Time series shows the past sales with effective demand for a particular product under normal conditions. Such data can be given in a tabular or graphic form for further analysis. This is the most popular method among business firms, partly because it is simple and inexpensive and partly because time series data often exhibit a persistent growth trend.

Time series has got four types of components namely, Secular Trend (T), Secular Variation (S), Cyclical Element (C), and an Irregular or Random Variation (I). These elements are expressed by the equation O = TSCI. Secular trend refers to the long run changes that occur as a result of general tendency.

Seasonal variations refer to changes in the short run weather pattern or social habits. Cyclical variations refer to the changes that occur in industry during depression and boom. Random variation refers to the factors which are generally able such as wars, strikes, flood, famine and so on.

When a forecast is made the seasonal, cyclical and random variations are removed from the observed data. Thus only the secular trend is left. This trend is then projected. Trend projection fits a trend line to a mathematical equation.

The trend can be estimated by using any one of the following methods:

(a) The Graphical Method,

(b) The Least Square Method.

a) Graphical Method:

This is the simplest technique to determine the trend. All values of output or sale for different years are plotted on a graph and a smooth free hand curve is drawn passing through as many points as possible. The direction of this free hand curve— upward or downward— shows the trend. A simple illustration of this method is given in Table 2.

Table 2: Sales of Firm

Year	Sales (Rs. Crore)
1995	40

1996	50
1997	44
1998	60
1999	54
2000	62

In Fig. 1, AB is the trend line which has been drawn as free hand curve passing through the various points representing actual sale values.

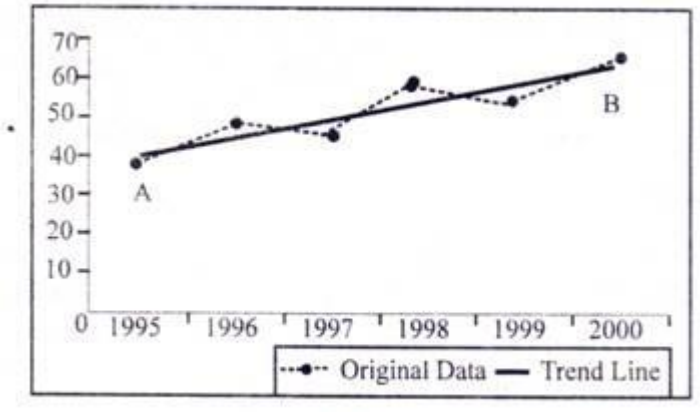


Fig. 1

(b) Least Square Method:

Under the least square method, a trend line can be fitted to the time series data with the help of statistical techniques such as least square regression. When the trend in sales over time is given by straight line, the equation of this line is of the form: y = a + bx. Where 'a' is the intercept and 'b' shows the impact of the independent variable. We have two variables—the independent variable x and the dependent variable y. The line of best fit establishes a kind of mathematical relationship between the two variables. v and y. This is expressed by the regression y on x.

In order to solve the equation v = a + bx, we have to make use of the following normal equations:

$\Sigma y = na + b \Sigma_X$

$\sum xy = a\sum x + b\sum x^2$

(ii) Barometric Technique:

A barometer is an instrument of measuring change. This method is based on the notion that “the future can be predicted from certain happenings in the present.” In other words, barometric techniques are based on the idea that certain events of the present can be used to predict the directions of change in the future. This is accomplished by the use of economic and statistical indicators which serve as barometers of economic change.

Generally, forecasters correlate a firm’s sales with three series: Leading Series, Coincident or Concurrent Series and Lagging Series:

(a) The Leading Series:

The leading series comprise those factors which move up or down before the recession or recovery starts. They tend to reflect future market changes. For example, baby powder sales can be forecasted by examining the birth rate pattern five years earlier, because there is a correlation between the baby powder sales and children of five years of age and since baby powder sales today are correlated with birth rate five years earlier, it is called lagged correlation. Thus we can say that births lead to baby soaps sales.

(b) Coincident or Concurrent Series:

The coincident or concurrent series are those which move up or down simultaneously with the level of the economy. They are used in confirming or refuting the validity of the leading indicator used a few months afterwards. Common examples of coinciding indicators are G.N.P itself, industrial production, trading and the retail sector.

(c) The Lagging Series:

The lagging series are those which take place after some time lag with respect to the business cycle. Examples of lagging series are, labour cost per unit of the manufacturing output, loans outstanding, leading rate of short term loans, etc.

(iii) Regression Analysis:

It attempts to assess the relationship between at least two variables (one or more independent and one dependent), the purpose being to predict the value of the dependent variable from the specific value of the independent variable. The basis of this prediction generally is historical data. This method starts from the assumption that a basic relationship exists between two variables. An interactive statistical analysis computer package is used to formulate the mathematical relationship which exists.

For example, one may build up the sales model as:

Quantum of Sales = a. price + b. advertising + c. price of the rival products + d. personal disposable income +u

Where a, b, c, d are the constants which show the effect of corresponding variables as sales. The constant u represents the effect of all the variables which have been left out in the equation but having effect on sales. In the above equation, quantum of sales is the dependent variable and the variables on the right hand side of the equation are independent variables. If the expected values of the independent variables are substituted in the equation, the quantum of sales will then be forecasted.

The regression equation can also be written in a multiplicative form as given below:

Quantum of Sales = $(\text{Price})^a$ + $(\text{Advertising})^b$+ (Price of the rival products) ^{c} + (Personal disposable income Y + u

In the above case, the exponent of each variable indicates the Elasticities of the corresponding variable. Stating the independent variables in terms of notation, the equation form is $QS = P^{\circ 8}. A^{o42} . R^{\circ .83}. Y_2^{\circ .68}. 40$

Then we can say that 1 per cent increase in price leads to 0.8 per cent change in quantum of sales and so on.

If we take logarithmic form of the multiple equation, we can write the equation in an additive form as follows:

$\log QS = a \log P + b \log A + c \log R + d \log Y_d + \log u$

In the above equation, the coefficients a, b, c, and d represent the Elasticities of variables P, A, R and Y_d respectively.

The co-efficient in the logarithmic regression equation are very useful in policy decision making by the management.

(iv) Econometric Models:

Econometric models are an extension of the regression technique whereby a system of independent regression equation is solved. The requirement for satisfactory use of the econometric model in forecasting is under three heads: variables, equations and data.

The appropriate procedure in forecasting by econometric methods is model building. Econometrics attempts to express economic theories in mathematical terms in such a way that they can be verified by statistical methods and to measure the impact of one economic variable upon another so as to be able to predict future events.

Purpose of Forecasting:

Forecasting reduces the risk associated with business fluctuations which generally produce harmful effects in business, create unemployment, induce speculation, discourage capital formation and reduce the profit margin. Forecasting is indispensable and it plays a very important part in the determination of various policies. In modem times forecasting has been put on scientific footing so that the risks associated with it have been considerably minimized and the chances of precision increased.

Criteria of a Good Forecasting Method:

There are thus, a good many ways to make a guess about future sales. They show contrast in cost, flexibility and the adequate skills and sophistication. Therefore, there is a problem of choosing the best method for a particular demand situation.

There are certain economic criteria of broader applicability. They are:

(i) Accuracy, (ii) Plausibility, (iii) Durability, (iv) Flexibility, (v) Availability, (vi) Economy, (vii) Simplicity and (viii) Consistency.

(i) Accuracy:

The forecast obtained must be accurate. How is an accurate forecast possible? To obtain an accurate forecast, it is essential to check the accuracy of past forecasts against present performance and of present forecasts against future performance. Accuracy cannot be tested by precise measurement but buy judgment.

(ii) Plausibility:

The executive should have good understanding of the technique chosen and they should have confidence in the techniques used. Understanding is also needed for a proper interpretation of results. Plausibility requirements can often improve the accuracy of results.

(iii) Durability:

Unfortunately, a demand function fitted to past experience may back cost very greatly and still fall apart in a short time as a forecaster. The durability of the forecasting power of a demand function depends partly on the reasonableness and simplicity of functions fitted, but primarily on the stability of the understanding relationships measured in the past. Of course, the importance of durability determines the allowable cost of the forecast.

(iv) Flexibility:

Flexibility can be viewed as an alternative to generality. A long lasting function could be set up in terms of basic natural forces and human motives. Even though fundamental, it would nevertheless be hard to measure and thus not very useful. A set of variables whose co-efficient could be adjusted from time to time to meet changing conditions in more practical way to maintain intact the routine procedure of forecasting.

(v) Availability:

Immediate availability of data is a vital requirement and the search for reasonable approximations to relevance in late data is a constant strain on the forecasters patience. The techniques employed should be able to produce meaningful results quickly. Delay in result will adversely affect the managerial decisions.

(vi) Economy:

Cost is a primary consideration which should be weighted against the importance of the forecasts to the business operations. A question may arise: How much money and managerial effort should be allocated to obtain a high level of forecasting accuracy? The criterion here is the economic consideration.

(vii) Simplicity:

Statistical and econometric models are certainly useful but they are intolerably complex. To those executives who have a fear of mathematics, these methods would appear to be Latin or Greek. The procedure should, therefore, be simple and easy so that the management may appreciate and understand why it has been adopted by the forecaster.

(viii) Consistency:

The forecaster has to deal with various components which are independent. If he does not make an adjustment in one component to bring it in line with a forecast of another, he would achieve a whole which would appear consistent.

To conclude, the ideal forecasting method is one that yields returns over cost with accuracy, seems reasonable, can be formalised for reasonably long periods, can meet new circumstances adeptly and can give up-to-date results. The method of forecasting is not the same for all products.

There is no unique method for forecasting the sale of any commodity. The forecaster may try one or the other method depending upon his objective, data availability, the urgency with which forecasts are needed, resources he intends to devote to this work and type of commodity whose demand he wants to forecast.

UNIT III: PRODUCTION & COST ANALYSIS:

Theory of Production:

Production is an activity that transforms inputs into output. The inputs could be land, labour, capitals, entrepreneurship etc. and the output could be goods or services. Production consists of producing, storing and distributing tangible goods and services. Therefore, production is any activity that increases consumer usability of goods and services. In a production process, manages take four types of decisions:

i) Whether to produce or not?

ii) How much output to produce?

iii) What input combination to use?

iv) What type of Technology to use?

Our study deals with the analysis of manager ‘s decision rules concerning (iii) and (iv) above. Three things are necessary in the production process.

a) Technology

b) Inputs - Fixed and variable

c) Time period of production – Short Run / Long run

The Production Function:

The production function is purely a technology relationship which expresses the relation between output of a good and the different combinations of inputs used in its production. It indicates the maximum amount of output that can be produced with the help of each possible combination of inputs.

The production function is written mathematically as

Q = F (L, K, N), where L, K, N are the amounts of land, capital and labour respectively, and Q is the amount of output. The production function rests on two main assumptions.

Technology invariant. If technology changes, it would result in alternation of the input – output relationship, resulting in another production function.

It is assumed that firms utilize their inputs at maximum levels of efficiency. In other words, the production function includes all the technically efficient methods of production. If a production function includes only a single technically efficient method, we call it a one-process production function; if it includes two efficient process, It 's a two process production function and son on.

Although a firm often uses several inputs, for simplicity we use a two-input case (Whose result can be generalized to the situation of more than two inputs). Thus we shall use a production function of the form

Q = F (L, K), where L, K are labour and capitals respectively and Q is quantity of output.

It must have noted that the form of production function is taken a given, by a managerial economist, because formulation of a production function falls, in fact, under the purview of production engineering. A managerial economist works only with the given production function.

We say that a firm is technically efficient when it obtained maximum level of output from only given combination of inputs. The production function incorporates the technically efficient method of production. A producer cannot decrease the amount of one input and at the same time maintain the output at the same level without increasing one or more inputs. When economists use production function, they assume that production is technically efficient.

On the other hand, we say a firm is economically efficient, when it produces a given amount of output at the lowest possible cost for a combination of inputs provided the prices of the inputs are given. Therefore, when only input combinations are given, we deal with the problem of technical efficiency, i.e. how to produce maximum output. On the other hand, when input prices are also given in addition to the combination of inputs, we deal with the problem of economic efficiency, i.e. how to produce a given amount of output at the lowest possible cost.

Short Run Production Function:

Before a more detailed analysis of short run production function is undertaken, certain key terms used in the analysis must be clarified. These are total product (TP), Marginal product (MP) and Average product (AP). Total Product (TP) i.e. Q is the total amount of output resulting from the use of different quantities of inputs. If we assume labour (L) to be the variable input (Capital (K), held constant), then Marginal product of labour (MPL) is defined as the change in the total product per unit charge in labour, i.e.

MP_L = dQ/ dL , where d – A change in.

It means MPL refers to the net addition to the total product as a result of use of an additional unit of labour. Marginal product can be found only when the factor input is a variable factor. Similarly, average product of labour (APL) may be defined as total product per unit of labour.

So AP_L = Q/L

Law of variable proportions (Reproduction function with one variable input):

Under this law, we study the effect on output of variation in factor proportions. The law refers to, —The diminishing amount of extra output that we get when we successively add equal extra units of a varying input to a fixed amount of some other input , Therefore, the law stated that, —If we increase the quantity of one input which is combined with a fixed quantity of another

input, the marginal physical productivity of the variable input must decline The law of variable proportion is otherwise known as —The law of diminishing Returns.

Assumption to the Law of variable proportion

1) The Techniques production or the state of technology is assumed be given and unchanged. If there is improvement in technology, then marginal and average product may rise instead of diminishing.

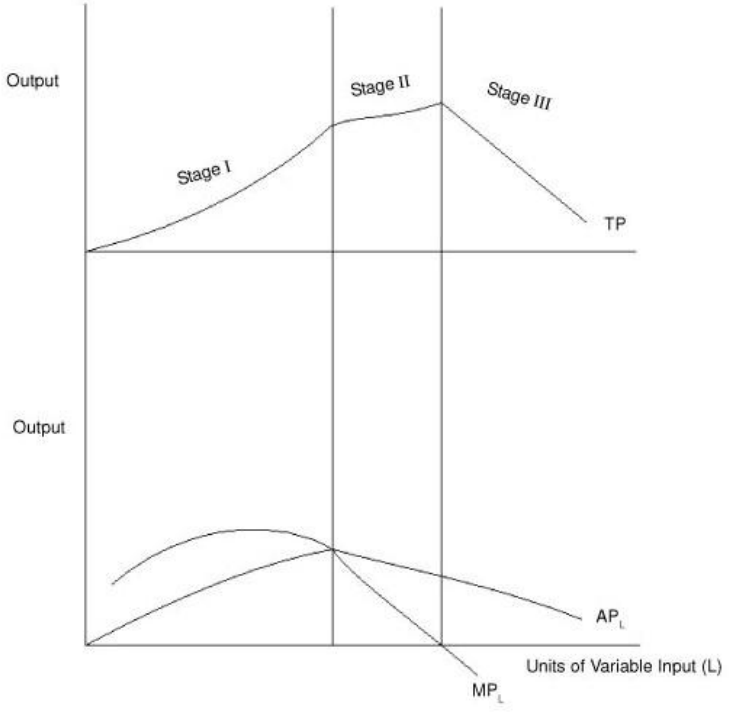
2) The process of production continues with one of the factors which varies while the quantity of other factor must be fixed.

3) The fixed factor can be adapted to the change in quantity of the variable factor.

4) The variable factor is homogenous or identical in all respects i.e. in size, quality, efficiency etc.

The three stages of production:

The Short Run production function can be divided into three distinct stages of production. We may use the following figure to explain these stages.



In the figure, Stage I runs from zero units of variable input to the level where APL is maximum, Stage II follows Stage 1 and then proceeds to the point where MPL is zero (i.e. TP is maximum) Stage III continue on from that point.

It ‘s obvious that no —Rational Firm will change to operate either in Stage I or in Stage III. In Stage I the firm is grossly underutilizing its fixed capacity, so in this case, marginal product of variable input rises (i.e. each additional unit of the variable vector contributes more to output than the earlier units)

It is therefore profitable for the firm to keep on employing addition as up its of the variable input. In Stage III, the firm grossly over utilizes its fixed capacity. In other words, it would have so little fixed capacity relative to the variable input it uses, that the marginal contribution of each additional unit of the variable input is negative. It ‘s therefore unadvisable to use any additional unit. Even if cost of variable input is zero, it ‘s still unprofitable to move into Stage III. It can, thus, be concluded that Stage II is the only relevant range for a —Rational Firm in a competitive situation. However, it must be noted that, the exact number of labour units hired by the form within stage II can be found out only when we have the corresponding data on wage pate.

