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Manmohan Joshi

# Managerial Economics

MANMOHAN JOSHI

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# **MANAGERIAL ECONOMICS**

Managerial Economics

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# ABOUT THE AUTHOR

Dr. Manmohan Joshi, M.A., M.Ed., Cert. Educational Admin, Dip. HRD, Dip. Mgmt. (UK), MBA, Ph.D. (Mgmt.), has over 50 years' teaching, training and administrative experience. He has worked as Principal of large and reputed educational institutions in India, Kuwait and the Sultanate of Oman.

For his work on Innovative Practices in Value Education he was awarded by the National Council of Educational Research and Training, India.

He is also the recipient of the Best Teacher Award from the Govt. of Tamilnadu as well as the Central Board of Secondary Education, India.

He has presented papers at various national and international conferences under the auspices of UNESCO. He has also conducted various workshops for teachers, students, parents and administrators. The topics covered a wide area viz., Leadership and Team Building, Value Education, Administration Skills, Career Choice, Effective Decision Making in Administration, Effective Communication Skills, Interpersonal Relationships, Continuous Comprehensive Evaluation, Skills in Dealing with Managers, Secretarial Skills. He has also authored several books on different subjects.

Later he worked as Acting Chief Executive for a reputed Training Institute in the Sultanate of Oman.

His recent formal official assignment was at a group of educational institutes in Bangalore, India, where he conducted workshops and training programmes – especially training in Soft Skills and Business Communication – for college professors and students, and taught students of MBA, B.Ed. and Law.

Currently he is a freelancer and conducts workshops and training programmes for college students, professors as well as those working in the corporate sector – particularly in the area of Soft Skills, Business Communication, Pedagogy of Teaching, Guidance and Counselling at College/School level.

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# PREFACE

The understanding of Economics plays a significant role in our lives. The success of a business organisation depends greatly on the managers having a keen insight about the principles of managerial economics

This book is an attempt to highlight the need for managers to understand and implement these principles in managing their organisations, and is likely to be of great use to existing as well as aspiring managers.

I'd like to express my gratitude to Sophie Tergeist for encouraging me at all stages.

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*Manmohan Joshi*

# 1 MEANING AND IMPORTANCE

## 1.1 INTRODUCTION

Economics impacts our day-to-day lives, and also influences the decisions taken by managers of business firms. Any business is part of an economy, and so economic conditions heavily impact business activities and vice versa. Hence in order to understand the market and apply appropriate strategies for planning, forecasting, production, pricing, supply etc. management practitioners and academicians developed Managerial Economics.

### 1.1.1 MEANING

Managerial economics deals with the application of various economic theories, principles, concepts and techniques to business management in order to solve business and management problems. It deals with the practical application of economic theory and methodology in decision making problems faced by private, public and non-profit organisations.

Spencer and Siegelman (1959) have expressed that:

*"Managerial economics is the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by the management".*

McNair and Meriam (1941) have said that:

*"Managerial economics is the use of economic modes of thought to analyse business situation".*

In fact, managerial economics can be defined as:

*"An amalgamation of economic theory with business practices so as to ease decision-making and future planning by management".*



## 1.2 IMPORTANCE

The main difference between the branches of economics is that traditional economics is primitive and is used in underdeveloped and less technologically advanced economies, whereas managerial economics is a result of globalisation and evolution of economies to include managerial decision-making.

Managerial economics helps in various ways, such as the following:

- Managerial economics is a discipline that combines economic theory with managerial practice. It helps in covering the gap between the problems of logic and the problems of policy. It offers powerful tools and techniques for managerial policy making.
- Managerial economics seeks to understand and to analyse the problems of business decision-making.
- Study of managerial economics helps in enhancement of analytic skills, assists in rational configuration as well as solution of problems.
- Managerial economics estimates economic relationships between different business factors such as income, elasticity of demand, cost volume, profit analysis etc. It assists the management in predicting various economic factors such as cost, profit, demand, capital, production, price etc.
- Managerial economics has a big role in managerial decision-making. It has applications in both profit and non-profit sectors. For example, an administrator of a non-profit hospital strives to provide the best medical care possible given limited medical staff, equipment and related resources.

## 1.3 FEATURES

The features of managerial economics are as follows:

- It studies the problems and principles of an individual business firm or an individual industry.
- It is pragmatic and highlights the practical application of various economic theories to solve business and management problems.
- It focuses on decision-making process, decision models and decision variables and their relationships.
- It uses various macro-economic concepts like national income, inflation, deflation, trade cycles, etc. to understand and adjust its policies to the environment in which the firm operates.

- It is both conceptual and metric in nature, and assists the decision maker through precise and evident measurement of various economic variables and their interrelationships.
- It also gives importance to the study of non-economic variables having implications on economic performance of the firm, for example, impact of technology, environmental forces, socio-political and cultural factors, etc.
- It uses the services of many other related sciences like mathematics, statistics, engineering, operational research and psychology to find solutions to business and management problems.
- It is prescriptive rather than descriptive.

However, managerial economics does not provide ready-made solutions to all kinds of problems faced by a firm. It provides only the logic and the methodology to find out the answers, but not the answers themselves. It all depends on the manager's ability, experience, expertise and intelligence to use different tools of economic analysis to find out the correct answers to business problems.

## 1.4 NATURE

The nature of managerial economics can be described as follows:

- It is both an art and science.
- It makes use of micro-economics.
- It also uses macro-economics.
- It is multi-disciplinary.
- It is prescriptive/normative.
- It is pragmatic.
- It is management oriented.

Fig. 1/1 below shows this.

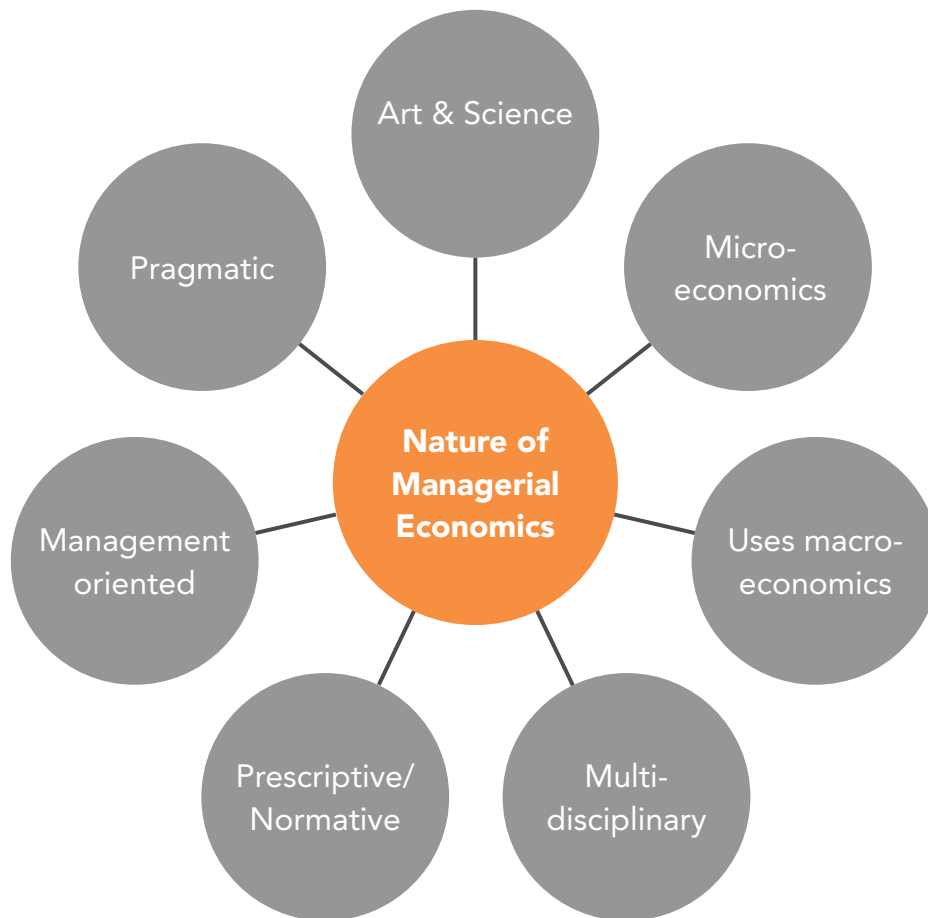


Fig.1/1 Nature of Managerial Economics

## 1.5 SCOPE

The scope of managerial economics is a continual process, as it is a developing science. Demand analysis and forecasting, profit management, and capital management are also considered under the scope of managerial economics.

Managerial economics is widely applied in organisations to deal with different business issues. Business and its functioning are equally affected both by Micro-economics and Macro-economics.

### 1.5.1 MICRO-ECONOMICS APPLIED TO OPERATIONAL ISSUES

It covers the following areas:

- **Theory of demand:** Generally, a firm produces different kinds of goods and services in order to meet the requirements of consumers. The following basic problems are to be addressed by a firm:
  - What to produce;
  - Where to produce;
  - For whom to produce;
  - How to produce;
  - How much to produce; and
  - How to distribute them in the market.

Hence the firm has to study in detail about the various determinants of demand, nature, composition and characteristics of demand, elasticity of demand, demand distinctions, demand forecasting etc. The production plan prepared by a firm should include all these points.

- **Theory of production and production decisions:** Physical production deals with the production of outputs by a firm, by employing different factor inputs in proper proportions. The most basic goal of any firm is to increase the output. Decision based on production analysis deals with production function, laws of returns, returns to scale, economies of scale, etc.
- **Pricing theory and analysis of market structure:** The most important policy of any firm would be the price setting policy. The pricing decision depends on the revenue, income and profits earned by a firm. Hence, we have to study price-output determination under different market conditions, objectives and considerations of pricing policies, pricing methods, practices, policies, etc. In order to do this, information has to be collected and analysed on market structure and conditions of various markets. It is the most important part of the business. The nature, extent and degree of competition, number of sellers and buyers, etc. determine the nature of policies to be adopted by a firm in the market.
- **Profit analysis and management:** The success or failure of a business firm is measured in terms of the amount of profit it is able to earn in a competitive market. There are many theories in profit management, such as the following:
  - The emergence of profit;
  - Functions of profit and its measurement;
  - Profit policies;
  - Techniques;
  - Profit planning;
  - Profit forecasting; and
  - Break-even point.

- **Theory of capital and investment decisions:** The success of any business is based on proper management and adequate capital investment. Business managers, as part of cost-benefit analysis, have to study the cost of employing capital and the rate of return expected from each and every project. Under capital management, managers should assess the following:
  - Capital requirement;
  - Methods of capital mobilisation;
  - Capital budgeting;
  - Optimal allocation of capital;
  - Selection of highly profitable projects;
  - Cost of capital;
  - Return on capital; and
  - Planning and control of capital expenditure, etc,

### 1.5.2 MACRO-ECONOMICS APPLIED TO BUSINESS ENVIRONMENT

It covers the following areas:

- **Economic environment:** The external environment has a significant role in managerial economics. Given below are some examples of external environment impacting managerial economics:
  - Macroeconomic management of the country relating to economic system, national income, trade cycles and its impact on the working of a firm;
  - Budgetary operations of the government and their implications on the firm;
  - Impact of liberalisation, globalisation and privatisation on the operations of a firm;
  - Impact of international changes in financial and trade institutions.
- **Social environment:** The following factors are covered under this:
  - Problems related to environment pollution, government policies related to environmental issues, and their impact on the policies and business of a firm;
  - Socio-political, cultural and other external forces and their influence on business operations.
- **Political environment:** There should be knowledge and information about various government policies (change in government may mean economic changes) and their impact on the working of a firm. These could include policies such as:

- Monetary;
- Fiscal;
- Physical;
- Industrial;
- Labour;
- Foreign trade;
- Foreign capital;
- Technology, etc.

Fig. 1/2 below shows the scope of Managerial Economics

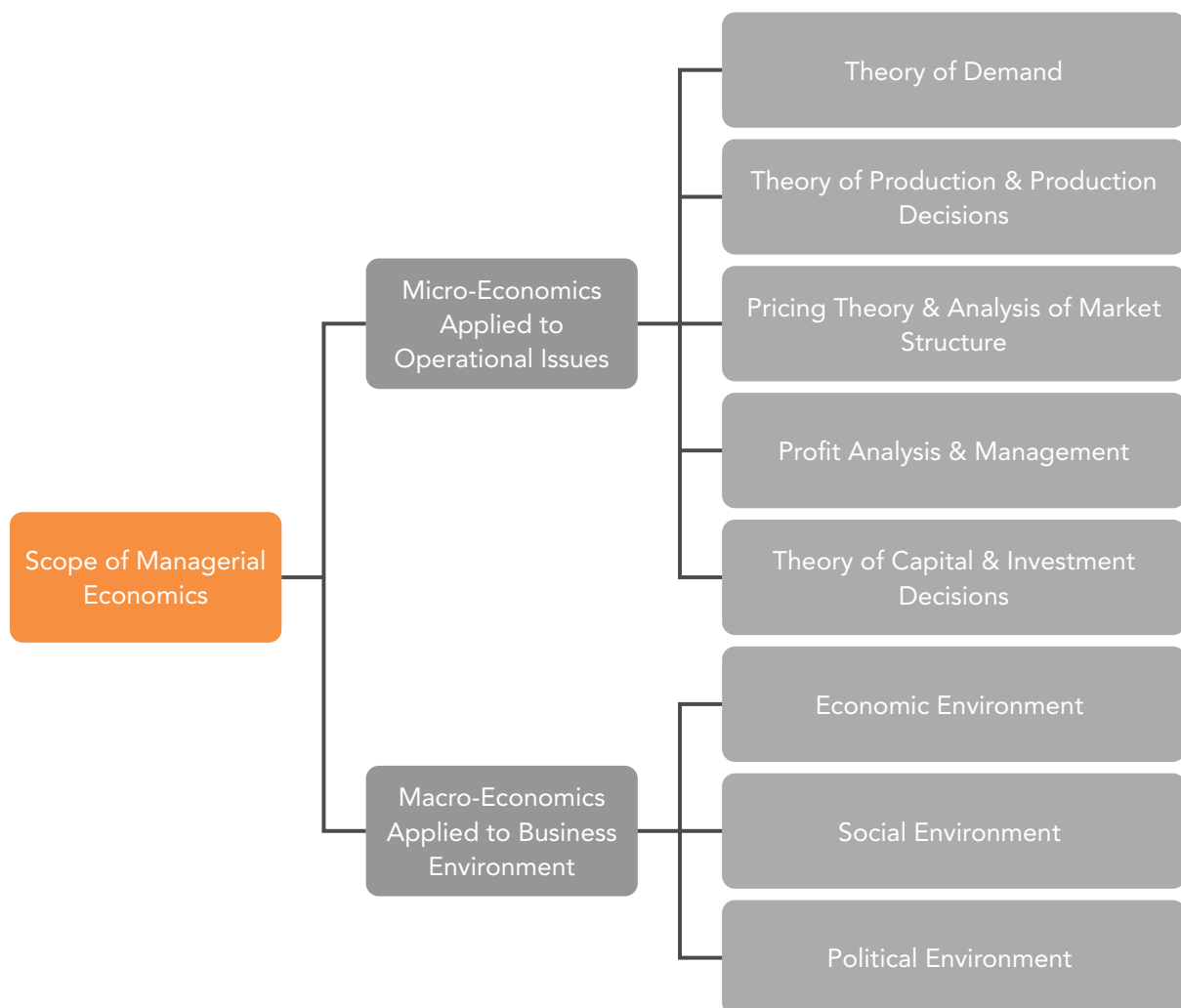


Fig. 1/2 Scope of Managerial Economics

## 1.6 IMPORTANT PRINCIPLES OF MANAGERIAL ECONOMICS

The following are generally considered to be significant basic economic tools that help a managerial economist:

- **Opportunity cost concept:** It is useful in decision involving a choice between different alternative courses of action. Resources are scarce and we cannot produce all the commodities. Opportunity cost of a decision is the sacrifice of alternatives required by that decision.
- **Incremental principle:** It states that a decision is said to be rational and sound if given the firm's objective of profit maximisation. It leads to increase in profit, which is in either of two scenarios:
  - If total revenue increases more than total cost;
  - If total revenue declines less than total cost.
- **Time perspective principle:** According to this principle, a manager should give due emphasis both to short-term and long-term impact of their decisions, giving apt significance to the different time periods before reaching any decision.
- **Discounting principle:** Discounting is a process used to transform future currency into an equivalent one at present.
- **Equi-marginal principle:** The laws of equi-marginal utility state that a consumer will reach the stage of equilibrium when the marginal utilities of various commodities they consume are equal.