Long Run Production Function: A case of returns to scale:

A situation where all inputs are subject to variations is a case of Long-Run production function. We know that in the short Run, fixed inputs set an upper limit to the output because additional units of a variable factor, say, labour are not accompanied by a corresponding change in the fixed factors of production. Consequently, the contribution of the variable input declines. By definition, in the long run, such limitations do not exist. In the long run all inputs can change, let ‘s considers two inputs, labour (L) and capital (K), these can change in two ways:

1) Both L and K can change in the same portion, implying that (K/L) ratio or technique of production remains the same.

2) Land K change in different proportion, implying that K/L ratio or technique of production varies with change in output.

The percentage increase in output when all inputs vary in the same proportion is known as —Returns to Scale . Obviously, returns to Scale relate to greater use of inputs maintaining the same technique of production. When Returns to Scale occurs, three alternatives situations are possible

1) Constant Returns to Scale – Out put increases in the same proportion as the

increase in inputs.

2) Increasing Returns to Scale – Output increases by a greater proportion than the increase in inputs.

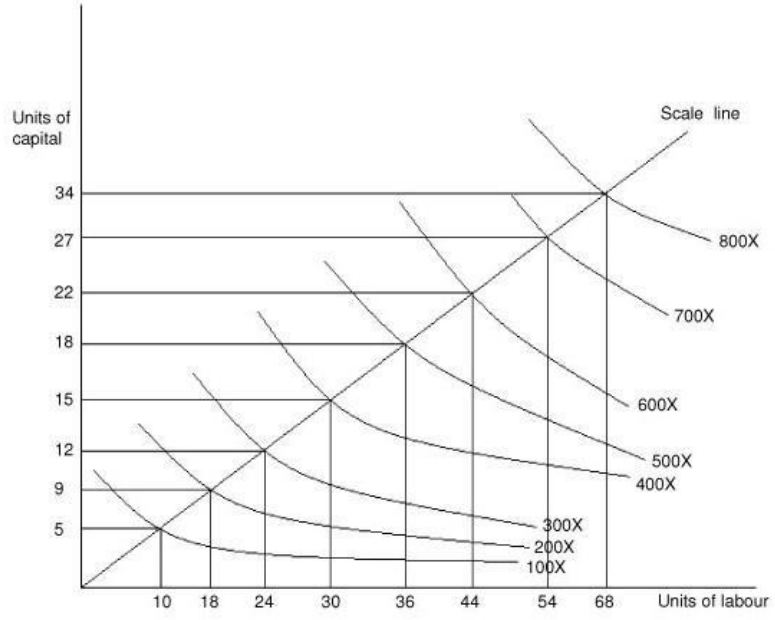
3) Decreasing Returns to Scale – Output increases by a lesser proportion than the increase in inputs.

The three kinds of Returns to Scale can be illustrated with the help of the following table.

A Hypothetical Example to slow returns to scale

Units of Labour (L)	Units of Capital (K) (Rs. 000)	Percentage increase in L and K	Total product ("00" units)	Percentage increase in Total product	Returns to scale
1	100	-	100	-	Increasing
2	200	100	220	120	
3	300	50	350	59	
4	400	33.33	500	42.9	
5	500	25	625	25	Constant
6	600	20	750	20	
7	700	16.66	860	14.66	Decreasing
8	800	14.29	940	9.3	
9	900	12.5	1,000	6.4	

The three kinds of Returns to Scale can also be expressed graphically as follows:



The above figures show iso-quants reflecting returns to scale, Here, it should be noted that, an iso-quant is a curve representing the various combinations of two inputs that produce the same amount of output. It ‘s a curve which shows the different combinations of the two inputs producing a given level of output. In the fig. along the ray, the proportion in which labour and capital are employed, remains constant, the ratio being 10 labour to 5 capitals, here. When we move from point A to C, we double the output, but input less than doubles – A, case of increasing returns to scale. Between points C and E, there are constant returns to scale – input increases by the same percentage as does the output. Beyond point E, there are decreasing returns to scale – output increases by a lesser proportion than the increase in inputs. So, the figure shows that spacing of iso-quants along a ray indicates whether returns are increasing, constant or decreasing.

Causes of Increasing Returns to Scale:

The reasons for experiencing increasing Returns to Scale are:

1) In case of large scale production, work can be divided into small parts and each individual can attain specialization by handling only one part of the work.

2) There are some industries in which it is not possible to undertake production at a small scale, e.g. blast furnaces, earth moving equipment's etc.

3) In some cases, increased size of operation gives us some dimensional advantages. This is important especially for those industries where storage is an important activity, like chemical industries, cold storage etc.

Cause of Decreasing Returns to Scale –

The advantages of mass production have their limitations.

This is so because,

1) Coordination and control become increasingly difficult.

2) Information may be lost or distorted when it is transmitted down the hierarchy from top management level to lower level management to supervisors and then to the workers.

Producer 's Equilibrium:

The production manager always confronts with the following two choice decisions, in the process production.

1) Choose the input combination that yields the maximum level of output with a given level of expenditure.

2) Choose the input combination that leads to the lowest cost of producing a given level of output.

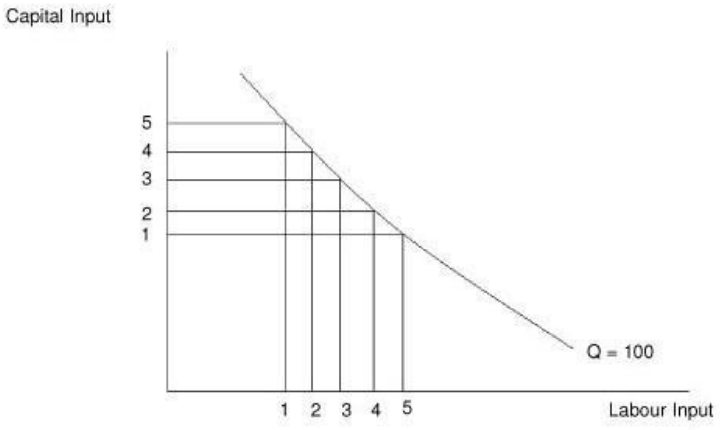
i.e. in the first case, to maximize output subject to a given cost and in the second case, to minimize cost subject to a given level of output (given input prices)

Both the decisions lead to the attainment of Equilibrium by the producer. Therefore, produces Equilibrium is the position of optimal input combination – optimal output. This position of maximum output can be attained when, i.e. Managerial Rate of Technical substitution of labour for capital has to be equated with the ratio between the prices of labour and capital respectively. L, K LK P MRTS = P

To analyse producer ‘s equilibrium, it ‘s necessary to be familiar with the concept of production isoquants and isocost line.

Production Isoquant:

A production isoquant (equal output course) is the locus of all those combinations of two inputs which yields a given level of output. With two variable inputs, capital and labour, the isoquant gives, the different combinations of capital and labour, that produces the same level of output.



The above figure shows production isoquant. The isoquant depicts various combinations of capital and labour inputs that can produce 100 units of output.

Generally, there are a number of ways (combination of inputs) that a particular output can be produced. The rate at which one input can be substituted for another input, if output remains constant is called the marginal rate of technical substitution (MRTS). It is defined in case of two inputs, capital and labour, as the amount of capital that can be replaced by an extra unit of labour, without affecting total output.

$$MRTS_{L\ for K} = \left|\frac{\Delta K}{\Delta L}\right|$$

It is customary to define MRTS as a positive number, since ΔK ΔL the slope of the isoquant,

is negative. Over the relevant of production, the MRTS diminishes. That is more and more labour

is distributed for capital, while holding output constant, the absolute value of ΔK ΔLdecreases.

Since along in an isoquant, the level of output remains the same, if ΔL units of labour are

substituted for ΔK units of capital, the increase in output due to unit's labour (namely,

ΔL MPL) should match the decrease in output a decrease of units of capital (namely,

ΔK MPK). In other words along an isoquant,

$$\Delta L \times MP_L = \Delta K \times MP_K$$

$$\Rightarrow \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K}$$

However, as we have seen earlier ΔK ΔL is equal to MRTSL, K and hence we get the following

expression for MRTSL, K as the ratio of the corresponding marginal products

$$MRTS_{L,K} = \frac{MP_L}{MP_K}$$

$$\text{i.e. slope of isoquant } \left(MRTS_{L,K}\right) = \frac{MP_L}{MP_K}$$

Iso Cost line –

An iso cost line shows various combination of the factor inputs that the firm can buy with a given outlay (expenditure) and factor prices. Every point on an iso cost line costs the since to the firm.

Algebraically, the isocost or the budget line can be expressed

C = (PL x L) + (PK x K)

Where C = Total budget allocation for inputs labour and capital

PL and Pk = Prices of labour and capital respectively.

Land K = Quantity of labour and capital respectively.

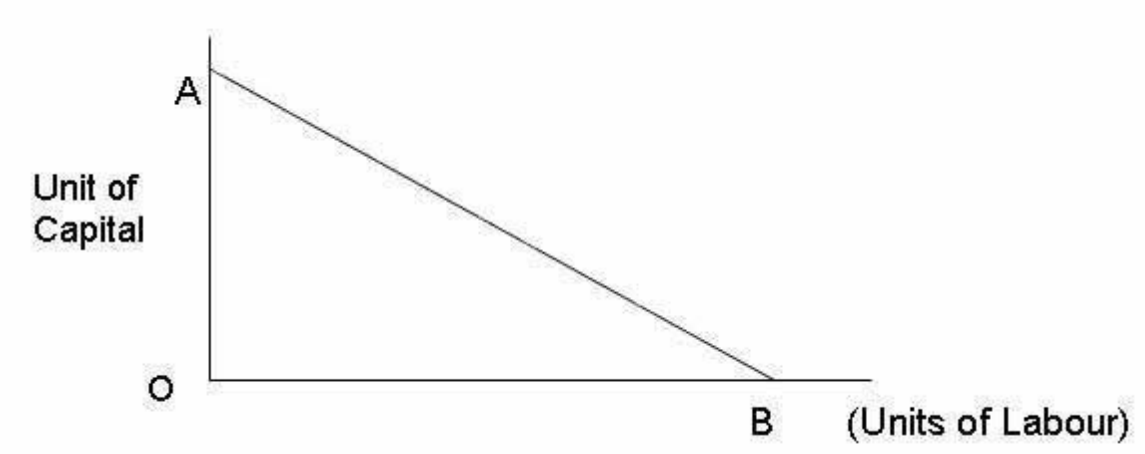
Since prices of inputs are taken as constant, the budget line acquires a straight line shape. Slope the Budget line equals relative prices.

Now, the budget equation

$$C = (P_L \times L) + (P_K \times K)$$

$$\Rightarrow K = \frac{C}{P_K} - \frac{P_L}{P_K}.L$$

Thus the slope of the Budget Line is $\left|\left(\frac{P_L}{P_K}\right)\right|$



The maximum amount of capital that can be bought, if only capital is purchased, is

$$OA = \frac{C}{P_K}.$$

If only labour is purchased then the maximum amount of labour that can be brought is OB = $\frac{C}{P_L}$

The two points and B can be joined by a straight line. This straightline is called the Iso Cost line or Equal Cost line, which shows the alternative combination of (K, L) that can be purchased for the given expenditure level.

Now, slope the iso cost is,

$$\frac{OA}{OB} = \frac{C/P_K}{C/P_L} = \frac{\cancel{C}}{P_K} X \frac{P_L}{\cancel{C}} = \frac{P_L}{P_K}$$

For, equilibrium, it 's necessary to ensure that slope of Iso quant is equal to the slope of Iso cost line. That is, for optimization the cost must be tangent to the iso quant. i.e.

$$MRTS_{L,K} = \frac{P_L}{P_K} \Rightarrow \frac{MP_L}{MP_K} = \frac{P_L}{P_K}$$

Emperical Production Function:

The short run output decisions and long run planning often require more than just the conceptual frame work of production theory. That is quantitative estimates of the parameters of the production function are required for some decisions.

In the process of decision making a manager should understand clearly the relationship between the inputs and output on one hand, and output and costs on the other. The short run production estimates are helpful to production managers in arriving at the optimal mix of inputs to achieve a particular output target of a firm. This is referred to as the —last cost combination of inputs in production analysis. Estimation of the long run production function may help a manager in understanding and taking decisions of long term nature such as capital expenditure.

Although, a variety of functional forms have been used to describe production relationship, the most popular among them is the Cobb-Douglas production function.

Cobb-Douglas Production Function:

The general form of C-D function is expressed as $Q = AL^{\alpha}K^{\beta}$ where Q= A, α & β are constants that, when estimated, describe the quantitative relationship between the inputs (K and L) and output (Q). The sum of the constant (α +β) can be used to determine Returns to Scale. That is

$\alpha + \beta = 1 \Rightarrow$ Constant returns to scale

$\alpha + \beta > 1 \Rightarrow$ Increasing returns to scale

$\alpha + \beta < 1 \Rightarrow$ Decreasing returns to scale

In a C–D function the exponent of a factor gives the ratio between the marginal product and average product. Given the production function

$$Q = AL^{\alpha} K^{\beta}$$

$$MP_L = \frac{\partial Q}{\partial L}$$

$$= \alpha AL^{\alpha - 1} K^{\beta} = \alpha\left(AL^{\alpha} K^{\beta}\right) L^{-1}$$

$$= \alpha\left(Q/L\right) = \alpha AP_L$$

$$\Rightarrow \alpha = \frac{MP_L}{AP_K}$$

here, APL and MPL are the average and marginal products of labour respectively.

Similarly, we find that

$$MP_K = \beta . \; Q/K$$

$$\Rightarrow \beta = \frac{MP_K}{AP_K}$$

α and β represent the labour and capital shares of output respectively. The C–D function

is a power function which can be converted into a linear form by taking it in a logarithmic form:

$$Q = AL^{\alpha} K^{\beta}$$

$$\text{Log } Q = \log A + \alpha \log L + \beta \log K$$

In a C-D production function if one of the inputs is zero, output is also zero. If we look at the form of the C-D production function, we find that it ‘s a multiplicative in nature. In such a function, if one input takes the value zero, the output becomes

zero. It implies that all the inputs considered in the function are necessary for the production process to take place.

Importance of Cobb-Douglas production function –

C-D production function is most popular in imperial research. The reasons for this are

1) The C-D function is convenient for international and inter-industry comparisons. Since α and β are pure numbers, (i.e. independent of units of measurements) they can be easily used for comparing results of different samples having varied units of measurement.

2) Another advantage is that this function captures the essential non-linearity's of production process and also has the benefit of the simplification of calculation by transforming the function into a linear form with the help of logarithms. The log-linear function becomes linear its parameters, which is quite useful to a managerial economist for his analysis.

3) In addition to being Elasticities, the parameters of C-D function also possess other attributes. For example, the sum of (α+β) shows the returns to scale in the production process. α and β represent the labour share and capital share of output respectively and so on.

4) This function can be used to investigate the nature of long-run production function, via – increasing, constant and decreasing returns to scale.

5) Although in its original form, C–D production function limits itself to handing just two inputs (e.g. L and K), it can be easily generalized for more than two inputs, like

$$Q = AX_1^a X_2^b X_3^c \text{ - - - - - - - - } X_n^p$$

Where $X_1 X_2 X_3$ - - - - - - - - X_n are different inputs.

Cost Output Relationship

Cost and revenue are the two major factors that a profit maximizing firm needs to monitor continuously. It is the level of cost relative to revenue that determines the firm's overall profitability. In order to maximize profits, a firm tries to increase its revenue and lower its cost. While the market factors determine the level of revenue to a great extent, the cost can be brought
down either by producing the optimum level of output using the least cost combination of inputs, or increasing factor productivities, or by improving the organizational efficiency. The firm's output level is determined by its cost. The producer has to pay for factors of production for their services. The expenses incurred on these factors of production are known as the cost of production, or in short cost. Product prices are determined by the interaction of the forces of demand and supply.

The basic factor underlying the ability and willingness of firms to supply a product in the market is the cost of production. Thus, cost of production provides the floor to pricing. It is the cost that forms the basis for many managerial decisions like which price to quote, whether to accept a particular order or not, whether to abandon or add a product to the existing product line, whether or not to increase the volume of output, whether to use idle capacity or rent out the facilities, whether to make or buy a product, etc. However, it is
essential to underline here that all costs are not relevant for every decision under consideration.