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## 2 DEMAND ANALYSIS

### 2.1 INTRODUCTION

The survival and growth of a business firm is greatly influenced by the demand for a firm's offerings (goods and/or services).

Demand analysis is the process of understanding the customer demand for a product or service in a target market. Companies use demand analysis techniques to determine if they can successfully enter a market and generate expected profits to expand their business operations.

#### 2.1.1 FACTORS IN DEMAND ANALYSIS

The following factors form part of demand analysis:

- **Market identification:** The first step of market analysis is to define and identify the specific market to target with new products or services.
- **Business cycle:** Once a potential market is identified, companies will assess what stage of the business cycle the market is in.
- **Product niche:** The market niche defines the product features aimed at satisfying specific market needs, as well as price range, production quality, and the demography that it is intended to target.
- **Growth potential:** It is an organisation's future ability to generate larger profits, expand its workforce and increase production. It is often a guide for investment interest from public and private investors.
- **Competition:** It is a process of companies and individuals competing in the same industry.

#### 2.1.2 OBJECTIVES AND IMPORTANCE OF DEMAND ANALYSIS

- **Objectives:**
  - It aids in forecasting sales and revenues;
  - It provides guidance for manipulation of demand;
  - It provides basis for analysing market influence on different products manufactured by a business unit and helps in adjusting and adapting such influences.



- **Importance:**
  - The analysis of demand helps a firm to formulate marketing decisions;
  - The demand analysis analyses and measures the forces that determine demand;
  - The demand analysis considers the situation that demand can be influenced by manipulating the factors on which consumers base their demand on attractive packaging.

## 2.2 MEANING OF DEMAND

In economics demand refers to given quantity of a commodity or a service that is bought by the consumer in the market at a particular price and at a particular time.

Fig. 2/1 below shows this phenomenon.



Fig. 2/1 Meaning of Demand

Some of the significant features of demand are these:

- It is backed by adequate purchasing power of the consumer.
- There is always a price for it.
- It has to be expressed in terms of specific quantity.
- It is related to time.
- Demand is created by consumers.
- It depends on the utility of a product.
- The higher the utility, higher would be the demand, and lower the utility, lower would be the demand.

### 2.2.1 INDIVIDUAL DEMAND SCHEDULE

The demand schedule explains the functional relationship between price and quantity. It is a list of various amounts of a commodity that a consumer is willing to buy (and so seller to sell) at different prices at a particular period of time. The schedule in Table 2/1 below shows that people buy more when price is low and buy less when price is high.

Price (in \$)	Quantity demanded in Units
10	100
8	200
6	300
4	400
2	500

**Table 2/1:** Individual Demand Schedule

### 2.2.2 MARKET DEMAND SCHEDULE

When the demand schedules of all buyers are taken together, we get the aggregate or market demand schedule. It refers to the aggregate behaviour of the entire market rather than mere totalling of individual demand schedules. Table 2/2 below gives an example of market demand schedule.

Price (in \$)	A	B	C	Total market demand
10	100	200	300	600
8	200	300	400	900
6	300	400	500	1200
4	400	500	600	1500
2	500	600	700	1800

**Table 2/2:** Market Demand Schedule

### 2.2.3 DETERMINANTS OF DEMAND

Demand for a commodity or service is determined by a number of factors, such as the following:

- Price of the commodity;
- Prices of other substitutes;
- Inflation or deflation in the country;
- Living standards of the people;
- Size and composition of population;
- Customs, habits, fashion etc;
- Publicity;
- Climatic conditions.

A business executive should have the knowledge and information about all these factors and forces in order to finalise their own production, marketing and other business strategies,

### 2.2.4 DEMAND CURVE

A demand curve is a locus of points showing various alternative price-quantity combinations.

Fig. 2/2 below shows the demand curve.

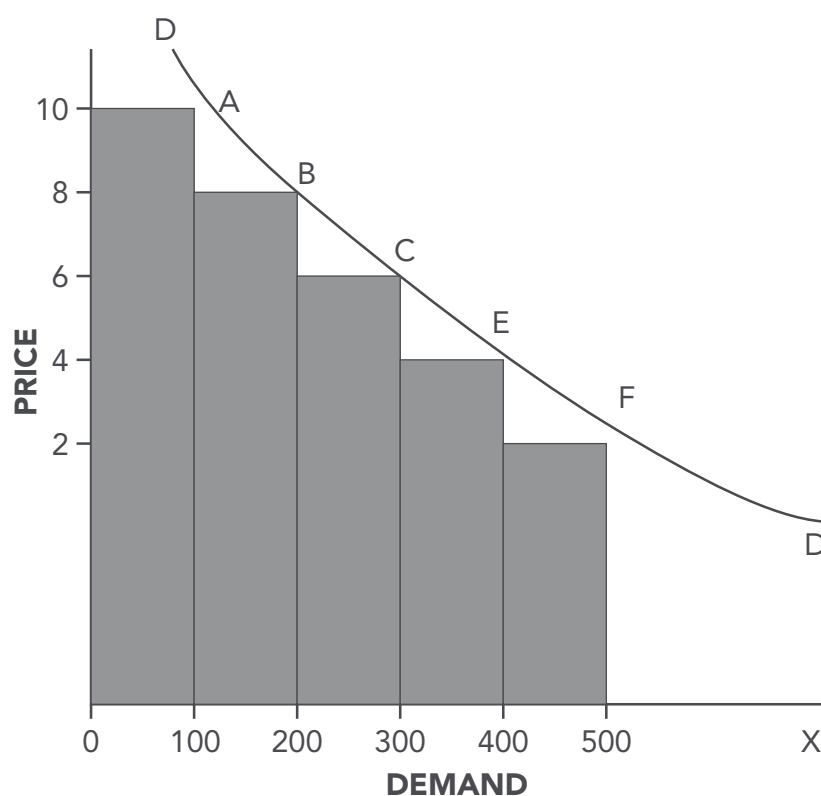


Fig. 2/2 Demand Curve

## 2.3 THE LAW OF DEMAND

The law of demand explains the relationship between price and quantity demanded of a commodity. It means that demand varies inversely with the price. We can say that:

*"Keeping other factors that affect demand constant, a fall in price of a product leads to increase in quantity demanded and a rise in price leads to decrease in quantity for the product".*

In mathematical terms we can say that:

- $D = F(P)$
- D represents Demand
- P stands for Price
- F denotes functional relationship

### 2.3.1 FEATURES OF THE LAW OF DEMAND

Some of the significant features of the law of demand are as follows:

- There is an inverse relationship between price and quantity demanded.
- Price is an independent variable and demand is a dependent variable.
- It is only a qualitative statement and as such it does not indicate quantitative changes in price and demand
- Generally, the demand curve slopes downwards from left to right.

The operation of the law is conditioned by the phrase "*Other things being equal*". It indicates that given certain conditions, certain results would follow. The inverse relationship between price and demand would be valid only when tastes and preferences, customs and habits of consumers, prices of related goods, and income of consumers would remain constant.

### 2.3.2 EXCEPTIONS TO THE LAW OF DEMAND

Generally speaking, customers would buy more when price falls in accordance with the law of demand. Exceptions to the law of demand state that with a fall in price, demand also falls and with a rise in price demand also rises. This can be represented by a rising demand curve. In other words, the demand curve slopes upwards from left to right. It is known as an exceptional demand curve or unusual demand curve.

Fig. 2/3 below depicts the exceptional demand curve. It is clear from this figure that as price rises from \$8 to \$10, quantity demanded also expands from 400 units to 500 units.

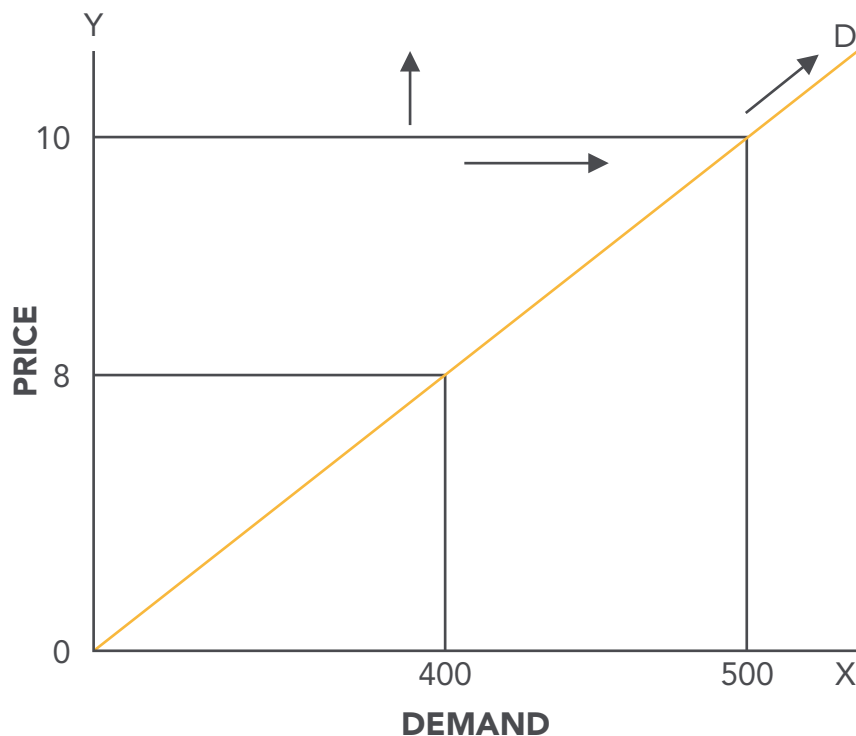


Fig. 2/3 Exceptional Demand Curve

Given below are some examples that favour the unusual demand curve:

- **Veblen's effect:** Thorstein Veblen (1899), a noted American economist, contends that there are certain commodities which are purchased by rich people not for their direct satisfaction, but for their 'snob appeal'. Veblen's effect states that demand for status symbol goods would go up with a rise in price and vice-versa. In case of such status symbol commodities, it is not the price which is important but the prestige conferred by that commodity on a person makes them to go for it. Examples are: diamonds and other precious stones, world famous paintings, commodities used by world famous personalities, high-end or vintage automobiles, etc.
- **Fear of shortage:** When serious shortages are anticipated by the people (e. g. during the war period, pandemic, civil unrest etc.) they purchase more goods at present even though the current price is higher.
- **Fear of future rise in prices:** If people fear future hike in prices, they buy more even though they feel that current prices are higher. Otherwise, they may have to pay a still higher price for the same product.
- **Necessaries:** Necessaries are those items which are purchased by consumers whatever may be the price. Consumers would buy more necessities in spite of their higher prices.

## 2.4 ELASTICITY OF DEMAND

In economics the term elasticity refers to a ratio of the relative changes in two quantities. It measures the responsibilities of one variable to the changes in another variable.

We can say that:

*“Elasticity of demand is the responsiveness or sensitiveness of demand to a given change in the price or non-price determinant of a commodity”.*

When demand for a product/service changes by some percentage due to change in consumer income by some percentage, measurement of these changes can lead to calculation of elasticity of demand. Elasticity of demand indicates a ratio of relative changes in two quantities i. e. price and demand.

Marshall (1920) has stated that:

*“The elasticity (or responsiveness) of demand in a market is great or small, according to the amount demanded much or little for a given fall in price and diminishes much or little for a given rise in price”.*

## 2.5 KINDS OF ELASTICITY OF DEMAND

Broadly speaking, there are five kinds of elasticity of demand:

- Price elasticity;
- Income elasticity;
- Cross elasticity;
- Promotional elasticity;
- Substitution elasticity.

### 2.5.1 PRICE ELASTICITY OF DEMAND

It is a technical term which explains the degree of responsiveness of the demand for a product to a change in its price.

*EP = Percentage change in quantity demanded*

---

*Percentage change in price*

*(EP is price elasticity)*

*Demand rises by 80% i.e., + 80 ÷ Price falls by 20% i.e., -20 = - 4*

*Demand falls by 80% i.e. - 80 ÷ Price rises by 20% i.e., + 20 = - 4*

It implies that at the present level with every change in price, there will be a change in demand four times inversely.

We can have the following five degrees of price elasticity of demand:

- **Perfectly elastic demand:** A very small change in price leads to an infinite change in demand.
- **Perfectly inelastic demand:** In case of any change in price, the quantity demanded will be perfectly constant.
- **Relatively elastic demand:** Here, if there is a small change in price, then it leads to proportional change in demand. For example, demand rises by 9% and price falls by 3%. Hence, the numerical co-efficient of demand is greater than one.
- **Relatively inelastic demand:** Here a huge change in price, say 8% fall in price, leads to less than proportional change in demand, say 4% rise in demand. One can notice here that change in demand is less than that of change in price.
- **Unitary elastic demand:** Here, there is a proportionate change in price which leads to equal proportional change in demand. For example, 5% fall in price leads to exactly 5% increase in demand. Hence, elasticity is equal to unity. It is possible to come across unitary elastic demand but it is a rare phenomenon.

The elasticity of demand depends on several factors of which the following are some of the important ones:

- Nature of the commodity;
- Existence of substitutes;
- Number of uses for the commodity;
- Durability and reparability of a commodity;
- Possibility of postponing the use of a commodity;
- Level of income of the people;
- Range of prices;
- Proportion of the expenditure on a commodity;

- Habits;
- Period of time;
- Level of knowledge;
- Existence of complementary goods;
- Purchase frequency of a product.

There are different methods to measure the price elasticity of demand. Among these the following are the most important:

- **Total expenditure method:** Under this method, the price elasticity is measured by comparing the total expenditure of the consumers (or total revenue i. e. total sales values from the point of view of the seller) before and after variations in price.  
*Total expenditure = Price per unit  $\times$  Total quantity purchased.*
- **Point method:** This method measures price elasticity of demand at different points on a demand curve. Hence, in this case, an attempt is made to measure small changes in both price and demand. In this method, the demand function is continuous, and hence, only marginal changes can be measured.
- **Arc method:** This method is suggested to measure large changes in both price and demand. When elasticity is measured over an interval of a demand curve, the elasticity is called as an interval or arc elasticity. It is the average elasticity over a segment or range of the demand curve. Hence, it is also called average elasticity of demand.

Price elasticity of demand helps in the following areas:

- Production planning;
- Fixing the prices of different goods;
- Fixing the rewards for factor inputs;
- Determining the foreign exchange rates;
- Determining the terms of trade;
- Fixing the rate of taxes;
- Declaration of public utilities.

### 2.5.2 INCOME ELASTICITY OF DEMAND

It is the ratio or percentage change in the quantity demanded of a commodity to a given percentage change in the income. In short, it indicates the extent to which demand changes with a variation in consumer's income.



**Formula**

$$E_y = \text{Percentage change in demand} \div \text{Percentage change in income}$$

The concept of  $E_y$  helps in classifying commodities into different categories. Based on the value of  $E_y$ , the commodities can be classified as:

- When  $E_y$  is positive, the commodity is normal;
- When  $E_y$  is negative, the commodity is inferior;
- When  $E_y$  is positive and greater than one, the commodity is luxury;
- When  $E_y$  is positive but less than one, the commodity is essential;
- When  $E_y$  is zero, the commodity is neutral.

Income elasticity of demand helps in the following areas:

- Determining the rate of growth of the firm;
- Demand forecasting of a firm;
- Production planning and marketing;
- Ensuring stability in production.

**2.5.3 CROSS ELASTICITY OF DEMAND**

This may be defined as the percentage change in the quantity demanded of a particular commodity in response to a change in the price of another related commodity.

**Formula**

$$E_c = \text{Percentage change in quantity demanded of commodity } X \div \text{Percentage change in the price of } Y$$

It should be noted that:

- Cross elasticity of demand is positive in case of good substitutes e. g. coffee and tea;
- High cross elasticity of demand exists for those commodities which are close substitute e. g. Levi's or Wrangler jeans;
- The cross elasticity is zero when commodities are independent of each other e. g. stainless steel or aluminium vessels;
- Cross elasticity between two goods is negative when they are complements. In these cases, rise in the price of one will lead to fall in the quantity of another commodity e. g. car and petrol.

Cross elasticity of demand helps at the following levels:

- At the firm level;
- At the industry level.

#### 2.5.4 ADVERTISING ELASTICITY OF DEMAND

Advertising elasticity refers to the responsiveness of demand or sales to change in advertising or other promotional expenses.