The purpose of this topic is to explore cost and its relevance to decision-making. We begin by developing the important cost concepts, an understanding of which can aid managers in making correct decisions. We shall examine the difference between economic and accounting concepts of costs and profits. We shall then consider the concepts of short-run and long-run costs and show that they, in conjunction with the concepts of production studies in the preceding unit, can give us a more complete understanding of the applications of cost theory to decision-making.

Theory of Costs

Every Business has two side: Income and Expenditure. The Expenditure side of business constitutes Cost and Income side constitutes the Revenue. The analysis of cost is important in the study of Managerial Economics because it provides a basis

for two important decisions made by Managers: a) Whether to produce or not; and b) How much to produce when a decision is taken to produce.

Cost Concepts

Some of the cost concepts that are frequently used in the Managerial decision making process, may be classified as follows:

Actual Cost and Opportunity Cost

Actual costs are those cost which a firm incurs while producing or acquiring a good or service like payment for labour, rent etc. Suppose we pay Rs. 100 per day to a worker when we employ for 10 days, then the cost of labour is Rs 1000. This is the cost actually incurred by the firm in the process of production. It is otherwise known as Accounting Cost or Acquisition Cost or Outlays Cost. Opportunity cost is the value of a resource in its next best use. It ‘s the cost for the next best alternative use. The opportunity cost is really meaningful in the decision making process. Sometimes this opportunity cost, are called as alternative cost.

Explicit Cost and Implicit Cost

Explicit costs are those cost that involve an actual payment to other Parties. Therefore, an explicit cost is the monetary payment made by a firm for use of an input owned and controlled by others. Explicit costs are also referred to by accounting costs. Implicit cost represents the values of foregone opportunities but do not involve an actual cost payment. Implicit cost are just as important as explicit costs but are sometimes neglected because they are not as obvious. For example, a manager who runs his own business foregone the salary that could have been earned by working for someone else. Therefore, an implicit cost generally is not included in accounting statements, since it is the opportunity cost of using resources that are owned or controlled by the owners of the firm, who could have received it had they used their own resource in their best alternative use rather than using the resources for their own firm ‘s production.

Accounting Cost and Economic Cost

Accounting costs are the actual or outlay costs. These costs point out how much expenditure has already been incurred on a particular process or on production as

such. These costs generally relate to the past. The accounting costs are useful for managing taxation nudes—as well as to calculate profit or loss of the firm on the other hand, economists take forward looking view of the firm. They are concerned with what cost is expected to be in the future and how the firm might be able to rearrange its resources to lower its cost and improve its profitability. They must therefore be concerned with opportunity cost along with explicit cost. Since the only cost that matter for business decision are future costs. It is the economic costs that are used for decision making.

Controllable and Non- Controllable Costs: -

Controllable costs are those costs which are capable of being controlled or regulated by executive vigilance and therefore can be used for assessing executive efficiency. Non-controllable costs are those which cannot be subjected to administrative control and supervision. Most of the costs are controllable, except, of course, those due to obsolescence and depreciation. The level at which such control can be exercised, however, differs; some costs (like capital costs) are not controlled at the shop level.

Out-of-Pocket Costs and Book Costs

Out-of-Pocket Costs are those costs that improve current cash payments to outsiders. For example, wages and salaries paid to the employees are Out-of-Pocket Costs. Other examples of Out-of-Pocket Costs are payment of rent, interest, transport charges etc. On the other hand, Book Costs are those business costs which do not involve any cash payments but for them a provision is made in the book of account to include them in profit and loss accounts and take tax advantages.

Private Costs & Social Cost

Private Costs are those that accrue directly to the individuals or firm engaged in relevant activity. Social Costs, on the other hand are passed on to persons not involved in the activity in any direct way (i.e. they are passed on to society at large)

Sunk Cost and Incremental cost

Sunk costs are expenditures that have been made in the past or to be paid in the future a part of contractual agreement of previous decision. In general, sunk costs are not relevant to economic decisions. Sometimes the Sunk costs are also called a

non-avoidable or non-escapable costs. Incremental costs refer to total additional cost of implementing a managerial decision. Change in product line, change in output level, adding or replacing a machine, changing distribution channels etc. are examples of incremental costs. Sometimes these costs are also called an avoidable or escapable costs. Moreover, since incremental costs may also be regarded as the difference in total costs resulting from a contemplated change they are also called differential costs. These costs are important for decision making purpose.

Relevant costs and Irrelevant costs: -

The relevant costs for decision making purposes are those costs which are incurred as a result of decision under consideration. The relevant costs are also referred to as the incremental costs. They are there main categories of relevant or incremental costs.

They are

1) The present period explicit costs

2) The opportunity costs implicitly involved in the decision

3) The future cost implications that flow from the decision.

On the other hand, costs that have been incurred already and the costs that will be incurred in future, regardless of the present decision are irrelevant costs as far as the current decision problem is concerned.

Direct costs and Indirect costs: -

Direct costs are the ones that have direct relationship with a unit of operation like a product, a process or a department of the firm. In other words, the costs which are directly and definitely identifiable are the direct costs. For example, the use of raw material, labour input and machine time involved in the production of each unit can usually be determined. So, the costs incurred by the firm on all these things, referred to as direct costs. Indirect costs are those whose course cannot be easily and definitely traced to a plant, a product, a process or a department. For example, stationery and other office administrative expenses, electricity charges, depreciation of plant and buildings, and other such expenses that cannot easily and accurately be

separated and attributed to individual units of production, except on arbitrarily basis. Such costs are termed as indirect costs.

Fixed cost and Variable cost: -

Fixed costs are that part of the total cost of the firm which does not change with output. Expenditures on depreciation, rent of land and buildings, property taxes and interest payment on Bonds are examples of fixed costs. For given a capacity fixed costs remain the same irrespective of actual output. Variable costs on the other hand change with changes in output. Examples of variable costs are wages and expenses on raw materials.

Total cost, Average cost and Marginal cost: -

Total cost (TC) of a firm is the some total of all the explicit and implicit expenditures incurred for producing a given level of output. It represents the money value of the total resources required for production of goods and services. For examples, a shoe makers total cost will include the amount he/she spends on leather, thread, rent for his/her workshop, interest on borrowed capital, wages and salaries of employees etc. and the amount he/she charges for his/her services and funds invested in the business.

Marginal cost (MC) is the extra cost of producing one additional incurred in producing one extra unit and this yields the marginal cost i.e. MC= d(TC)/ d(N), where d: A change in MC refers to the charge in total cost associated with a one-unit change in output. This cost concept is significant to short term decisions about profit maximizing rates of output.

The total costs concept is useful in break - even analysis and finding out weather a firm is making profit or not. The Ac concept is significant for calculating the per unit profit. The marginal and incremental cost concepts are needed in deciding whether a firm need to expand its production or not. In fact, the relevant costs to consider will depend upon the situation or production problem faced by the manager. Cost control efforts can be aided considerably by using Ratio Analysis technique. Ratio is a yardstick which provides a measure of relation between the two figures compared. The ratio may be expressed in percentage term (e.g. cost of material as a percent of total production cost), as a proportion (e.g. net profit as a production of total assets) or as a rate (e.g. sales per Rupees of total assets). In ratio analysis, a desirable ration

is predetermined, the actual performance is compared with ratio and the relation are behind the ratio analysis in that management must take a greater interest in relative as opposed to absolute figures in order to control costs. Ratio analysis is mainly used as an external standard i.e. for comparing performance with organization in the industry. However, the ratio analysis can also be effectively used for comparing the performance of the firm overtime

Relationship between Production and Costs

The cost is closely related to production theory. A cost function is the relationship between a firm's costs and the firm's output. While the production function specifies the technological maximum quantity of output that can be produced from various combinations of inputs, the cost function combines this information with input price data and gives information on various outputs and their prices. The cost function can thus be thought of as a combination of the two pieces of information i.e., production function and input prices.

Now consider a short-run production function with only one variable input. The output grows at an increasing rate in the initial stages implying increasing retunes to the variable input, and then diminishing returns to the variable input start. Assuming that the input prices remain constant, the above production function will yield the variable cost function which has a shape that is characteristic of much variable cost function increasing at a decreasing rate and then increasing at an increasing rate.

Relationship between average product and average costs, and marginal product and marginal costs

For example:

TVC = Prices of Accuring Variable Factors of Production = (Pr.V)

$$AVC = \frac{TVC}{Q} = Pr.\frac{V}{Q} = \frac{Pr}{Q/V}$$

$$\text{and } MC = \frac{\Delta TVC}{\Delta Q} = Pr.\frac{\Delta V}{\Delta Q} = \frac{Pr}{\Delta Q/\Delta V}$$

Where, Pr stands for the price of the variable factor and V stands for amount of variable factor.

You may note that Pr being given, AVC is inversely related to the average product of the variable factor.

In the same way, given the wage rage, MC is inversely related to the marginal product of labour.

Short-Run Cost Functions:

During short run some factors are fixed and others are variable. The short-run is normally defined as a time period over which some factors of production are fixed and others are variable. Needless to emphasize here that these periods are not defined by some specified length of time but, rather, are determined by the variability of factors of production. Thus, what one firm may consider the long-run may correspond to the short-run for another firm. Long run and short run costs of every firms varies. In the short-run, a firm incurs some costs that are associated with variable factors and others that result from fixed factors. The former are called variable costs and the latter represent fixed costs. Variable costs (VC) change as the level of output changes and therefore can be expressed as a function of output (Q), that is VC = f (Q). Variable costs typically include such things as raw material, labor, and utilities. As production begins, variable costs will, for a time, increase by a decreasing amount, this is true through the fourth unit of the output. Beyond the fourth unit, however, variable costs rise by increasing amount for each successive unit of output. The explanation of this behavior of variable costs lies in the law of diminishing returns.

Long-Run Cost Functions

Long-run total cost curves are derived from the long-run production functions in which all inputs arevariable. In the long run none of the factors are variable and all can be varied to increase the level of output.The long run average cost of production is the least possible average cost of production of producingany given level of output when all inputs are variable, including of course the size of the plant. In thelong run there is only the variable cost as total cost. There is no dichotomy of total cost into fixed andvariable costs. Thus we study the shape and relationship of long run average cost curve and long runmarginal cost curve.Long run is a planning horizon. It's only a perspective view for the future course of action. Long runcomprises all possible short run situations from which a choice is made for the actual course of operation.

Revenue Analysis

Revenue represents the income side of business. It can be of 3 types:

Total Revenue :- It refers to the total money receipts received by a business organization from the sale of its products in the market. It 's denoted as Px X Qx, where x: The Product; Px: Price of x; Qx: Quantity of x sold in the market.

Average Revenue: - It represents the income per unit of the product sold in the market. It 's arrived at by dividing Total Revenue with total output sold in the market. In generations AR is ……. equal to the price of the product.

Marginal Revenue: - It refers to the net additional income to the total revenue when an extra unit of the product is sold. It is equal to the ratio between change in Total revenue and change in total output sold in the market MR=ΔTC/ΔTO

MARKET STRUCTURE & PRICING STRATEGIES

In common parlance, the term '**markets** 'means a particular place or locality, where goods are bought and sold. We often speak of the Mumbai market, the New York market, the Rani Bagh market and so on. In economics, however, this term is used in a broader sense. If reefers to a complex set of activities by which actual and potential buyers as well as sellers with each other and the price as well as the output are determined. In the process of determining the terms at which the exchange would take place, they may make all sorts of bids and offers, using bargaining and haggling. The term 'potential' here implies that if the prevailing price of the commodity happens to be higher or lower than the one at which some transactors plan to deal, those buyers or sellers in the two cases respectively are eliminated from the market. Thus, **market** determines who buyers and sellers are, what the price will be and what quantities will be brought and sold. **Market** is actually the essence of business. All business decisions relating to price, output, product style, advertisement, investment, etc. are taken in the light of actual as well as potential competition by new entrants. `

Nature of competition

Competition has different meanings. The term always denotes the presence in a specific market of two or more sellers and two or more buyers of a definite commodity, each seller acting independently of every other seller and each buyer independently of every other buyer. **Competition** implies freedom in economic life. It has been considered as a healthy sign in consumption, production, distribution and exchange. The presence and the pressure of competitive market forces in the modern business units force the producers to produce as efficiency as possible. Those who are inefficient and not able to cover up their minimum cost of production will automatically leave the market. The more perfect the **competition**, the more perfect the market will be.

Perfect competition

In economic theory, **perfect competition** has a meaning diametrically opposite to the everyday use of this term as synonymous to rivalry. The **perfect competition** means complete freedom in economic life and absence of rivalry among firms. It prevails, when all the conditions given here are simultaneously present in the market. However, most of these stringent conditions are unlikely to be present in the real world. The real world consists of various imperfections and monopolistic tendencies. The market is rarely perfect in the actual sense. This suggests that **perfect competition** is a purely theoretical market from, which is never observed in reality. However, the stock market is close approximation of **perfect competition**. Here, any particular stock is homogenous, there is no information cost (information is readily available through published prices), free entry and exit conditions for the transactors having insignificant control on price.

The following features serve as a necessary set of assumptions or conditions underlying the model of **perfect competition**.

- Large Number of Sellers and Buyers.
- Homogenous Product.
- Free Entry and Exit.
- Absence of Government Regulation.
- Perfect Mobility of Factors of Production.

• Perfect Knowledge.
• Absence of Transportation and Selling Costs.

Pure competition versus perfect competition

Some economists, notably E.H. Chamberlin and F.H. Knight make distinction between **pure competition** and **perfect competition**. According to Chamberlin, "**Pure competition** is unallowed by monopolyelments.it is much simpler and less exclusive concept than **perfect competition** for the letter may be interpreted to involve perfect in many other respects than in the absence of monopoly e.g. perfect mobility or perfect knowledge or such other perfection as the particulars theorist finds convenient or useful to him."

Usually, the term **pure competition** and **perfect competition** and **perfect competition** are used interchangeably, since in both the cases sellers as well as buyers are price takers with no control over the prevailing market price, Further, the demand and supply curves of the firms as well as industry are similar in either situations.

Monopoly

Monopoly is a market from, which has always attracted the attention of economists. This word has come from the Greek words, monos (single), polein (selling), which mean alone to sell, Therefore, in literary terms, it implies a market structure, where there is a single seller. In economic theory, **monopoly** is characterized by sole producer selling a district product for which there are no close substitutes and there are strong barriers to entry. This sole producer (may be known as monopolist) controls the entire supply of the market. Thus, the supply curve of the firm and the industry will be one and the same. Under these circumstances, the monopolist will tend to have complete control over the price of the product sold by him. That is why monopolist is a price maker rather than a price taker and he need not fear the actions and reactions of rivals, at last in the near future. In other words, the monopolist operates unfettered by the competition of rivals. The level up to which the monopolist can raise the price, depends upon the elasticity of demand, while cost condition determine the level, down to which the monopolist can lower the price.

Pure **monopoly** implies complete absence of competition both in short-run as well as long-run, while under **perfect competition**, the competition is complete. In the actual world, there is neither pure **monopoly** nor **perfect competition**. Between these two extreme opposite limiting cases, lie various real intermediate market situations like monopolistic competition, oligopoly, (increasing order of degree of **monopoly** and hence imperfections). These market forms differ from each other in respect of degree of imperfections.

Origin of monopoly (kinds of monopoly)

The origin of **monopoly** may be legal or technological or both. A firm can continue to enjoy the **monopoly** power, or competitive advantage, so long as, it can prevent the entry of other firms into the industry. The moment other firms are able to enter into the industry, the position changes radically and the erstwhile **monopoly** loses its monopoly power leading to a change in the market from affecting check over pricing strategies. Following factors are responsible for creating conditions for the emergence and growth of **monopoly**

• **Control over Strategic Raw Material**: Ownership and control of entire or most of the supply of basic input and strategic raw materials or exclusive knowledge of production and distribution techniques by a single firm lead to **monopoly** conditions.

• **Small size of market**: Sometimes, the size of the market or technology is such that output of only one firm of optimum size is sufficient to meet the demand of the entire market comfortably. Under these circumstances, all the firms except the largest and the most efficient.

• **Patents, Copy Rights and Licenses**: Legal backing provided by the Government to produce a particular product through granting of patents ,copy rights, trade marks, licenses, and quota for a given period may create and perpetuate **monopoly.**

• **Limit pricing**: Sometimes, the existing firm adopts a limit price policy combined with other policies such as heavy advertising or continuous product differentiation to prevent entry by potential firms.

• **Public Utilities**: The Government generally undertakes the production of the

product or of the essential services like transportation, electricity, water, communication etc. to avoid the exploitation of the consumers. We often find **monopoly** tendencies in these services on account of economics of large scale.

• **Monopolistic Combinations**: **Monopoly** may be the result of combinations. It is possible for a number of competing firms in an industry to come to a voluntary agreement among themselves to eliminate competition in the matter of price, output and market share.

• **Fiscal Monopoly**: There are certain monopolies, created by the Government itself. Printing of currency notes and stamps, minting of coins, etc. are some examples. The nature of these services is that they cannot be entrusted to private enterprises.

Monopolistic competition

Monopolistic competition refers to a market structure in which there are many sellers selling similar but differentiated products and there is existence of free entry and free exit of firms. In other words, it is a situation, where there is a keen, but, not perfect competition among sellers producing close, but not perfect substitutes. Consumer goods like tooth pastes, brushes, bathing soaps, detergents, textiles, television sets, refrigerators, automobiles, etc. fall under the category of monopolistic competition in the Indian market. Here, each firm is a monopolist of its own differentiated product. But, the products supplied by the firms are close substitutes of each other. Hence, Price and output decisions of a firm depend upon the policies of the rivals only to some extent.

Features of monopolistic competition

A firm under **monopolistic** competition faces competition from rival firms producing similar products (close substitutes). At the same time, unlike a perfectly competitive firm, it has some influence over the price of the product. That is why, it has downward sloping average revenue and marginal revenue curves. The greater is the difference between average revenue (price) and marginal revenue, the greater is the degree of imperfection and vice-versa. The main features of **monopolistic**competition are:

• **Many Sellers**: The numbers of firms under **monopolistic** competition are fairly

large, though, it is not as large as found under perfect competition. Each firm shall be a small size firm controlling only a small part of the total market.

• **Product Differentiation**: product differentiation is one of the most distinguishing features of **monopolistic** competition. According to Chamberlin, it is the basic characteristic of monopolistic competition. H defines product differentiation as follows, "A general class of product is differentiated, if any significant basis exists for distinguishing the goal (or services) of one seller from those of another. Product differentiation may involve qualitative material or workmanship differences in the products.

• **Sales promotion or Selling Cost**: Advertising and other selling expenses have an important role under **monopolistic** competition on account of imperfect knowledge on the part of buyers. Advertising broadens the market and encourages competition. Salesman salaries, other expenses of sales department, window displays and different types of demonstrations are some examples of selling expenses. Advertisement may, however, be broadly classified as promotional advertisement and competitive advertisement.

• **Identical Demand and Cost Curves**: Demand and cost curves are assumed to be identical under **monopolistic** competition .This highly simplifying assumption will mean similar effects on the demand and cost conditions of the firms on account of changes in the quality of their products and/or selling costs.

• **Free Entry and Exit**: Under **monopolistic** competition, there is freedom of entry and exit of the firms in the long run. New firms enter the group .When the existing firms earn super normal profits by differentiating their products, This will result in a decrease in the demand of existing products at least to some extent and/or an increase in the cost.

• **Other characteristics**: Other characteristics of **monopolistic** competition are actually the basic assumptions of Chamberlin's large group model. These assumptions are mostly same as those of pure competition except that of homogeneous product (which is replaced by the assumption of product differentiation).

(i) The goal of the firm is profit maximization both in the short-run as in the long-run.
(ii) The price of factor inputs and technology are given.
(iii) The firm is assumed to behave as if it possessed information regarding the demand and cost curves with certainty.
(iv) The long-run is assumed to consist of identical short-run periods, independent of on another, so that decisions in one period neither affect future periods nor are affected by past actions.

Oligopoly

Apart from the case of large number of small firms producing differentiated products, we also often find a small number of big firms, whose products may or may not be differentiated. Such situation leads to another market from, termed as **oligopoly**. This term is derived from two Greek words, 'oligi', which means a few and 'polien' which means 'to sell.' **Oligopoly** is defined as the market structure in which there are a few and 'polien' which means 'to sell'. **Oligopoly** is defined as the market structure in which there are a few sellers of the homogeneous or differentiated products, who intensively complete against each other and recognize interdependence in their decision making. Actual number of sellers under **oligopoly** depends on the size of the market. If there are only two sellers, it's called duopoly.

Features of oligopoly

Some special characteristics are found under **oligopoly**, which distinguish it from other market forms. Main features of oligopolistic market are:

• **Few Dominant Firms** : Under **oligopoly**, Few large sellers dominate the market for a product. Each seller has sizeable influence on the market, every firm possesses a large number of market's total demand. It uses all resources at its disposal to counter the actions of rival firms to ensure its survival and growth in the market. Thus, each firm acts as a strategic competitor.

• **Mutual Interdependence**: As the number of firms is small, each (sizeable) firm has to to its price, or promotion. This will enable the firm to know how the buyers of its influence the price, output and profits of other firms in the market. On the other hand, it cannot fail to take into account the reactions of other firms to its price and output policy. Therefore, there is a good deal of interdependence of the firm under

oligopoly. Successful decision making depends on the prediction of the reactions of the rival firms be as unpredictable as possible to rivals. Since more than one reaction-pattern is possible from other firms, we must make assumption about the reaction of others before providing certain and determinate solution of price-output fixation under **oligopoly**.

• **Entry of Firms**: On the basis of ease of entry of competitors in the market, **oligopoly** may be classified as open or closed. Under open **oligopoly**, new firms are free to enter the market. On the other hand, closed **oligopoly** is dominated by a few large firms with blockaded entry of new firms.

• **Leadership:** On the basis of presence of price leadership, the **oligopoly** situation may be classified as partial or full .Partial **oligopoly** refers to the market situation, where one large firm (called price leader) dominate the market and the other firms (called followers) look to the price leader with regard to the policy of price fixations. Full **oligopoly**, on the contrary, exists, where no firm is dominant enough to take the role of a price leadership is a conspicuous by its absence.

• **Agreement**: **Oligopoly** may be classified into collusive and non-collusive **oligopoly** on the basis of agreement or understanding among the firms. Collusive **oligopoly** refers to a market situation, where the firms, instead of competing with each other, combine together and follow a common price and follow a common price policy. The collusion may be open or tacit (secret). On the other hand, non-collusive **oligopoly** implies absence of any agreement or understanding.

• **Coordination**: An **oligopoly** situation may be classified into organized and syndicated **oligopoly** on the basis of the degree of coordination found among the firms. Under organized **oligopoly**, the firms organize themselves into a central association for fixing price, output, quota, etc. On the contrary, syndicated or unorganized oligopoly refers to a situation, where the firms sell their products through the centralized syndicate.

Equilibrium of a firm

Generally, a **firm** is taken as a production unit producing an output. It considers the market conditions and aims at producing the desired output at the least cost. A **firm**

is an independent unit producing goods and services for sale. According to prof. Watson," A **firm** is a unit engaged in production for a sale at a profit and with the objective of maximizing the profit'. A **firm** is also taken as an income producing unit having some particular characteristics.

Equilibrium of a Firm: By equilibrium, we mean a point of rest. It is also called of no change. Whenever a **firm** attains a stage from which it does not want to move forward or backward, it is said to be in equilibrium. So we can say that a **firm** is in equilibrium when it has no firm will be in equilibrium when it is of no advantage to increase or decrease its output,' Thus we conclude that a **firm** is in equilibrium when it is earning maximum profits or minimizing losses.

Assumptions of Equilibrium of a Firm: The concept of equilibrium of a **firm** rests on the following assumptions.

• **Rational firm**: Rational **firm** always aims at earning maximum profits. In case of losses in the short-run, it earns only minimum losses. The concept of **firm's** equilibrium applies only to a rational firm.

• **Production of one Commodity**: It is assumed that a **firm** produces only a single commodity. Cost of a factor of production is also taken as constant and fixed. In other words, a **firm** can get the required and desired units of a factor at the given price.

• **Estimation of Marginal Revenue and marginal Cost**: Another assumption of **firm's** equilibrium is that it can easily estimate its marginal revenue and marginal costs. Thus total revenue and total costs can also be calculated by a **firm**.

Conditions for Equilibrium: It is already clear that a **firm** is in equilibrium only when it earns maximum profit or has minimum losses. This condition for equilibrium applies to all types of markets i.e., under perfect competition, in monopoly and under monopolistic competition. Therefore, we can say that a **firm** will be willing to stick to its present position only if it earns maximum profits, whatever the form of market may be. There are two methods for determination of a **firm**. They are:

• Total Revenue and Total Cost Approach

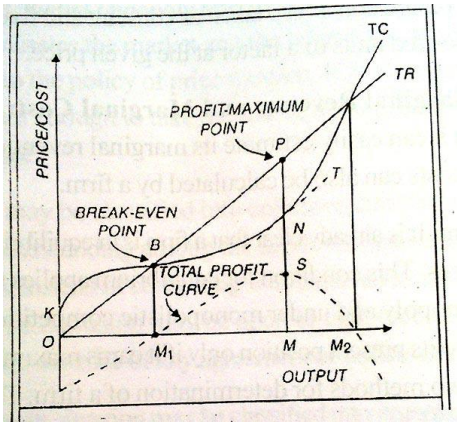
• Marginal Revenue and Marginal Cost Approach

Total revenue and total cost approach

Total Revenue and Total Cost Approach is the simplest way to determine the equilibrium of a **firm**. In order to calculate the profit of a **firm**, we find out the difference between the total revenue and total cost at different levels of output. A **firm** is said to be in equilibrium when the difference between total revenue and total cost is maximum, every rational producer will try to maximize his profits. For this purpose, he will increase his production up to the point where the difference between total revenue (TR) and total cost (TC) is maximum. Only in such a position, he does not want any change. We can find the equilibrium of a **firm** with the help of this approach both under perfect and imperfect market conditions.

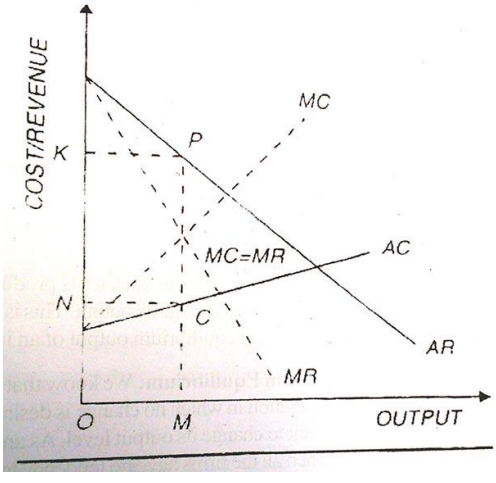
Equilibrium of the firm under perfect competition

Perfect competition is a market in which there is a large number of buyers and sellers. They are selling homogenous goods. There is also free entry and exit of the **firms**. A **firm** is a small portion of the whole industry. Price is fixed by the industry. **Firm** is only a price-taker. It cannot affect price. In other words, a **firm** can sell as much as it desires only at the given price. That is why the total revenue curve of a **firm** is an upward sloping line drawn at an angle. The shape of the TR curve tells that the total revenue of the **firm** is increasing with the increase I production at the same rate. It is generally assumed that the total cost of production continues to rise as output is increased. The rate of increase falls at first and then starts rising. The following diagram shows the application of total revenue & total cost approach for finding out the profit maximizing output.



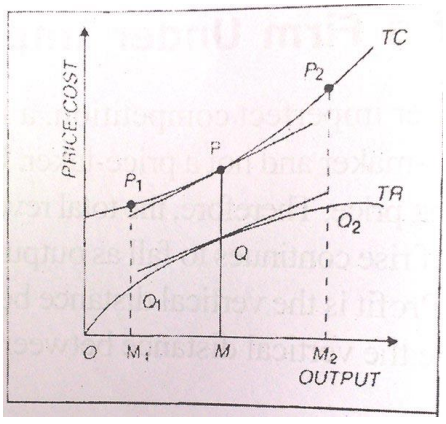
Equilibrium of a firm under imperfect competition

Profit Maximization Case: Under imperfect competition, a **firm** has control over the price of a commodity. It is, therefore, a price-maker and not a price-taker. Under imperfect competition a **firm** can sell larger output only at a falling price. Therefore, the total revenue curve continuous to rise from left upwards to the right. But the rate of rise continues to fall as output sold increases. The total cost curve also rises with increasing output. Profit is the vertical distance between the TR and TC. The **firm** chooses that level of output where the vertical distance between TR and TC is the maximum. This output is shown as below:



Minimization of Loss Case: A **firm** can undergo losses also in the short run. In this case, a **firm** will be in equilibrium when its losses are minimum. For this purpose, also we find the vertical distance between TR and the TC curves. A **firm** is said to be

in equilibrium when the distance between the TR and TC curves is minimum. This can be shown as below:



Defects of the TR-TC Approach:

Through the total revenue and total cost approach is the simplest approach, yet it suffers from some defects. Its main shortcomings are as under :

• It is very difficult to find the maximum vertical distance between total revenue and total cost curves.

• This approach is based on the total costs and total revenue. It ignores the per unit cost of an output.

• It becomes difficult to find out the equilibrium of an industry with the help of this approach.
Due to these defects, modern economists have used marginal revenue and marginal cost approach in place of the total revenue and total costs approach.

The marginal revenue and marginal cost approach

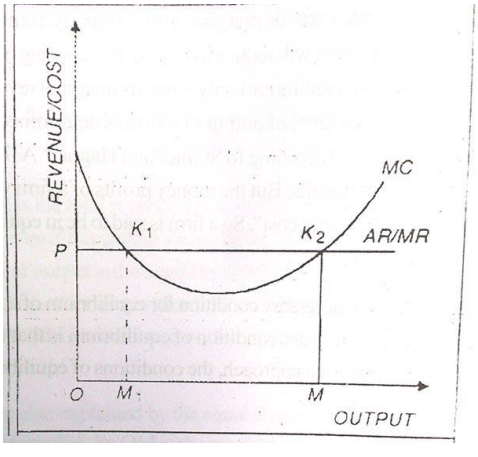
Marginal revenue and marginal cost approach is another method to know the equilibrium of a firm. This approach is advocated by modern economists like Mrs. Joan Robinson. Marginal revenue is the addition made to the total revenue by the sale of one more unit of the output. Marginal cost is the addition made to the total cost by producing an additional unit of the output. In order to know the equilibrium

level of output, a firm compares its marginal revenue and marginal cost. It will be profitable for a firm to increase its production when marginal revenue exceeds marginal cost. Similarly, if marginal revenue is less that the marginal cost of output, a rational firm will reduce its output. By reducing output, a firm can minimize its losses. In this way, a firm will be in equilibrium only when its marginal revenue equals marginal cost.

Equilibrium of a firm under perfect competition

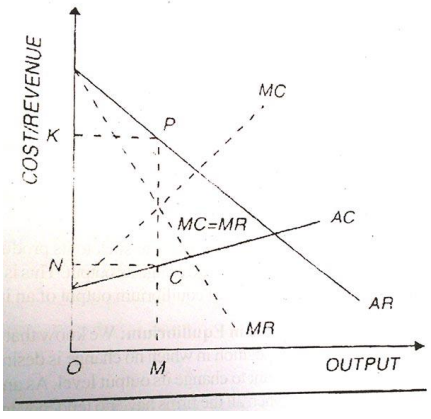
Perfect competition is characterized by the presence of large number of buyers and sellers. **Firms** sell identical goods. **Firm** has not control over the price. **Firm** is a price-taker. It can sell as much as it wants only at the given price. In this way, firms can sell varying amounts of output at the fixed and given price. Due to this reason, average revenue (AR) and marginal revenue (MR) are the same. And AR=MR is a horizontal straight line. It is generally assumed that marginal cost falls at first and then starts rising. In below figure the price given to the firm P. MC is the marginal cost curve. Point K1 is the breakeven point because at this point MC curve cuts MR curve from above. This is not a point of firm's equilibrium because it satisfies only the first of the two conditions of equilibrium. The profit-maximizing output is OM because at this output MR is equal to MC and MC curve cuts MR from below. Thus we can conclude that a **firm** is in equilibrium only if it satisfies two conditions. These are:

(i) MR=MC
(ii) MC rises to intersect the horizontal MR line.