##### Formula

$$E_a = \text{Percentage change in demand or sales} \div \text{Percentage change in advertisement expenditure}$$

The study of advertising elasticity of demand helps in the following areas:

- Determining the level of prices;
- Formulating appropriate sales promotion strategy;
- Manipulating the sales.

#### 2.5.5 SUBSTITUTION ELASTICITY OF DEMAND

It measures the effects of the substitution of one commodity for another. It may be defined as the percentage change in the demand ratios of two substitute goods X and Y to the percentage change in the price ratio of two goods X and Y.

##### Formula

$$E_s = \text{Percentage change in the ratio of 2 goods X and Y} \div \text{Percentage change in the price ratio of 2 goods X and Y.}$$

The concept of substitution elasticity helps in the following areas:

- Calculating cost of different alternative inputs;
- Employing those inputs which are much cheaper than others to cut down cost of operations.

# 3 DEMAND FORECASTING

## 3.1 INTRODUCTION

Business firms are expected to forecast demand in the short-term, medium-term and long-term so as to develop suitable business strategies. An important aspect of demand analysis from the management point of view is concerned with forecasting demand for products, either existing or new. Such forecasts are of immense use in making decisions with regard to production, sales, investment, expansion, employment of manpower etc., both in the short-run as well as in the long-run.

## 3.2 FEATURES OF DEMAND FORECASTING

The important features of demand forecasting are these:

- It is an informed and well thought out guesswork;
- It is in terms of specific quantities;
- A forecast is made for a specific period of time which would be sufficient to make a decision and put it into action;
- It is based on historical information and past data.

Demand forecasting is generally associated with forecasting sales. To use demand forecasting in an active rather than a passive way, management must recognise the degree to which sales are a result not only of external economic environment but also of the action of the company itself.

## 3.3 MANAGERIAL USES OF DEMAND FORECASTING

Demand forecasts are of immense management use, both in the short-run as well as in the long-run.

### 3.3.1 IN THE SHORT-RUN

Demand forecasts for short periods are made on the assumption that the company has a given production capacity, and the period is too short to change the existing capacity. Generally, it would be one-year period. It helps in the following areas:

- Production planning;
- Formulating of right purchase policy;
- Framing realistic pricing policy;
- Sales forecasting;
- Estimating short-run financial requirements;
- Reducing dependence on chances;
- Evolving a suitable labour policy.

### 3.3.2 IN THE LONG-RUN

Long-run forecasting of probable demand for a product of a company is generally for a period of 3 to 5 or 10 years. It helps in the following areas:

- Business planning;
- Financial planning;
- Manpower planning;
- Business control;
- Determination of the growth rate of the firm;
- Establishment of stability in the working of the firm;
- Indicating interdependence of different industries.

## 3.4 LEVELS OF DEMAND FORECASTING

Demand forecasting may be undertaken at the following three levels:

- **Micro level or firm level:** This refers to the demand forecasting by a firm for its product(s). The management of a firm is really interested in such forecasting.
- **Industry level:** Demand forecasting for the product of an industry as a whole is generally undertaken by the trade associations and the results are made available to the members. By using such data and information, a member firm may determine its market share.
- **Macro level:** Estimating industry demand for the economy as a whole will be based on macro-economic variables like national income, national expenditure, consumption function, index of industrial production, aggregate demand, aggregate supply etc. Generally, it is undertaken by national institutes, government agencies, etc. Such forecasts are helpful to the government in determining the volume of exports and imports, control of prices, etc.

The managerial economist has to take into consideration the estimates of aggregate demand and also industry demand, while making the demand forecast for the product of a particular firm.

### 3.5 METHODS OF DEMAND FORECASTING

Broadly speaking, there are two methods of demand forecasting viz. survey methods and statistical methods.

#### 3.5.1 SURVEY METHODS

There are different approaches under survey methods. Under consumers' interview method, efforts are made to collect the relevant information directly from the consumers with regard to their future purchase plans. To collect information from consumers, a number of alternative techniques are developed. Among them, the following are some of the important ones:



- **Survey of buyers' preferences:** Under this method, consumer-buyers are requested to indicate their preferences and willingness about particular products. They are asked to reveal their future purchase plans with respect to specific items. However, this method is not useful in estimating the future demand of the households, as they run in large numbers and do not express their future demand requirements freely. At best, it can be used for short-term forecasting.
- **Direct interview method:** Under this method, customers are directly contacted and interviewed. They are requested to answer specifically about their budget, expenditure plans, particular items to be selected, the quality and quantity of products, relative price preferences, etc. for a particular period of time. There are two different methods of direct personal interviews. They are as follows:
  - **Complete enumeration method:** Under this method, all potential customers are interviewed in a particular city or region. The answers elicited and consolidated are carefully studied to obtain the most probable demand for a product. However, this method can be employed to only those products whose customers are concentrated in a small region or locality.
  - **Sample survey method:** Under this method, different cross sections of customers that make up the bulk of the market are carefully chosen. Only such consumers, who are selected from the relevant market through some sampling method, are interviewed or surveyed.
- **Opinion survey method:** Under this method, sales representatives, professional experts, the market consultants and others are asked to express their considered opinions about the volume of sales expected in the future. However, it is subjective and depends on the intelligence and awareness of the sales people. It cannot be relied upon for long-term business planning.
- **Delphi (or experts' opinion) method:** Under this method, outside experts are appointed. They are supplied with all kinds of information and statistical data. The management requests the experts to express their considered opinions and views about the expected future sales of the company. Since experts' opinions are more valuable, a firm gives lot of importance to them and prepares their future plans on the basis of the forecasts made by the experts.
- **End use or input-output method:** Under this method, the sale of the product under consideration is projected on the basis of demand surveys of the industries using the given product as an intermediate product. The demand for the final product is the end-user demand of the intermediate product in the production of the final product. For example, steel can be used for making various types of agricultural and industrial machinery. It may have demand both in the domestic market as well as the international market. This method is used to forecast the demand for intermediate products only.

### 3.5.2 STATISTICAL METHODS

Under this method, statistical, mathematical models, equations etc. are extensively used in order to estimate future demand for a particular product. They are used for estimating long-term demand. They use historical data in estimating future demand. The analysis of the past demand serves as the basis for present trends and both of them become the basis for calculating the future demand of a commodity under consideration, after taking into account the changes that are likely to occur in future.

There are several statistical methods and their application should be done by someone who is reasonably well-versed in the methods of statistical analysis and in the interpretation of the results of such analysis. Two of them are these:

- **Trend projection method:** An old firm operating in the market for a long period will have the accumulated previous data on either production or sales pertaining to different years. If we arrange them in chronological order, we get 'time' series. The heart of this method lies in the use of time series. Changes in time series arise on account of the following reasons:
  - **Long-term movements:** They indicate the general conditions in which graph of a time series moves in relatively a long period of time.
  - **Seasonal movements:** Time series also undergo changes during seasonal sales of a company.
  - **Cyclical movements:** It implies change in time series or fluctuations in the demand for a product during different phases of a business cycle like depression, revival, boom, etc.
  - **Random movements:** These movements imply sporadic changes in time series occurring due to unforeseen events such as floods, strikes, elections, earthquakes, droughts, pandemics and other natural calamities.
- **Economic indicators method:** Under this method, a few economic indicators become the basis for forecasting the sales of a company. An economic indicator indicates change in the magnitude of an economic variable. This helps in the decision-making process of a company. However, it is difficult to find out an appropriate economic indicator.

## 3.6 DEMAND FORECASTING FOR NEW PRODUCTS

It means the demand forecasting for a different kind of product, which is totally different from established products.

Dean (1951) has suggested some guidelines for forecasting the demand for new products. These are:

- **Evolutionary approach:** When a new product is evolved from the old product, the demand conditions of the old product can be taken as a basis for forecasting the demand for the new product e. g. a new model of an existing smartphone with enhanced features.
- **Substitute approach:** If the new product developed serves as a substitute for the existing product, the demand for the new product may be worked out on the basis of 'market share'.
- **Opinion poll approach:** Here the potential buyers are directly contacted, or through the use of samples of the new product, and their responses are found out. These are used to forecast the demand for a new product.
- **Sales experience approach:** The product may be offered for sale through one supermarket and the estimate of sales obtained may be extrapolated to arrive at estimated demand for the product.
- **Growth curve approach:** According to this, the rate of growth and the ultimate level of demand for the new product are estimated on the basis of the pattern of growth of established products.
- **Vicarious approach:** A firm will survey consumers' reactions to a new product indirectly by getting in touch with some specialised and informed dealers who have good knowledge about the market, about the different varieties of the product already available in the market, the consumers' preferences, etc. This helps in making a more efficient estimation of future demand.