Equilibrium of a firm under imperfect competition

Under imperfect competition, AR and MR of a **firm** are two different things. This is because under imperfect competition, a **firm** is a price-maker. It can sell more by lowering the price of its output. That is why AR and MR curves of a **firm** fall downward from left to right. White MC and AC rise from left to right. The conditions of equilibrium of a firm are the same as apply under perfect competition, In other words, a **firm** will be in equilibrium if it's MR is equal to MC and MC cuts MR from below:



The superiority of the marginal approach shown in the diagram given above is that we can read all the three things directly from the diagram in which a firm is interested. The three things are:

(i) Equilibrium output = OM
(ii) Equilibrium Price = PM
(iii) Total Profit = Area PCNK

Equilibrium condition of the industry

Industry is a group of firms producing homogenous goods. The concept of the industry is very important under perfect competition because in this market form, is fixed by the industry. Firm is only a price-taker.

An industry is said to be in equilibrium when it has no tendency either to expand or contract its output over the long run.

An industry likes to stick to a level of output only when the demand for and supply of output produced by the industry are equal. If on a particular price level, demand is more than the supply of output, it will be profitable for the industry to increase production.

Similarly, if demand is less than its supply, industry will reduce its output. Thus an industry is in equilibrium only when the demand for and supply of its production are equal to each other at a particular price.

Trade cycles - meaning and characteristics

Trade cycles or **business cycles** are a prominent feature of the capitalist economies. **Business cycles** refer to the regular fluctuations in economic activity in the economy activity in the economy as a whole. The expansions, recessions, contractions and revivals of aggregate economic activity occur and recur in an unchanged sequence. In Keynes' words, "A **business cycle** is composed of periods of good trade characterized by rising prices and low unemployment percentages alternating with periods of bad trade characterized by falling prices and high unemployment percentages". Thus, a market feature of a **business cycle** is the boom being followed by a depression, recovery and again boom conditions in a free- enterprise economy which is industrialized.

Trade cycles have the following characteristics:

• One a **business cycle** is an economy-wide phenomenon. When depression sets in the industrial sector, it cannot be restricted there. Soon it spreads to agriculture, trade and transport sectors; so is the case during boom.

• Two, a **business cycle** shows a wave-like variation in economic activity. The expression or prosperity is followed by a depression and so on. The economy moves from one extreme to another almost like a pendulum.

• Three, business fluctuations tend to recur. Thy come again and again after the lapse of some time. The time or periodicity is not always the same. Nor are the causes always the same. Some **trade cycles** may last only two or three years while

others may be six to eight years in duration.

• Four, **trade cycles** are self-reinforcing or cumulative. Once the cyclical movement starts in one direction, it tends to feed on itself. The force of the economic crises tends to increase. Once the prosperity phase starts, it tends to run out of control of the policy makers.

Economists have suggested the following for main criteria for making the different stages or phases of a **trade cycle**.

• The consumption criterion is that with the onset of a depression, there is a sudden and significant fall in the real consumption of the people in general and the working class in particular. Likewise, the recovery phase shows a definite rise in the per capita real consumption of the people.

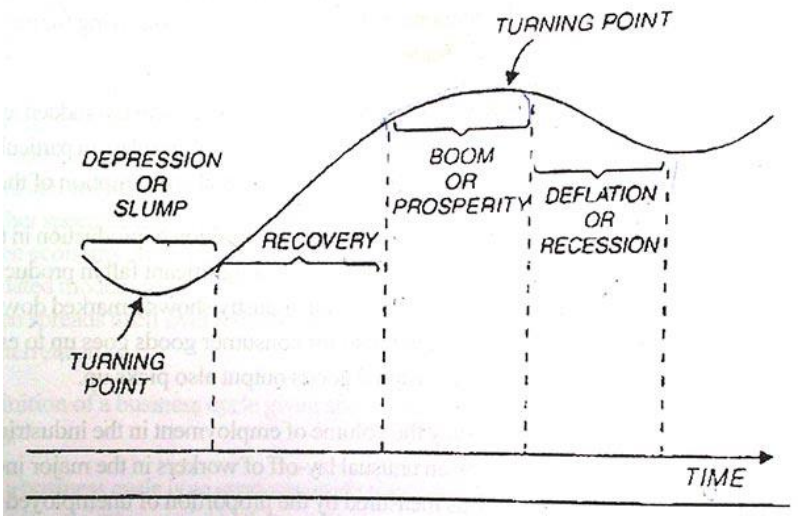
• The production criterion is to watch the volume and composition of production of production in the economy. During depression, the capital goods industries show a significant fall in production first and other industries are affected later. The construction industry shows a market downward trend. Similarly, in the case of recovery, the demand for consumer goods goes up to encourage the consumer goods output. Later on the capital goods output also picks up.

• The employment criterion is to study the volume of employment in the industrial sector. The onset of a recession is indicated by an unusual lay-off of workers in the major industries. The open unemployment percentage as measured by the proportion of unemployed to the whole labour force goes up significantly. The start of recovery is clear when more and more jobs are made available by the manufacturing firms.

• The price-level criterion judges the different phases on the basis of the general price level. Prosperity is generally associated with rising prices and depression with falling prices. The general price index, both when it rises and falls markedly, shows cyclical changes.

Phases (or stages) of a trade cycle

A **business cycle** is short-term picture of the behaviour of real output in a private enterprise economy. Industrialized economies having free-market mechanism have economic growth over the long period. But the process of economic growth is often shaken by **business cycles** which show up-turn and down-turn of income, output and employment. A **business cycle** can be shown to be a wave-like path of the economy's real output as shown in figure. Economists often describe a **business cycle** with the help of distinct phases or stages. The four phases of a **business cycle** are: (i) slump, (ii) recovery, (iii) boom and (iv) deflation.



We can describe the four phases of a typical **trade cycle** as follows:

(i) **Slump or Depression**: This is the most critical and fearful stage of a **trade cycle**. Harberler has described depression as "a state of affairs in which real income consumed or volume of production per head and the rate of employment are falling and are sub- normal in the sense that there are idle resources and unused capacity, especially unused labour." Depression or slump leads to redistribution of the national income. Profits and wages fall faster relatively to rent and other fixed incomes of shareholders go down fast.

(ii) **Recovery**: Recovery shows the upturn of the output and employment of the economy from the state of depression. Recovery is most probably the result of the

fresh demand for plant and equipment arising from the consumer goods industries which had been postponing this investment during depression. The capital goods have a limited life. They wear out completely after some time and need replacement. This replacement demand starts the recovery process .Although prices remain more or less stable, wages and other incomes show a noticeable rise.

(iii) **Boom or Prosperity**: During the recovery phase, rise in output and incomes of the people induces substantial increase in aggregate spending. This has a multiplier effect. As effective demand increases, income rises faster than before. The whole process becomes self-reinforcing. The cumulative process of rising investment and employment forges ahead. As investors become more confident, expanding productive activity takes the economy to a boom or prosperity phase. According to Haberler, Prosperity is "A state of affairs in which the real income consumed, real income produced and the level of employment are high or rising, and there are no idle resources or unemployed workers or very few of either."

(iv) **Recession**: The end of prosperity phase comes because of certain tendencies in the private- enterprise economy prevalent during the boom conditions.

Firstly, as price rise, wages tend to lag behind .As a result, purchasing power of workers, who form a majority of the people, tends to lag behind the supply of consumer goods.

Secondly, expansion of production is hampered by shortages of some inputs and bottlenecks in production.

Thirdly, excessive demand for labour and material pushes up both the factor and the product prices but in a disproportionate fashion.

Fourthly, the non-availability of credit beyond a particular rate of expansion might also act as a serious break on prosperity. Situation where the **business cycle** takes a downward turn from the state of boom. Output, Profits and employment start falling gradually. Business psychology is pessimistic.

Pricing strategies

Pricing decisions are equally important for a new product and an existing product, for entering into a new market or a new market segment and are affected by a host of factors like objective of the firm, cost of production, market structure, competitor ‘s strategy, elasticity of demand, government policy, etc.

Cost based pricing

Under cost plus pricing, price of the product is the sum of cost plus a profit margin.

i. Cost plus or Mark up pricing

Price= AC+ m, where AC=TC/Q, m is the percentage of mark up

ii. Marginal cost pricing

This is used when demand is slack and market is highly competitive. Under marginal cost pricing price of the product is the sum of variable cost plus a profit margin. This method is used by firms to enter into a new market as well as to beat competitors. As this method ignores the element of fixed cost, it cannot be adopted as a long term strategy.

iii. Target Return Pricing

This method of pricing is the same as the previous ones but for the fact that margin is decided on the basis of target rate of return, determined on the company ‘s experience, consumer ‘s paying capacity, risk involved, and similar other factors.

Pricing based on firm ‘s objectives

If we consider pricing in the light of objectives of a firm, a profit maximizing firm considers total cost of production for determination of price and hence will adopt Mark up pricing. Those which maximize sales would adopt competitive pricing like Marginal cost pricing.

Competition based pricing

(A) penetration pricing

When a firm plan to enter a new market which is dominated by existing players, its only option is to charge a low price, even lower than the ongoing price. This price is

called Penetration price. The principle of marginal costing may be used to determine penetration price. This method is short term in perspective and its success largely depends upon the price elasticity of demand of the product because in the long run ultimately factors other than price may become important.

(B) entry deterring pricing

Under this method of pricing the price is kept low, thus making the market unattractive for other players. Success of entry deterring pricing strategy depends on the fact that the firm earns economies of scale and hence can afford to charge low price. This practice is also known as Limit Pricing.

(C) going rate pricing

Going rate pricing strategy is adopted when most of the players do not indulge in separate pricing but follow the prevailing market price. This pricing strategy is popular in monopolistic and oligopoly markets where product differentiation is minimal or only cosmetic, and consumer 's switching cost is almost negligible. It is mostly adopted when the product has reached maturity and has become generic to the extent that consumers ask for a good soap or soft tooth brush instead of a particular brand.

Product life cycle based pricing

Product life cycle pricing refers to different pricing for a product at different stages of its life cycle (viz. introduction, growth, maturity, saturation, and decline).

(A) price skimming

Under price skimming producers charge a very high price in the beginning to skim the market and earn super margins on sales. As the market is small in the introduction stage, a firm tries to popularize its product among the niche consumers and may charge a high price and skim the market by creating high value perception on account of the novelty factor of the product. Nokia has been using this strategy successfully for its products.

(B) product bundling

Under product bundling two or more products are bundled together for a single price. This strategy is often used as a double edged weapon, for propagating a new product, as well as for selling a product in its stage of decline. It may be adopted at the time of introduction as well as during growth and maturity.

(C) perceived value pricing

According to this pricing, value of goods for different consumers depends upon their perception of utility of the good. The underlying philosophy of this pricing is that a product is as good as a consumer finds it. Such pricing is normally adopted during the growth and maturity stage so as to differentiate the product from that of competitors ‘and retain the quality conscious customers. Here the price of the good is not at all governed by the cost of production.

Cyclical pricing

(A) rigid pricing

Rigid pricing suggests that firms should follow a stable pricing policy irrespective of the phase of the economic cycle (i.e. inflation and recession)

(*B) flexible pricing: -*

Under flexible pricing firms keep their prices flexible to meet the challenges of change in demand.

Multi product pricing

(a) loss leader pricing

Under loss leader pricing multi product firms sell one product at a low price and compensate the loss by other products.

(B) transfer pricing

Transfer prices are the charges made when a company supplies goods, services or financials to its subsidiary or sister concern. Transfer pricing is used in large organizations for transaction between various divisions, i.e., internal pricing as opposed to external market.

Retail pricing

(a) every day low pricing(edlp)

Under EDLP a low price is charged throughout the year and none or very few special discounts are given on special occasions. This method can be successful only when the retailer is very large in size to avail of economies of scale and has very low overhead expenses.

(B) high-low pricing

This method involves high prices on a regular basis, coupled with temporary (or occasional) discounts as promotional activity. On all days the price is higher than EDLP, but on discount days it is lower than EDLP. This method is adopted by those firms which have high overhead expenses and cannot afford everyday low pricing.

(C) value pricing

Under value pricing sellers try to create a high value of the product and charge a low price. This is a strategy suitable for the maturity and saturation stage when demand can be maintained by keeping focus on higher quality and lower cost.

NATIONAL INCOME ANALYSIS

National income is the total market value of all final goods and services produced in an economy including net factor income from abroad during an accounting year. In order to avoid double counting of the goods and services in the national income, only final goods are taken into consideration and for calculating Net National Income, the Wear N' Tear and depreciation charges are deducted from Gross National Income. National income also refers to the aggregate of factor income earned by the normal residents of a nation during a given period (say a year) as a result of their productive services.

In other words, the total amount of income accruing to a country from economic activities in a year's time is known as national income. It includes payments made to all resources in the form of wages, interest, rent and profits.

Definitions of National Income:

According to Prof. Pigou, *"National income or dividend is that part of the objective income of the community including, of course, income derived from abroad which can be measured in money."*

According to Prof. Pigou *"only those goods and services should be included (double counting being avoided) that are transacted is a specific year in exchange of money."*

Pigou's definition is precise, convenient, elastic and workable because it does away with the difficulty of measuring the national income inherent in Marshall's definition.

Concepts of National Income:

There are a number of concepts pertaining to national income and methods of measurement relating to them.

(A) Gross Domestic Product (GDP):

GDP is the total value of goods and services produced within the country during a year. This is calculated at market prices and is known as GDP at market prices. Dernberg defines GDP at market price as "the market value of the output of final goods and services produced in the domestic territory of a country during an accounting year."

There are three different ways to measure GDP:

Product Method, Income Method and Expenditure Method.

These three methods of calculating GDP yield the same result because National Product = National Income = National Expenditure.

1. The Product Method:

In this method, the value of all goods and services produced in different industries during the year is added up. This is also known as the value added method to GDP or GDP at factor cost by industry of origin. The following items are included in India in

this: agriculture and allied services; mining; manufacturing, construction, electricity, gas and water supply; transport, communication and trade; banking and insurance, real estates and ownership of dwellings and business services; and public administration and defense and other services (or government services). In other words, it is the sum of gross value added.

2. The Income Method:

The people of a country who produce GDP during a year receive incomes from their work. Thus GDP by income method is the sum of all factor incomes: Wages and Salaries (compensation of employees) + Rent + Interest + Profit.

3. Expenditure Method:

This method focuses on goods and services produced within the country during one year.

GDP by expenditure method includes:

(1) Consumer expenditure on services and durable and non-durable goods (C),

(2) Investment in fixed capital such as residential and non-residential building, machinery, and inventories (I),

(3) Government expenditure on final goods and services (G),

(4) Export of goods and services produced by the people of country (X),

(5) Less imports (M). That part of consumption, investment and government expenditure which is spent on imports is subtracted from GDP. Similarly, any imported component, such as raw materials, which is used in the manufacture of export goods, is also excluded.

Thus GDP by expenditure method at market prices = C+ I + G + (X – M), where (X-M) is net export which can be positive or negative.

(B) GDP at Factor Cost:

GDP at factor cost is the sum of net value added by all producers within the country. Since the net value added gets distributed as income to the owners of factors of production, GDP is the sum of domestic factor incomes and fixed capital consumption (or depreciation).

Thus GDP at Factor Cost = Net value added + Depreciation.

GDP at factor cost includes:

(i) Compensation of employees i.e., wages, salaries, etc.

(ii) Operating surplus which is the business profit of both incorporated and unincorporated firms. [Operating Surplus = Gross Value Added at Factor Cost—Compensation of Employees—Depreciation]

(iii) Mixed Income of Self- employed.

Conceptually, GDP at factor cost and GDP at market price must be identical/This is because the factor cost (payments to factors) of producing goods must equal the final value of goods and services at market prices. However, the market value of goods and services is different from the earnings of the factors of production.

In GDP at market price are included indirect taxes and are excluded subsidies by the government. Therefore, in order to arrive at GDP at factor cost, indirect taxes are subtracted and subsidies are added to GDP at market price.

Thus, GDP at Factor Cost = GDP at Market Price – Indirect Taxes + Subsidies.

(C) Net Domestic Product (NDP):

NDP is the value of net output of the economy during the year. Some of the country's capital equipment wears out or becomes obsolete each year during the production process. The value of this capital consumption is some percentage of

gross investment which is deducted from GDP. Thus Net Domestic Product = GDP at Factor Cost – Depreciation.

(D) Nominal and Real GDP:

When GDP is measured on the basis of current price, it is called GDP at current prices or nominal GDP. On the other hand, when GDP is calculated on the basis of fixed prices in some year, it is called GDP at constant prices or real GDP.

Nominal GDP is the value of goods and services produced in a year and measured in terms of rupees (money) at current (market) prices. In comparing one year with another, we are faced with the problem that the rupee is not a stable measure of purchasing power. GDP may rise a great deal in a year, not because the economy has been growing rapidly but because of rise in prices (or inflation).

On the contrary, GDP may increase as a result of fall in prices in a year but actually it may be less as compared to the last year. In both 5 cases, GDP does not show the real state of the economy. To rectify the underestimation and overestimation of GDP, we need a measure that adjusts for rising and falling prices.

This can be done by measuring GDP at constant prices which is called real GDP. To find out the real GDP, a base year is chosen when the general price level is normal, i.e., it is neither too high nor too low. The prices are set to 100 (or 1) in the base year.

Now the general price level of the year for which real GDP is to be calculated is related to the base year on the basis of the following formula which is called the deflator index:

$$\text{Real } GDP = \frac{\text{GDP for the Current Year}}{} \times \frac{\text{Base Year (=100)}}{\text{Current Year Index}}$$

Suppose 1990-91 is the base year and GDP for 1999-2000 is Rs. 6, 00,000 crores and the price index for this year is 300.

Thus, Real GDP for 1999-2000 = Rs. 6, 00,000 x 100/300 = Rs. 2, 00,000 crores

(E) GDP Deflator:

GDP deflator is an index of price changes of goods and services included in GDP. It is a price index which is calculated by dividing the nominal GDP in a given year by the real GDP for the same year and multiplying it by 100. Thus,

$$GDP \text{ Deflator} = \frac{\text{Nominal (or Current Prices) } GDP}{\text{Real (or Constant Prices) } GDP} \times 100$$

$$\text{For example, GDP Deflator in 1997-98} = \frac{1426.7\text{th. crores}}{1049.2\text{th. crores at}} \times 100$$
$$= 135.9$$

It shows that at constant prices (1993-94), GDP in 1997-98 increased by 135.9% due to inflation (or rise in prices) from Rs. 1049.2 thousand crores in 1993-94 to Rs. 1426.7 thousand crores in 1997-98.

(F) Gross National Product (GNP):

GNP is the total measure of the flow of goods and services at market value resulting from current production during a year in a country, including net income from abroad.

GNP includes four types of final goods and services:

(1) Consumers' goods and services to satisfy the immediate wants of the people;

(2) Gross private domestic investment in capital goods consisting of fixed capital formation, residential construction and inventories of finished and unfinished goods;

(3) Goods and services produced by the government; and

(4) Net exports of goods and services, i.e., the difference between value of exports and imports of goods and services, known as net income from abroad.

In this concept of GNP, there are certain factors that have to be taken into consideration: First, GNP is the measure of money, in which all kinds of goods and services produced in a country during one year are measured in terms of money at current prices and then added together.

But in this manner, due to an increase or decrease in the prices, the GNP shows a rise or decline, which may not be real. To guard against erring on this account, a particular year (say for instance 1990-91) when prices be normal, is taken as the base year and the GNP is adjusted in accordance with the index number for that year. This will be known as GNP at 1990-91 prices or at constant prices.

Second, in estimating GNP of the economy, the market price of only the final products should be taken into account. Many of the products pass through a number of stages before they are ultimately purchased by consumers.

If those products were counted at every stage, they would be included many a time in the national product. Consequently, the GNP would increase too much. To avoid double counting, therefore, only the final products and not the intermediary goods should be taken into account.

Third, goods and services rendered free of charge are not included in the GNP, because it is not possible to have a correct estimate of their market price. For example, the bringing up of a child by the mother, imparting instructions to his son by a teacher, recitals to his friends by a musician, etc.

Fourth, the transactions which do not arise from the produce of current year or which do not contribute in any way to production are not included in the GNP. The sale and purchase of old goods, and of shares, bonds and assets of existing companies are not included in GNP because these do not make any addition to the national product, and the goods are simply transferred.

Fifth, the payments received under social security, e.g., unemployment insurance allowance, old age pension, and interest on public loans are also not included in GNP, because the recipients do not provide any service in lieu of them. But the depreciation of machines, plants and other capital goods is not deducted from GNP.

Sixth, the profits earned or losses incurred on account of changes in capital assets as a result of fluctuations in market prices are not included in the GNP if they are not responsible for current production or economic activity.

For example, if the price of a house or a piece of land increases due to inflation, the profit earned by selling it will not be a part of GNP. But if, during the current year, a portion of a house is constructed anew, the increase in the value of the house (after subtracting the cost of the newly constructed portion) will be included in the GNP.

Similarly, variations in the value of assets, that can be ascertained beforehand and are insured against flood or fire, are not included in the GNP.

Last, the income earned through illegal activities is not included in the GNP.

Although the goods sold in the black market are priced and fulfill the needs of the people, but as they are not useful from the social point of view, the income received from their sale and purchase is always excluded from the GNP.

There are two main reasons for this. One, it is not known whether these things were produced during the current year or the preceding years. Two, many of these goods are foreign made and smuggled and hence not included in the GNP.

Three Approaches to GNP:

After having studied the fundamental constituents of GNP, it is essential to know how it is estimated. Three approaches are employed for this purpose. One, the income method to GNP; two, the expenditure method to GNP and three, the value

added method to GNP. Since gross income equals gross expenditure, GNP estimated by all these methods would be the same with appropriate adjustments.

1. Income Method to GNP:

The income method to GNP consists of the remuneration paid in terms of money to the factors of production annually in a country.

Thus GNP is the sum total of the following items:

(i) Wages and salaries:

Under this head are included all forms of wages and salaries earned through productive activities by workers and entrepreneurs. It includes all sums received or deposited during a year by way of all types of contributions like overtime, commission, provident fund, insurance, etc.

(ii) Rents:

Total rent includes the rents of land, shop, house, factory, etc. and the estimated rents of all such assets as are used by the owners themselves.

(iii) Interest:

Under interest comes the income by way of interest received by the individual of a country from different sources. To this is added, the estimated interest on that private capital which is invested and not borrowed by the businessman in his personal business. But the interest received on governmental loans has to be excluded, because it is a mere transfer of national income.

(iv) Dividends:

Dividends earned by the shareholders from companies are included in the GNP.

(v) Undistributed corporate profits:

Profits which are not distributed by companies and are retained by them are included in the GNP.

(vi) Mixed incomes:

These include profits of unincorporated business, self-employed persons and partnerships. They form part of GNP.

(vii) Direct taxes:

Taxes levied on individuals, corporations and other businesses are included in the GNP.

(viii) Indirect taxes:

The government levies a number of indirect taxes, like excise duties and sales tax. These taxes are included in the price of commodities. But revenue from these goes to the government treasury and not to the factors of production. Therefore, the income due to such taxes is added to the GNP.

(ix) Depreciation:

Every corporation makes allowance for expenditure on wearing out and depreciation of machines, plants and other capital equipment. Since this sum also is not a part of the income received by the factors of production, it is, therefore, also included in the GNP.

(x) Net income earned from abroad:

This is the difference between the value of exports of goods and services and the value of imports of goods and services. If this difference is positive, it is added to the GNP and if it is negative, it is deducted from the GNP.

Thus GNP according to the Income Method = Wages and Salaries + Rents + Interest + Dividends + Undistributed Corporate Profits + Mixed Income + Direct Taxes + Indirect Taxes + Depreciation + Net Income from abroad.

2. Expenditure Method to GNP:

From the expenditure view point, GNP is the sum total of expenditure incurred on goods and services during one year in a country.

It includes the following items:

(i) Private consumption expenditure:

It includes all types of expenditure on personal consumption by the individuals of a country. It comprises expenses on durable goods like watch, bicycle, radio, etc., expenditure on single-used consumers' goods like milk, bread, ghee, clothes, etc., as also the expenditure incurred on services of all kinds like fees for school, doctor, lawyer and transport. All these are taken as final goods.

(ii) Gross domestic private investment:

Under this comes the expenditure incurred by private enterprise on new investment and on replacement of old capital. It includes expenditure on house construction, factory- buildings, and all types of machinery, plants and capital equipment.

In particular, the increase or decrease in inventory is added to or subtracted from it. The inventory includes produced but unsold manufactured and semi-manufactured goods during the year and the stocks of raw materials, which have to be accounted for in GNP. It does not take into account the financial exchange of shares and stocks because their sale and purchase is not real investment. But depreciation is added.

(iii) Net foreign investment:

It means the difference between exports and imports or export surplus. Every country exports to or imports from certain foreign countries. The imported goods are not produced within the country and hence cannot be included in national income, but the exported goods are manufactured within the country. Therefore, the difference of value between exports (X) and imports (M), whether positive or negative, is included in the GNP.

(iv) Government expenditure on goods and services:

The expenditure incurred by the government on goods and services is a part of the GNP. Central, state or local governments spend a lot on their employees, police and army. To run the offices, the governments have also to spend on contingencies which include paper, pen, pencil and various types of stationery, cloth, furniture, cars, etc.

It also includes the expenditure on government enterprises. But expenditure on transfer payments is not added, because these payments are not made in exchange for goods and services produced during the current year.

Thus GNP according to the Expenditure Method=Private Consumption Expenditure (C) + Gross Domestic Private Investment (I) + Net Foreign Investment (X-M) + Government Expenditure on Goods and Services (G) = C+ I + (X-M) + G.

As already pointed out above, GNP estimated by either the income or the expenditure method would work out to be the same, if all the items are correctly calculated.

3. Value Added Method to GNP:

Another method of measuring GNP is by value added. In calculating GNP, the money value of final goods and services produced at current prices during a year is taken into account. This is one of the ways to avoid double counting. But it is difficult to distinguish properly between a final product and an intermediate product.

For instance, raw materials, semi-finished products, fuels and services, etc. are sold as inputs by one industry to the other. They may be final goods for one industry and intermediate for others. So, to avoid duplication, the value of intermediate products used in manufacturing final products must be subtracted from the value of total output of each industry in the economy.

Thus, the difference between the value of material outputs and inputs at each stage of production is called the value added. If all such differences are added up for all industries in the economy, we arrive at the GNP by value added. GNP by value added = Gross value added + net income from abroad. Its calculation is shown in Tables 1, 2 and 3.

Table 1 is constructed on the supposition that the entire economy for purposes of total production consists of three sectors. They are agriculture, manufacturing, and others, consisting of the tertiary sector.

Out of the value of total output of each sector is deducted the value of its intermediate purchases (or primary inputs) to arrive at the value added for the entire economy. Thus the value of total output of the entire economy as per Table 1, is Rs. 155 crores and the value of its primary inputs comes to Rs. 80 crores. Thus the GDP by value added is Rs. 75 crores (Rs. 155 minus Rs. 80 crores).

TABLE 1 : GDP BY VALUE ADDED

(Rs. crores)

Industry	Total Output	Intermediate Purchases	Value Added
(1)	(2)	(3)	(4) = (2-3)
1. Agriculture	30	10	20
2. Manufacturing	70	45	25
3. Others	55	25	30
Total	155	80	75

The total value added equals the value of gross domestic product of the economy. Out of this value added, the major portion goes in the form wages and salaries, rent, interest and profits, a small portion goes to the government as indirect taxes and the remaining amount is meant for depreciation. This is shown in Table 3.

Thus we find that the total gross value added of an economy equals the value of its gross domestic product. If depreciation is deducted from the gross value added, we have net value added which comes to Rs. 67 crores (Rs. 75 minus Rs. 8 crores).

This is nothing but net domestic product at market prices. Again, if indirect taxes (Rs. 7 crores) are deducted from the net domestic product of Rs. 67 crores, we get Rs. 60 crores as the net value added at factor cost which is equivalent to net domestic product at factor cost. This is illustrated in Table 2.

TABLE 2
VALUE ADDED AT FACTOR COST

		(Rs. Crores)
1.	Market Value of output	155
2.	*Less:* cost of intermediate Goods	80
3.	Gross value added	75
4.	*Less*: depreciation	8
5.	Net value added or domestic product at market prices	67
6.	*Less*: indirect taxes	7
7.	Net value added at factor cost	60

Net value added at factor cost is equal to the net domestic product at factor cost, as given by the total of items 1 to 4 of Table 2 (Rs. 45+3+4+8 crores=Rs. 60 crores). By adding indirect taxes (Rs 7 crores) and depreciation (Rs 8 crores), we get gross value added or GDP which comes to Rs 75 crores.

If we add net income received from abroad to the gross value added, this gives -us, gross national income. Suppose net income from abroad is Rs. 5 crores. Then the gross national income is Rs. 80 crores (Rs. 75 crores + Rs. 5 crores) as shown in Table 3.

TABLE 3 : GROSS DOMESTIC PRODUCT

(Rs Crores)

1.	Wages and salaries	45
2.	Income from rent	3
3.	Net interest	4
4.	Profits of companies	8
	Net Value Added or NDP	60
5.	Indirect taxes	+7
6.	Depreciation	+8
	Gross Value Added or GDP	75
7.	Net income from abroad	+5
Gross National Income		80

It's Importance:

The value added method for measuring national income is more realistic than the product and income methods because it avoids the problem of double counting by excluding the value of intermediate products. Thus this method establishes the importance of intermediate products in the national economy. Second, by studying the national income accounts relating to value added, the contribution of each production sector to the value of the GNP can be found out.

For instance, it can tell us whether agriculture is contributing more or the share of manufacturing is falling, or of the tertiary sector is increasing in the current year as compared to some previous years. Third, this method is highly useful because "it provides a means of checking the GNP estimates obtained by summing the various types of commodity purchases."

It's Difficulties:

However, difficulties arise in the calculation of value added in the case of certain public services like police, military, health, education, etc. which cannot be estimated accurately in money terms. Similarly, it is difficult to estimate the contribution made to value added by profits earned on irrigation and power projects.

(G) GNP at Market Prices:

When we multiply the total output produced in one year by their market prices prevalent during that year in a country, we get the Gross National Product at market prices. Thus GNP at market prices means the gross value of final goods and services produced annually in a country plus net income from abroad. It includes the gross value of output of all items from (1) to (4) mentioned under GNP. GNP at Market Prices = GDP at Market Prices + Net Income from Abroad.

(H) GNP at Factor Cost:

GNP at factor cost is the sum of the money value of the income produced by and accruing to the various factors of production in one year in a country. It includes all items mentioned above under income method to GNP less indirect taxes.

GNP at market prices always includes indirect taxes levied by the government on goods which raise their prices. But GNP at factor cost is the income which the factors of production receive in return for their services alone. It is the cost of production. Thus GNP at market prices is always higher than GNP at factor cost. Therefore, in order to arrive at GNP at factor cost, we deduct indirect taxes from GNP at market prices. Again, it often happens that the cost of production of a commodity to the producer is higher than a price of a similar commodity in the market.

In order to protect such producers, the government helps them by granting monetary help in the form of a subsidy equal to the difference between the market price and the cost of production of the commodity. As a result, the price of the commodity to the producer is reduced and equals the market price of similar commodity.

For example if the market price of rice is Rs. 3 per kg but it costs the producers in certain areas Rs. 3.50. The government gives a subsidy of 50 paisa per kg to them in

order to meet their cost of production. Thus in order to arrive at GNP at factor cost, subsidies are added to GNP at market prices.

GNP at Factor Cost = GNP at Market Prices – Indirect Taxes + Subsidies.

(I) Net National Product (NNP):

NNP includes the value of total output of consumption goods and investment goods. But the process of production uses up a certain amount of fixed capital. Some fixed equipment wears out, its other components are damaged or destroyed, and still others are rendered obsolete through technological changes.

All this process is termed depreciation or capital consumption allowance. In order to arrive at NNP, we deduct depreciation from GNP. The word 'net' refers to the exclusion of that part of total output which represents depreciation. So NNP = GNP—Depreciation.

(J) NNP at Market Prices:

Net National Product at market prices is the net value of final goods and services evaluated at market prices in the course of one year in a country. If we deduct depreciation from GNP at market prices, we get NNP at market prices. So NNP at Market Prices = GNP at Market Prices—Depreciation.