These methods are not mutually exclusive. The management can use a combination of several of them, supplement and cross check each other.



# 4 SUPPLY AND MARKET EQUILIBRIUM

## 4.1 INTRODUCTION

Supply of a product basically depends on cost of production and the management decision. It covers such problems like where to sell, when to sell, to whom to sell, how much to sell, at what price to sell, etc.

Demand and supply are two important concepts in economics, the knowledge of which is very essential to a manufacturing firm for taking numerous decisions almost every day. These two concepts link the market behaviour of consumers, producers and sellers with that of price.

### 4.1.1 MEANING OF SUPPLY

Supply is one of the two forces that determine the price of a commodity in the market. Supply means the amount offered for sale at a given price.

The supply of goods is the quantity offered for sale in a given market at a given time at various prices.

McConnel (2005) has stated that:

*"Supply may be defined as a schedule which shows the various amounts of a product, which a producer is willing to and able to produce and make available for sale in the market at each specific price in a set of possible prices, during some given period".*

Thus, we can say that:

*"Supply of a product refers to the various amounts which are offered for sale at a particular price during a given period of time".*

### 4.1.2 DETERMINANTS OF SUPPLY

Apart from price, many other factors bring about changes in supply. These are some important ones:

- Natural factors;
- Change in techniques of production;
- Cost of production;
- Prices of related goods;
- Government policy;
- Monopoly power;
- Number of sellers or firms;
- Complementary goods;
- Discovery of new sources of inputs;
- Improvements in transport and communication;
- Future rise in prices.

## 4.2 SUPPLY CURVE

Supply curve means the quantity of a product that sellers would wish to supply at different price levels.

Table 4/1 below shows how many packets of coffee the sellers are willing to supply at each price level.

Price (£ per packet)	Supply (Thousands of packets)
0	0
1	0
2	10
3	20
4	30
5	40
6	50
7	60
8	70
9	80
10	90

**Table 4/1** Sellers' willingness to sell coffee

Based on the information given in this table a supply curve can be drawn. The supply curve in Fig. 4/1 below represents the relationship between price of a product or service and the quantity supplied.

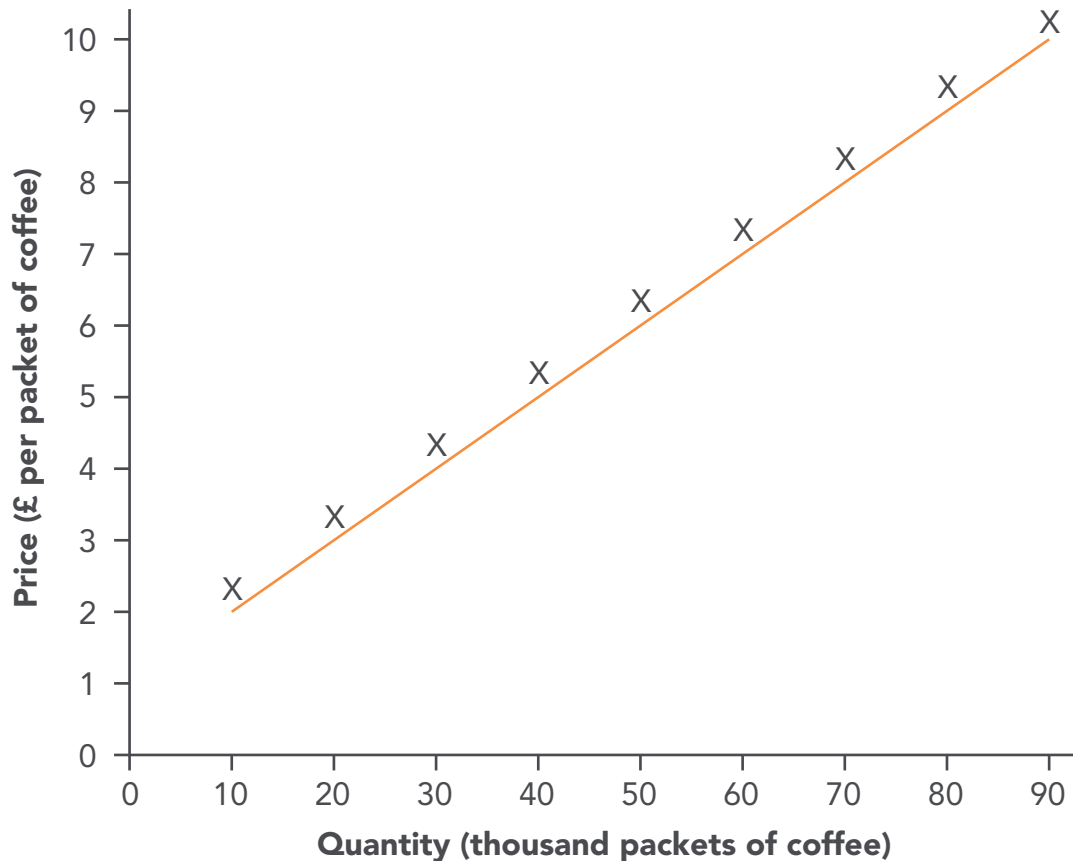


Fig. 4/1 Normal Supply Curve

#### 4.2.1 FACTORS THAT CAUSE THE SUPPLY CURVE TO MOVE

When there is increase in the prices at which products are sold and bought, the quantity of goods to be supplied should increase. This happens because of the following:

- Only efficient producers are able to make profit if the prices are low. But when the prices increase, less efficient producers are also in a position to make some profit. This enables them to wish to supply products. On the other hand, if prices go down, they may have to close down their business.
- If producers are making profit, they may invest in installing new and improved machinery, or employ more staff. This will enable them to increase their production and thus be able to supply more quantities of their products.

- If the prices go high, business people try to take advantage of the situation and wish to produce increased number of products and thus be able to supply more of it. High prices also lead to a situation where new competitors enter the market in order to supply similar products.

While drawing the supply curve in Fig. 4/1, it was assumed that other factors were constant. If there is a change in any one of the following factors, it will have effect on the supply of a product:

- **Technology:** When there is an improvement in technology, it allows more production at the same cost. This means that a particular producer will be willing to supply more without increasing the price. For example, there could be new machines for processing coffee seeds, better methods of processing, or better and cheaper methods of packaging etc. Methods of cultivation and harvesting might be improved leading to availability of increased and cheaper raw material. This will mean more production without increasing cost.
- **Costs:** If the suppliers of a particular product are able to reduce the cost of production, they can supply more at the same cost. This situation may attract new suppliers also to the market. On the other hand, if the cost of production increases – such as increased cost of labour, raw materials etc. – some suppliers may have to close down their business. This means that the quantity of a product supplied to the market will be reduced.
- **External regulations:** If the government makes new rules regarding the safety of machinery, minimum wages to be paid to employees, or stricter rules with regard to environmental issues, it may have effect on the cost and amount of production. If this happens, it will mean reduced production, and reduced supply.

Fig. 4/2 below depicts the effect on supply of increase in the cost of a factor of production.