(K) NNP at Factor Cost:

Net National Product at factor cost is the net output evaluated at factor prices. It includes income earned by factors of production through participation in the production process such as wages and salaries, rents, profits, etc. It is also called National Income. This measure differs from NNP at market prices in that indirect taxes are deducted and subsidies are added to NNP at market prices in order to arrive at NNP at factor cost. Thus

NNP at Factor Cost = NNP at Market Prices – Indirect taxes+ Subsidies

= GNP at Market Prices – Depreciation – Indirect taxes + Subsidies.

= National Income.

Normally, NNP at market prices is higher than NNP at factor cost because indirect taxes exceed government subsidies. However, NNP at market prices can be less than NNP at factor cost when government subsidies exceed indirect taxes.

(L) Domestic Income:

Income generated (or earned) by factors of production within the country from its own resources is called domestic income or domestic product.

Domestic income includes:

(i) Wages and salaries, (ii) rents, including imputed house rents, (iii) interest, (iv) dividends, (v) undistributed corporate profits, including surpluses of public undertakings, (vi) mixed incomes consisting of profits of unincorporated firms, self-employed persons, partnerships, etc., and (vii) direct taxes.

Since domestic income does not include income earned from abroad, it can also be shown as: Domestic Income = National Income-Net income earned from abroad.

Thus the difference between domestic income f and national income is the net income earned from abroad. If we add net income from abroad to domestic income, we get national income, i.e., National Income = Domestic Income + Net income earned from abroad.

But the net national income earned from abroad may be positive or negative. If exports exceed import, net income earned from abroad is positive. In this case, national income is greater than domestic income. On the other hand, when imports exceed exports, net income earned from abroad is negative and domestic income is greater than national income.

(M) Private Income:

Private income is income obtained by private individuals from any source, productive or otherwise, and the retained income of corporations. It can be arrived at from NNP at Factor Cost by making certain additions and deductions.

The additions include transfer payments such as pensions, unemployment allowances, sickness and other social security benefits, gifts and remittances from abroad, windfall gains from lotteries or from horse racing, and interest on public debt. The deductions include income from government departments as well as surpluses from public undertakings, and employees' contribution to social security schemes like provident funds, life insurance, etc.

Thus Private Income = National Income (or NNP at Factor Cost) + Transfer Payments + Interest on Public Debt — Social Security — Profits and Surpluses of Public Undertakings.

(N) Personal Income:

Personal income is the total income received by the individuals of a country from all sources before payment of direct taxes in one year. Personal income is never equal to the national income, because the former includes the transfer payments whereas they are not included in national income.

Personal income is derived from national income by deducting undistributed corporate profits, profit taxes, and employees' contributions to social security schemes. These three components are excluded from national income because they do reach individuals.

But business and government transfer payments, and transfer payments from abroad in the form of gifts and remittances, windfall gains, and interest on public debt which are a source of income for individuals are added to national income.

Thus Personal Income = National Income – Undistributed Corporate Profits – Profit Taxes – Social Security Contribution + Transfer Payments + Interest on Public Debt.

Personal income differs from private income in that it is less than the latter because it excludes undistributed corporate profits.

Thus Personal Income = Private Income – Undistributed Corporate Profits – Profit Taxes.

(O) Disposable Income:

Disposable income or personal disposable income means the actual income which can be spent on consumption by individuals and families. The whole of the personal income cannot be spent on consumption, because it is the income that accrues before direct taxes have actually been paid. Therefore, in order to obtain disposable income, direct taxes are deducted from personal income. Thus Disposable Income=Personal Income – Direct Taxes.

But the whole of disposable income is not spent on consumption and a part of it is saved. Therefore, disposable income is divided into consumption expenditure and savings. Thus Disposable Income = Consumption Expenditure + Savings.

If disposable income is to be deduced from national income, we deduct indirect taxes plus subsidies, direct taxes on personal and on business, social security payments, undistributed corporate profits or business savings from it and add transfer payments and net income from abroad to it.

Thus Disposable Income = National Income – Business Savings – Indirect Taxes + Subsidies – Direct Taxes on Persons – Direct Taxes on Business – Social Security Payments + Transfer Payments + Net Income from abroad.

(P) Real Income:

Real income is national income expressed in terms of a general level of prices of a particular year taken as base. National income is the value of goods and services produced as expressed in terms of money at current prices. But it does not indicate the real state of the economy.

It is possible that the net national product of goods and services this year might have been less than that of the last year, but owing to an increase in prices, NNP might be higher this year. On the contrary, it is also possible that NNP might have increased but the price level might have fallen, as a result national income would appear to be less than that of the last year. In both the situations, the national income does not depict the real state of the country. To rectify such a mistake, the concept of real income has been evolved.

In order to find out the real income of a country, a particular year is taken as the base year when the general price level is neither too high nor too low and the price level for that year is assumed to be 100. Now the general level of prices of the given year for which the national income (real) is to be determined is assessed in accordance with the prices of the base year. For this purpose the following formula is employed.

Real NNP = NNP for the Current Year X Base Year Index (=100) / Current Year Index

Suppose 1990-91 is the base year and the national income for 1999-2000 is Rs. 20,000 crores and the index number for this year is 250. Hence, Real National Income for 1999-2000 will be = 20000 x 100/250 = Rs. 8000 crores. This is also known as national income at constant prices.

(Q) Per Capita Income:

The average income of the people of a country in a particular year is called Per Capita Income for that year. This concept also refers to the measurement of income at current prices and at constant prices. For instance, in order to find out the per capita income for 2001, at current prices, the national income of a country is divided by the population of the country in that year.

$$\text{Per Capita Income for 2001} = \frac{\textit{National income for 2001}}{\textit{Population in 2001}}$$

Similarly, for the purpose of arriving at the Real Per Capita Income, this very formula is used.

$$\text{Real Per Capita Income for 2001} = \frac{\textit{Real national income for 2001}}{\textit{Population in 2001}}$$

This concept enables us to know the average income and the standard of living of the people. But it is not very reliable, because in every country due to unequal distribution of national income, a major portion of it goes to the richer sections of the society and thus income received by the common man is lower than the per capita income.

Methods of Measuring National Income:

There are four methods of measuring national income. Which method is to be used depends on the availability of data in a country and the purpose in hand.

(1) Product Method:

According to this method, the total value of final goods and services produced in a country during a year is calculated at market prices. To find out the GNP, the data of all productive activities, such as agricultural products, wood received from forests, minerals received from mines, commodities produced by industries, the contributions to production made by transport, communications, insurance

companies, lawyers, doctors, teachers, etc. are collected and assessed at market prices. Only the final goods and services are included and the intermediary goods and services are left out.

(2) Income Method:

According to this method, the net income payments received by all citizens of a country in a particular year are added up, i.e., net incomes that accrue to all factors of production by way of net rents, net wages, net interest and net profits are all added together but incomes received in the form of transfer payments are not included in it. The data pertaining to income are obtained from different sources, for instance, from income tax department in respect of high income groups and in case of workers from their wage bills.

(3) Expenditure Method:

According to this method, the total expenditure incurred by the society in a particular year is added together and includes personal consumption expenditure, net domestic investment, government expenditure on goods and services, and net foreign investment. This concept is based on the assumption that national income equals national expenditure.

(4) Value Added Method:

Another method of measuring national income is the value added by industries. The difference between the value of material outputs and inputs at each stage of production is the value added. If all such differences are added up for all industries in the economy, we arrive at the gross domestic product.

Difficulties or Limitations in Measuring National Income

There are many conceptual and statistical problems involved in measuring national income by the income method, product method, and expenditure method.
We discuss them separately in the light of the three methods:

(A) Problems in Income Method:

The following problems arise in the computation of National Income by income method:

1. Owner-occupied Houses:

A person who rents a house to another earns rental income, but if he occupies the house himself, will the services of the house-owner be included in national income. The services of the owner-occupied house are included in national income as if the owner sells to himself as a tenant its services.

For the purpose of national income accounts, the amount of imputed rent is estimated as the sum for which the owner-occupied house could have been rented. The imputed net rent is calculated as that portion of the amount that would have accrued to the house-owner after deducting all expenses.

2. Self-employed Persons:

Another problem arises with regard to the income of self-employed persons. In their case, it is very difficult to find out the different inputs provided by the owner himself. He might be contributing his capital, land, labour and his abilities in the business. But it is not possible to estimate the value of each factor input to production. So he gets a mixed income consisting of interest, rent, wage and profits for his factor services. This is included in national income.

3. Goods meant for Self-consumption:

In under-developed countries like India, farmers keep a large portion of food and other goods produced on the farm for self-consumption. The problem is whether that part of the produce which is not sold in the market can be included in national income or not. If the farmer were to sell his entire produce in the market, he will have to buy what he needs for self-consumption out of his money income. If, instead he keeps some produce for his self-consumption, it has money value which must be included in national income.

4. Wages and Salaries paid in Kind:

Another problem arises with regard to wages and salaries paid in kind to the employees in the form of free food, lodging, dress and other amenities. Payments in kind by employers are included in national income. This is because the employees would have received money income equal to the value of free food, lodging, etc. from the employer and spent the same in paying for food, lodging, etc.

(B) Problems in Product Method:

The following problems arise in the computation of national income by product method:

1. Services of Housewives:

The estimation of the unpaid services of the housewife in the national income presents a serious difficulty. A housewife renders a number of useful services like preparation of meals, serving, tailoring, mending, washing, cleaning, bringing up children, etc.

She is not paid for them and her services are not including in national income. Such services performed by paid servants are included in national income. The national income is, therefore, underestimated by excluding the services of a housewife.

The reason for the exclusion of her services from national income is that the love and affection of a housewife in performing her domestic work cannot be measured in monetary terms. That is why when the owner of a firm marries his lady secretary, her services are not included in national income when she stops working as a secretary and becomes a housewife.

When a teacher teaches his own children, his work is also not included in national income. Similarly, there are a number of goods and services which are difficult to be assessed in money terms for the reason stated above, such as painting, singing, dancing, etc. as hobbies.

2. Intermediate and Final Goods:

The greatest difficulty in estimating national income by product method is the failure to distinguish properly between intermediate and final goods. There is always the possibility of including a good or service more than once, whereas only final goods are included in national income estimates. This leads to the problem of double counting which leads to the overestimation of national income.

3. Second-hand Goods and Assets:

Another problem arises with regard to the sale and purchase of second-hand goods and assets. We find that old scooters, cars, houses, machinery, etc. are transacted daily in the country. But they are not included in national income because they were counted in the national product in the year they were manufactured.

If they are included every time they are bought and sold, national income would increase many times. Similarly, the sale and purchase of old stocks, shares, and bonds of companies are not included in national income because they were included in national income when the companies were started for the first time. Now they are simply financial transactions and represent claims.

But the commission or fees charged by the brokers in the repurchase and resale of old shares, bonds, houses, cars or scooters, etc. are included in national income. For these are the payments they receive for their productive services during the year.

4. Illegal Activities:

Income earned through illegal activities like gambling, smuggling, illicit extraction of wine, etc. is not included in national income. Such activities have value and satisfy the wants of the people but they are not considered productive from the point of view of society. But in countries like Nepal and Monaco where gambling is legalized,

it is included in national income. Similarly, horse-racing is a legal activity in England and is included in national income.

5. Consumers' Service:

There are a number of persons in society who render services to consumers but they do not produce anything tangible. They are the actors, dancers, doctors, singers, teachers, musicians, lawyers, barbers, etc. The problem arises about the inclusion of their services in national income since they do not produce tangible commodities. But as they satisfy human wants and receive payments for their services, their services are included as final goods in estimating national income.

6. Capital Gains:

The problem also arises with regard to capital gains. Capital gains arise when a capital asset such as a house, some other property, stocks or shares, etc. is sold at higher price than was paid for it at the time of purchase. Capital gains are excluded from national income because these do not arise from current economic activities. Similarly, capital losses are not taken into account while estimating national income.

7. Inventory Changes:

All inventory changes (or changes in stocks) whether positive or negative are included in national income. The procedure is to take changes in physical units of inventories for the year valued at average current prices paid for them.

The value of changes in inventories may be positive or negative which is added or subtracted from the current production of the firm. Remember, it is the change in inventories and not total inventories for the year that are taken into account in national income estimates.

8. Depreciation:

Depreciation is deducted from GNP in order to arrive at NNP. Thus depreciation lowers the national income. But the problem is of estimating the current depreciated value of, say, a machine, whose expected life is supposed to be thirty years. Firms calculate the depreciation value on the original cost of machines for their expected life. This does not solve the problem because the prices of machines change almost every year.

9. Price Changes:

National income by product method is measured by the value of final goods and services at current market prices. But prices do not remain stable. They rise or fall. When the price level rises, the national income also rises, though the national production might have fallen.

On the contrary, with the fall in the price level, the national income also falls, though the national production might have increased. So price changes do not adequately measure national income. To solve this problem, economists calculate the real national income at a constant price level by the consumer price index.

(C) Problems in Expenditure Method:

The following problems arise in the calculation of national income by expenditure method:

(1) Government Services:

In calculating national income by, expenditure method, the problem of estimating government services arises. Government provides a number of services, such as police and military services, administrative and legal services. Should expenditure on government services be included in national income?

If they are final goods, then only they would be included in national income. On the other hand, if they are used as intermediate goods, meant for further production, they would not be included in national income. There are many divergent views on this issue.

One view is that if police, military, legal and administrative services protect the lives, property and liberty of the people, they are treated as final goods and hence form part of national income. If they help in the smooth functioning of the production process by maintaining peace and security, then they are like intermediate goods that do not enter into national income.

In reality, it is not possible to make a clear demarcation as to which service protects the people and which protects the productive process. Therefore, all such services are regarded as final goods and are included in national income.

(2) Transfer Payments:

There arises the problem of including transfer payments in national income. Government makes payments in the form of pensions, unemployment allowance, subsidies, interest on national debt, etc. These are government expenditures but they are not included in national income because they are paid without adding anything to the production process during the current year.

For instance, pensions and unemployment allowances are paid to individuals by the government without doing any productive work during the year. Subsidies tend to lower the market price of the commodities. Interest on national or public debt is also considered a transfer payment because it is paid by the government to individuals and firms on their past savings without any productive work.

(3) Durable-use Consumers' Goods:

Durable-use consumers' goods also pose a problem. Such durable-use consumers' goods as scooters, cars, fans, TVs, furniture's, etc. are bought in one year but they are used for a number of years. Should they be included under investment expenditure or consumption expenditure in national income estimates? The expenditure on them is regarded as final consumption expenditure because it is not possible to measure their used up value for the subsequent years.

But there is one exception. The expenditure on a new house is regarded as investment expenditure and not consumption expenditure. This is because the rental income or the imputed rent which the house-owner gets is for making investment on the new house. However, expenditure on a car by a household is consumption expenditure. But if he spends the amount for using it as a taxi, it is investment expenditure.

(4) Public Expenditure:

Government spends on police, military, administrative and legal services, parks, street lighting, irrigation, museums, education, public health, roads, canals, buildings, etc. The problem is to find out which expenditure is consumption expenditure and which investment expenditure is.

Expenses on education, museums, public health, police, parks, street lighting, civil and judicial administration are consumption expenditure. Expenses on roads, canals, buildings, etc. are investment expenditure. But expenses on defence equipment are treated as consumption expenditure because they are consumed during a war as they are destroyed or become obsolete. However, all such expenses including the salaries of armed personnel are included in national income.

Importance of National Income Analysis:

The national income data have the following importance:

1. For the Economy:

National income data are of great importance for the economy of a country. These days the national income data are regarded as accounts of the economy, which are known as social accounts. These refer to net national income and net national expenditure, which ultimately equal each other.

Social accounts tell us how the aggregates of a nation's income, output and product result from the income of different individuals, products of industries and transactions of international trade. Their main constituents are inter-related and each particular account can be used to verify the correctness of any other account.

2. National Policies:

National income data form the basis of national policies such as employment policy, because these figures enable us to know the direction in which the industrial output, investment and savings, etc. change, and proper measures can be adopted to bring the economy to the right path.

3. Economic Planning:

In the present age of planning, the national data are of great importance. For economic planning, it is essential that the data pertaining to a country's gross income, output, saving and consumption from different sources should be available. Without these, planning is not possible.