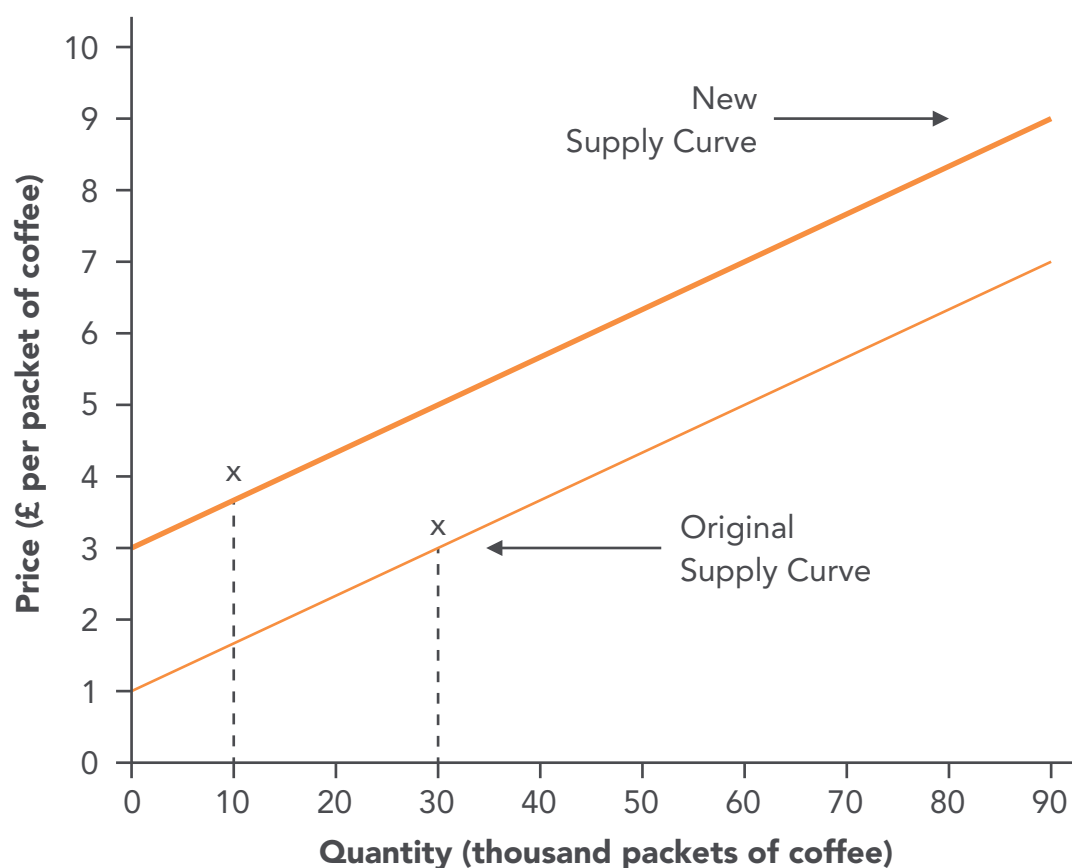


Fig. 4/2 Change in Supply Curve

We see that if the cost of production increases, the supply curve moves to the left. Before the increase in the selling price of £4 per packet suppliers were willing to supply 30 thousand packets of coffee, but with the cost of production going up, the suppliers will be interested in supplying only 10 thousand packets of coffee at the selling price of £4 per packet.

However, if there is improvement in technology, production cost may come down, and so the supply curve will move back to the right. In this situation the suppliers will be willing to supply more than they could supply before the availability of improved technology.

#### 4.2.2 IMPORTANCE OF ALLOWING CREDIT TO CUSTOMERS

Many companies benefit if they allow credit facility to buyers. First of all, the number of customers increases – thus increasing the volume of sales. Those who could not afford to buy certain products for lack of availability of cash are now able to do so because of credit facility. This is particularly beneficial to manufacturers or sellers of high value items like cars, TV, fridge etc. Since they allow credit to their customers, they are in a position to increase their sales and thus the higher profit that they make.

The wholesalers and retailers – who themselves get credit from manufacturers – are able to recover at least a larger part of the cost of goods before they have to pay because of volume of sales.

Since the credit facility increases the demand for certain products, the production capacity is to be increased in order to meet this demand. When production increases, the companies are in a position to spend cost of research and development over a larger amount of units to be sold. This reduces the cost of production of such items.

### **4.2.3 PRINCIPLES OF CREDIT CONTROL**

It is necessary that before allowing credit to its customers a business house should decide its credit policy. A credit limit needs to be set for each customer regarding the maximum amount, and the period of time. However, if the creditworthiness of a customer increases over a period of time, their credit limits may also be increased.

After the decision on credit limits has been taken, the sales personnel of a business must have up to date knowledge regarding the credit limit set for each customer, and must comply with them. Whenever a customer is nearing the credit limit the accounts department must inform the sales personnel of the situation.

The sales personnel must obtain the approval of the management before allowing credit facility to a new customer.

A check on the creditworthiness of a customer is necessary. As far as the existing customers are concerned, it can be based on their payment history. More caution is needed in respect of new customers before they can be allowed to buy on credit. This could be done by getting a bank reference from the customer, and also trade references – which means the business houses which have extended and are still extending credit to this customer.

### **4.2.4 EFFECT OF ALLOWING CREDIT ON DEMAND AND SUPPLY**

When people are able to buy increased number of products because of credit facility, it leads to larger demand for a variety of products. This often happens with regard to certain items like laptops, iPads, TVs, automobiles and many more such items.

Large demand for a product leads to increase in sales. This means that the product volume is to be increased. When the manufacturer increases production, they are in a position to distribute the research and development as well as manufacturing cost over a larger number of units produced – thus reducing the price of a product. The reduced price of a particular product or service may increase the demand for it. This in turn may lead to increased production, and consequently increased supply.

## 4.3 MARKET EQUILIBRIUM

In economics equilibrium denotes absence of change in movement. There are two kinds of approaches in market equilibrium. These are:

- **Partial equilibrium approach:** It means the price of a single commodity will be determined keeping the price of another commodity constant.
- **General equilibrium approach:** It means the price determination of all the goods and factors will be mutual and simultaneous. Thus, it explains a multi-market equilibrium position.

### 4.3.1 EQUILIBRIUM BETWEEN DEMAND AND SUPPLY PRICE

Equilibrium between demand and supply price is obtained by the interaction of these two forces in the following manner:

- Price is an independent variable;
- Demand and supply are dependent variables – they depend on price;
- Demand varies inversely with price;
- A rise in price causes a fall in demand and a fall in price causes a rise in demand.

On the other hand:

- Supply varies directly with the changes in price;
- A rise in price causes a rise in supply;
- A fall in price causes a fall in supply.

Thus, at the point where the two curves of demand and supply interact with each other, the equilibrium price is established.

# 5 ECONOMIC ENVIRONMENT

## 5.1 INTRODUCTION

The survival and success of every business organisation depends to a very large extent on its economic environment. The economic environment constitutes economic conditions, economic policies, and the economic system.

### 5.1.1 ECONOMIC CONDITIONS

The economic conditions of a country refer to a set of economic factors that have a great influence on business organisations and their operations. These include:

- Gross domestic product;
- Per capita income;
- Markets for goods and services;
- Availability of capital;
- Foreign exchange services;
- Growth of foreign trade;
- Strength of capital markets;
- Nature of the economy;
- People income distribution pattern; and
- Development process.

### 5.1.2 ECONOMIC POLICIES

All business activities are directly influenced by the economic policies framed by the government from time to time. Some of these policies are:

- Industry policy;
- Fiscal policy;
- Monetary policy; and
- Export-import policy.



### 5.1.3 ECONOMIC SYSTEM

Money is the lifeblood of any business organisation and the economic system. The world economy is primarily governed by three types of economic systems:

- Capitalist economy;
- Socialist economy; and
- Mixed economy.

The management strategist must scan, monitor, forecast, and assess the following elements of the economic environment:

- Nature of the country's economy;
- Monetary and fiscal policies;
- Autonomy of economy;
- Economic legislation;
- Tax rates;
- Interest rates;
- Government budget deficit;
- Consumption pattern;
- Price fluctuations;
- Global movement of labour and capital;
- Stock market trends;
- Inflation trends in the country; and
- Unemployment trends.

## 5.2 ECONOMICS

Economics plays a major role in affecting the business environment. There are several factors which are responsible for this phenomenon.

They are the following.

### 5.2.1 INFLATION

The term 'inflation' refers to an increase in the general level of prices sustained over a period of time. High rates of inflation can inflict great economic damage. In this situation governments might take measures designed to reduce demand for goods and services and

increase unemployment. As more people lose their jobs the rate of inflation should decline because at the same time fewer people have either the means or the inclination to spend as much of their disposable income or savings as previously, or to borrow money with which to make purchases. Consequently, output of goods and services contracts and a 'recession' looms.

In countries in which substantial welfare payments are made to unemployed people, the extent to which the rate of inflation falls will be less than in countries where the 'safety net' provided by the State is weak or absent. In other words, it takes a lot more unemployment to reduce the level of inflation in countries which make more generous provision for citizens who temporarily fall on hard times.