4. Economic Models:

The economists propound short-run as well as long-run economic models or long-run investment models in which the national income data are very widely used.

5. Research:

The national income data are also made use of by the research scholars of economics. They make use of the various data of the country's input, output, income, saving, consumption, investment, employment, etc., which are obtained from social accounts.

6. Per Capita Income:

National income data are significant for a country's per capita income which reflects the economic welfare of the country. The higher the per capita income, the higher the economic welfare of the country.

7. Distribution of Income:

National income statistics enable us to know about the distribution of income in the country. From the data pertaining to wages, rent, interest and profits, we learn of the disparities in the incomes of different sections of the society. Similarly, the regional distribution of income is revealed.

It is only on the basis of these that the government can adopt measures to remove the inequalities in income distribution and to restore regional equilibrium. With a view to removing these personal and regional disequibria, the decisions to levy more taxes and increase public expenditure also rest on national income statistics.

Inter-Relationship between different concepts of National Income

The inter-relationship among the various concept of national income can be shown in the form of equations as under:

1.	Gross National Product (GNP)	= Gross National Expenditure (GNE)
2.	Gross Domestic Product (GDP)	= GNP – Net Income from abroad.
3.	GNP at Market Prices	= GNP at Factor Cost + Indirect Taxes – Subsidies
4.	NNP at Market Prices	= GNP at Market Prices – Depreciation or Capital Consumption Allowance
5.	Net Domestic Product (NDP) at Market Prices	= NNP at Market Prices – Net Factor Income from abroad
6.	NNP at Factor Cost or National Income or National Product	= NNP at Market Prices – Indirect Taxes + Subsidies
7.	NDP at Factor Cost or Domestic Income or Domestic Product	= National Income – Net Factor Income from abroad
8.	Private Income	= NNP at Factor Cost + Government and Business Transfer Payments + Current Transfers from abroad in the form of Gifts and Remittances + Windfall Gains + Net Factor Income from abroad + Interest on Public Debt and Consumer Interest – Social Security Contribution – Income from Government Departments and property – Profits and Surpluses of Public Corporations (or Undertakings) Or = Income from Domestic Product accruing to Private Sector + Interest on Public Dept + Net Factor Income from abroad + Transfer Payments + Current Transfers from the rest of the world (or abroad) NDP at Factor Cost – Income from
9.	Income from Domestic Product accruing to Private Sector	= Domestic Product accruing to Government Departments – Saving of Non-Departmental Enterprises.
10.	Personal Income	= Private Income – Saving of Private Corporate Sector (or Undistributed Corporate Profits) – Corporation Tax (or Profit Taxes)
11.	Personal Disposable Income or Disposable Income	= Personal Income – Direct Taxes paid by Households (or Direct Personal Taxes) and Miscellaneous Fees, Fines, etc. Or = NDP at Factor Cost + Transfer Payments + Net Factor Income from abroad – Corporation Tax – Undistributed Corporate Profits – Social Security Payments – Direct Personal Taxes Or = National Income at Factor Cost + Transfer Payments + Net Income from abroad – Corporate Tax – undistributed Corporate Profits – Social Security payments – Direct Personal Taxes – Indirect Taxes + Subsidies.

Inflation:

The word inflation is derived from the Latin “Inflare” and means to increase or to balloon.

In economics, inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services.

The following are the types of inflation:

1- Hyperinflation: An extremely high rate of inflation is known as hyperinflation. It is a state of galloping inflation. N. Gregory Mankiw has defined Hyperinflation as "inflation that exceeds 50% per month, which is just over 1% over per day.
2- Suppressed Inflation: Suppressed inflation is a situation where deliberate policies are pursued to prevent price rises in the present, but it is only a temporary suppression of inflation.

Deflation: this means a fall in prices, the opposite of inflation.
Disinflation: It refers to the slowing of the rate of inflation, that is, prices are still rising, but at a slower rate than before. It implies the process of bringing down prices moderately from their previous higher level.
3- Reflation: It is a term used to denote inflation after a period of deflation, meaning inflation designed to restore prices to a previous level.
4- Crawling Inflation: Crawling inflation is where inflation is low and which moves up and down slowly.

Based on its cases or sources, we can identify three kinds of inflation
a. Administered Pricing
b. Demand Pull Inflation
c. Cost Pull Inflation

Administered Pricing: Inflation caused by the revision of prices by the government.
Demand Pull Inflation: Demand-pull inflation arises when aggregate demand outpaces aggregate supply in an economy.
Cost Pull Inflation: This is because of rise in costs. Cost-push inflation or supply-shock inflation is a type of inflation caused by large increases in the cost of important goods or services where no suitable alternative is available.

General Causes of Inflation in India

Following are the main causes of inflation in India:
1. Supply Constraints
2. Demand Accelerators

Following are the main **supply constraints** because of which prices rise in India:
1. Fluctuation in Agricultural Output
2. Hoarding of Essential Goods
3. Low growth of Industrial Sector
4. Increment in Administered Prices
5. Restriction on Imports

The various factors that have **accelerated demand** thus have resulted in the increase in prices are:
1. Growth of Population
2. Increment in Income and Employment
3. Urbanization

Monetary and fiscal factors have also contributed to price rise in the India as they work as demand accelerations. The following are important reasons in this respect:

1. Rising Level of Government Spending
2. Deficit Financing

Impact of Inflation

Inflation influences and touches the life of every individual and corporate entity. Hence, inflation influences the decisions affects our lives in the following ways:

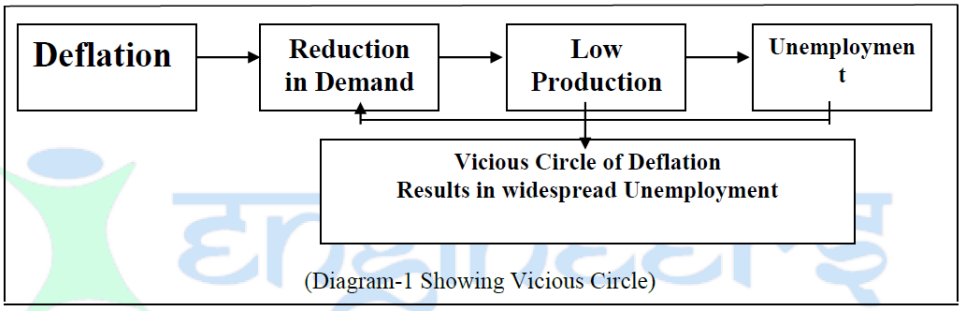
1. Indirect Tax
2. Shoe Leather Costs
3. Menu costs
4. Variability in Relative Prices
5. Negative Impact on Export
6. Change in Yardstick
7. Tax Anomaly
8. Redistribution
9. Reduction in Investment and Saving
10. Vicious Circle of Inflation

Measures to Control Inflation

Monetary Policy: Inflation can be controlled by controlling the supply of money in the economy. The central bank, through its monetary policy, can control inflation to a certain extent. Through various measures like CRR, SLR, Bank Rate, Open Market Operations, Moral Suasion (for details see chapter of Monetary Policy), etc. the Central bank can increase or decrease the supply of currency in the economy and thus control inflation to some extent.

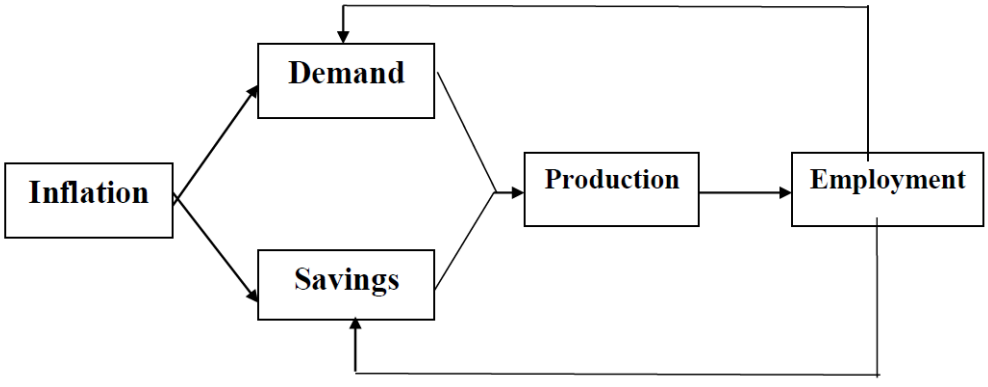
Price Controls

This vicious circle can be understood from the following equation



(Diagram-1 Showing Vicious Circle)

This can be understood from the following diagram:



So thus see that mild inflation is better than no inflation at all. This is true especially for a country which is in the take off stage of development.

Monetary Policy

Monetary policy is concerned with the measures taken to regulate the supply of money, the cost and availability of credit in the economy. Further, it also deals with the distribution of credit between uses and users and also with both the lending and borrowing rates of interest of the banks. In developed countries the monetary policy has been usefully used for overcoming depression and inflation as an anti-cyclical policy.

However, in developing countries it has to play a significant role in promoting economic growth. As Prof. R. Prebisch writes, “The time has come to formulate a monetary policy which meets the requirements of economic development, which fits into its framework perfectly.” Further, along with encouraging economic growth,

the monetary policy has also to ensure price stability, because the excessive inflation not only has adverse distribution effect but hinders economic development also.

It is important to understand the distinction between objectives or goals, targets and instruments of monetary policy. Whereas goals of monetary policy refer to its objectives which, as mentioned above, may be price stability, full employment or economic growth, targets refer to the variables such as supply of money or bank credit, interest rates which are sought to be changed through the instruments of monetary policy so as to attain these objectives.

The various instruments of monetary policy are changes in the supply of currency, variations in bank rates and other interest rates, open market operations, selective credit controls, and variations in reserve requirements. We shall first explain below the objectives or goals of monetary policy in a developing economy with special reference to those adopted by Reserve Bank of India.

After having explained the objectives we shall explain role of monetary policy in promoting economic growth in a developing country like India. In the end we will explain monetary policy of reserve Bank of India in different periods of planned development, especially soft interest and liberal credit policy adopted by Reserve Bank of India since 1996.

Objectives of Monetary Policy:

Before explaining in detail the monetary measures undertaken by RBI to regulate credit and growth of money supply, it is important to explain the objectives of monetary policy pursued of RBI in formulation of its policy. Since monetary policy is one instrument of economic policy, its objectives cannot be different from those of overall economic policy.

The three important objectives of monetary policy are:

1. Ensuring price stability, that is, containing inflation.

2. To encourage economic growth.

3. To ensure stability of exchange rate of the rupee, that is, exchange rate of rupee with the US dollar, pound sterling and other foreign currencies.

Fiscal Policy

Fiscal policy refers to the guiding principles of the financial work which are constituted by the state based on political, economic and social development tasks under a certain period. Its purpose is to regulate aggregate demand through government's spending and tax policies. On the one hand, an increase in government spending will stimulate aggregate demand and increase the national income. Correspondingly, a decrease will depress aggregate demand and reduce national income. On the other hand, a tax is a kind of contraction strength to national income. Therefore, the aggregate demand and the national income will be restrained though increasing government revenue. And they will be increased due to reducing in government revenue as well. The fiscal policy with a distinct class character is formulated by the state, represents the will and interests of the ruling class, and is subject to a certain level of development of social productive forces and economic relations. The state fiscal policy is an integral part of overall economic policy, and is closely linked with the other economic policies. In fact, the development and implementation of fiscal policy must be cooperated with the financial policy, industrial policy and income distribution policy and other economic policy.
The important role played by the **fiscal policy in a developing economy** can be explained through:

Fiscal policy during inflation,

Fiscal policy during depression,

Fiscal policy and unemployment,

Fiscal policy and income inequalities and

Fiscal policy and economic growth.

Fiscal Policy during Inflation

Inflation is a period in which the purchasing power with, the people in the economy is high. The first step to curb inflation is to control the purchasing power with the people. This can be done using all the tools of fiscal policy. For instance, during inflation, since the private expenditure is high the government should bring down the public expenditure so that, to that extent the income generation will be controlled. Alternatively, the government can increase the existing tax rates or impose new taxes. This will have the effect of taking away the purchasing power from the rich and well-to-do people thereby curbing the consumption expenditure. The tax revenue will then be used for public expenditure purposes which will also be low during inflation. Hence, there will be effective control of money supply in the economy. Another way in which the fiscal authorities can function is to indulge in public borrowing. The government may start borrowing from the people in large scale so that the disposable income with the people will be reduced bringing down the demand and prices. If voluntary lending is not effective, then the government may resort to involuntary lending or compulsory saving by the people. Through its debt management policy also the fiscal authorities can control inflation. The anti-inflation debt management requires the retirement or payment of bank-held securities or debts through budgetary surplus. But this is very difficult in practice as in a developing country the government cannot have budgetary surplus.

Fiscal Policy during Depression

Depression is a period characterized by low income, low employment and low consumption. Fiscal policy should change this situation. The government must adopt deficit budget in order to increase the income stream in the economy through increased injection of fresh purchasing power into the economy. Secondly, the government must encourage consumption and investment and for this purpose the taxation should be brought down. Liberalized corporate tax policy will also help to increase the corporate expenditure giving the necessary thrust for the revival of economic activity. Public expenditure during this period must be increased. The government can achieve this either through pump priming or compensatory spending. Pump priming refers to the initiation of investment activity by the government through its expenditure on public projects which will be followed up by the increased private investment. Compensatory spending is resorted to when the private investment is not adequate enough. Then the government also injects public investment through public projects. Public debt policy can be suitably modified to fight against depression. The government should borrow more from the rich people

and spend this amount in large scale on public works, and social security projects. All these steps will help to protect the economy and enable it to recover from depression.

Fiscal Policy and Unemployment

Fiscal policy plays a vital role in generating employment opportunities in the developing countries. In a developing economy, it should aim at solving the problem of both cyclical unemployment and disguised unemployment. While the former is of temporary nature, the latter has the snow-balling effect. The latter refers to a situation in which more than the required number of people are employed in a job. In other words, by reducing the excess of labor from that job, the productivity or production will not be affected. Hence, it has been found that fiscal policy alone cannot solve this problem of unemployment in a developing economy. It has to be coupled with monetary policy. For instance, during inflationary period, the government should adopt surplus budget, along with hard money policy, while during depression, deficit budget should be combined with cheap money policy.

Fiscal Policy and Income Inequalities

The role of fiscal policy in removing income inequalities in a developing economy cannot be exaggerated. With public expenditure and taxation, the government can very easily achieve income equality. The government should devise its public expenditure scheme by focusing on the poor and down-trodden people in the society. It may provide cheap food, cheap cloth, subsidized housing, free medical aid, free education, etc., to the poor people thereby raising their standard of living. For this purpose, the government should raise funds by imposing taxes on the rich people so as to bring down their purchasing power. It may completely or partially relieve the poor people from the tax net. This has the effect of-taking away as much as possible from the rich people and spending on poor people. It may also resort to large dose of indirect taxes so as to make the rich bear the burden as the poor will be paying such taxes only if they spend on items on which the government has imposed heavy indirect taxes. Therefore, taxation and public expenditure are the two very useful instruments of fiscal policy which can bring about the income equality in a developing economy.

Fiscal Policy and Economic Growth

Economic growth calls for the application of all the tools of fiscal policy. In developing economy, there may be no shortage of real or physical resources, but there may be a severe shortage of financial resources which are required to utilize the physical resources. The object of fiscal authorities should be to mobilize much funds as possible so as to carry out large scale public projects. A very effective method of mobilizing financial resources is taxation. The government can resort to both the direct as well as indirect taxes so as to generate as much funds as possible from all those who have the ability to pay. Different type of direct taxes and indirect taxes may be levied to cover every section of the population. There can be specific taxes to curb certain consumption activities. Another instrument available is public debt. Apart from the voluntary lending schemes the government should also devise schemes to encourage compulsory savings. Resources mobilized in this manner should be spent in such a way that the infrastructural facilities are strengthened first. This should be followed by the expenditure on growth oriented industries and other related activities. Care should be taken to avoid creating or widening sectoral imbalance so that the benefits of growth will be shared by all the sectors in the economy. Government must use its planning machinery to identify the right priorities so that the hard mobilized funds are utilized in the best way possible. In this process now-a-days the governments also resort to deficit financing. It is considered as a means of financing economic development. But too much reliance on deficit financing will also be dangerous. However, fiscal policy can play a vital role in helping to achieve a rapid economic growth.