It is uncertain whether high inflation encourages or reduces economic growth. Some countries have grown slowly during low or high inflation. In any examination of the environment, thought has to be given not only to current but also to likely future levels of inflation.

Organisations which depend upon consumer spending, perhaps as retailers or through direct marketing or by selling to customers who are themselves dependent upon consumer sales, have to be particularly sensitive to prevailing economic environment. Sales volumes can reflect current buoyant confidence, based on stable low inflation and high employment, or widespread anxiety about future employment prospects. Prolonged economic recession can inflict long-lasting damage on sales, particularly when consumers believe that if they postpone purchases, they will see prices fall further.

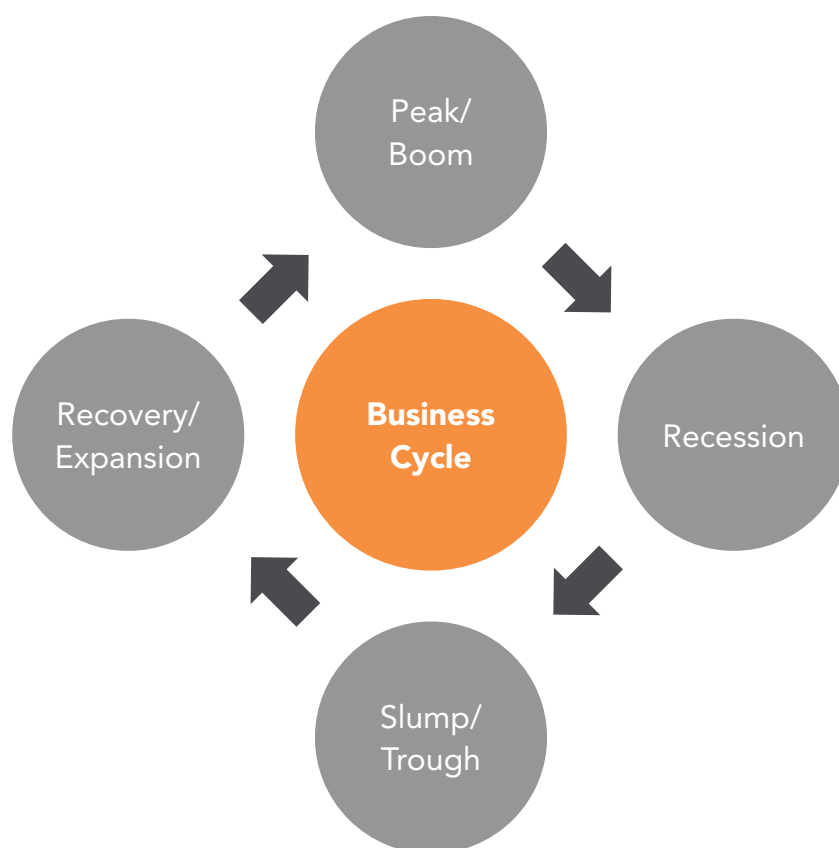
### 5.2.2 THE BUSINESS CYCLE

There are 'ups and downs' of business activity. This 'business cycle' is spread over years. The reasons are quite often uncertain but the features are clear. There are four phases of the cycle:

- **Peak or boom:** This is the phase when unemployment, output and investment are at high levels. In these conditions people spend generously, raising demand for goods, services and higher earnings. Profits are higher too, but the cloud on the horizon labelled 'high labour costs' is growing uncomfortably larger.
- **Recession:** It is technically determined by falling output in absolute terms, as recorded in government data assembled from company information. In reality, recessions also occur when output is simply not rising; governments might deny that there is a recession although the people experience quite the opposite effects. Unemployment is rising and investment is delayed or curtailed, the rate of inflation is falling and fewer foreign-made products and services are being purchased.

- **Slump or trough:** It happens when the recession ‘bottoms out’ and it is characterised by widespread hardship, caused by business failures and high unemployment. Use of the word ‘slump’ is widely avoided by governments and the media because it is closely associated with economic suffering and dislocation.
- **Recovery or expansion:** A recession might last from months to years in different countries. But sooner or later there comes the return of better times, through ‘recovery’ or ‘expansion’. Unemployment begins to fall, commercial activity increases, corporate and individual earnings start to go up, consumer spending picks up, prices for goods and services start to increase, and investment levels are improving.

Fig. 5/1 below depicts the business cycle.



**Fig. 5/1** The Business Cycle

There are serious implications for organisations - in particular, companies - from the business cycle. Many small businesses are particularly vulnerable because of lack of adequate financial reserves to withstand the consequences of weakened finances on non-existent earnings, arising from market conditions beyond their control.

All companies, of whatever size, experience fall in sales and this can be worse for some sectors than for others. Generally speaking, those companies which sell to other companies usually suffer more than those which sell to consumers. But in recent years the fear of recession has tended to provoke more rapid downturn in expenditure by companies as well as individuals.

The state of a country's economy at a particular point in time is therefore of concern. The following questions need to be addressed:

- Where is it currently in the business cycle and therefore where is it heading?
- How stable is it and what are its prospects for the coming years, particularly in the medium to three to five years' term?
- What is the current tax regime?
- What is the level of interest rates?
- How strong is the currency?
- What are the exchange rates for international businesses?

## 5.3 COMPETITIVE RIVALRY

Competitive rivalry plays an important role in the business operations of various companies. The following points need to be considered.

### 5.3.1 VARIABLES OF COMPETITION

- **Price cutting:** The most obvious form of competition is seen when rivals decide to 'cut' the price of their products. Whenever this occurs it creates instability in the market. Price cuts or discounts might arise from several causes. A company might be producing more than it can sell. It might also decide to seek domination of its market through lower costs.  
Price-cutting is not without risk. Cuts are capable of being readily matched, or exceeded, by competitors. They might 'buy' a larger market share for so long as price reductions are offered, but newly-won customers might well purchase elsewhere as soon as the discounts are withdrawn. Competitors might have greater financial strength to survive a period of price-based competition – or a 'price war' – better than the company which 'starts the fight'. However, once all or most companies in an industry are engaged in price-cutting, each of them is vulnerable to experiencing sustained lower sales revenues. In a recession it might be necessary for everyone to join in, simply because sales are so depressed by the overall economic environment.

- **Structure:** The structure of an industry will influence levels of competition. Where, as often occurs, two or three companies together dominate an industry, they can between them maintain a degree of discipline and good order over all the participants. This might be done by, for example, setting prices that others follow, establishing industry standards for good practice and supporting industry self-regulation through finding a trade association or similar body to which all players might subscribe as members.

### 5.3.2 THREAT OF NEW COMPETITION FROM OUTSIDE

The threat of new entrants is always present, and can come from some unexpected sources, including large companies, hitherto operating in entirely different industries, which are intent upon diversification. Instead of starting from scratch, they might prefer to purchase an existing 'player', either in whole or in a substantial part that is sufficient to permit them to exert a direct influence on the future management of the company.

A prospective entrant might be deterred by apprehension of what retaliation is likely to be incurred from those already in the industry. Peter (1980) describes a hypothetical concept, which he calls the 'entry deterring price'. This is arrived at by balancing the forecast 'rewards of entry', which depend upon future as well as current conditions (including market prices) against the anticipated costs of meeting 'structural entry barriers' and risking retaliation.

It follows that, if the companies already in the industry choose or are obliged to price their products at levels below the entry deterring price, the threat of entry by newcomers might be removed, because the prospective potential returns have fallen. On the other hand, higher profitability might encourage entry, which in turn might serve in time to put down returns for everyone as more companies, including the newcomers, compete.

## 6 CIRCULAR FLOW OF INCOME

### 6.1 CIRCULAR FLOW OF INCOME MODEL

Income in an economy flows from one part to another whenever a transaction takes place. New spending generates new income, which generates further new spending, and so on. Spending and income continue to circulate around the economy. This is called the circular flow of income.

The circular flow of income shows all the money coming into an economy. This is called 'injection'. The flow also shows all the money that goes out of an economy. It is called the 'leakage' or 'withdrawal'.

The five-sector flow model describes the operation of the economy and the linkages between the main sectors in the economy. This model is based on dividing the economy into five sectors. A sector may be defined as a part of the economy where the participants are engaged in a similar type of economic activity. They are the following:

- Individuals or the domestic sector;
- Business;
- Financial institutions;
- Government;
- International trade.

Fig. 6/1 below depicts this model.

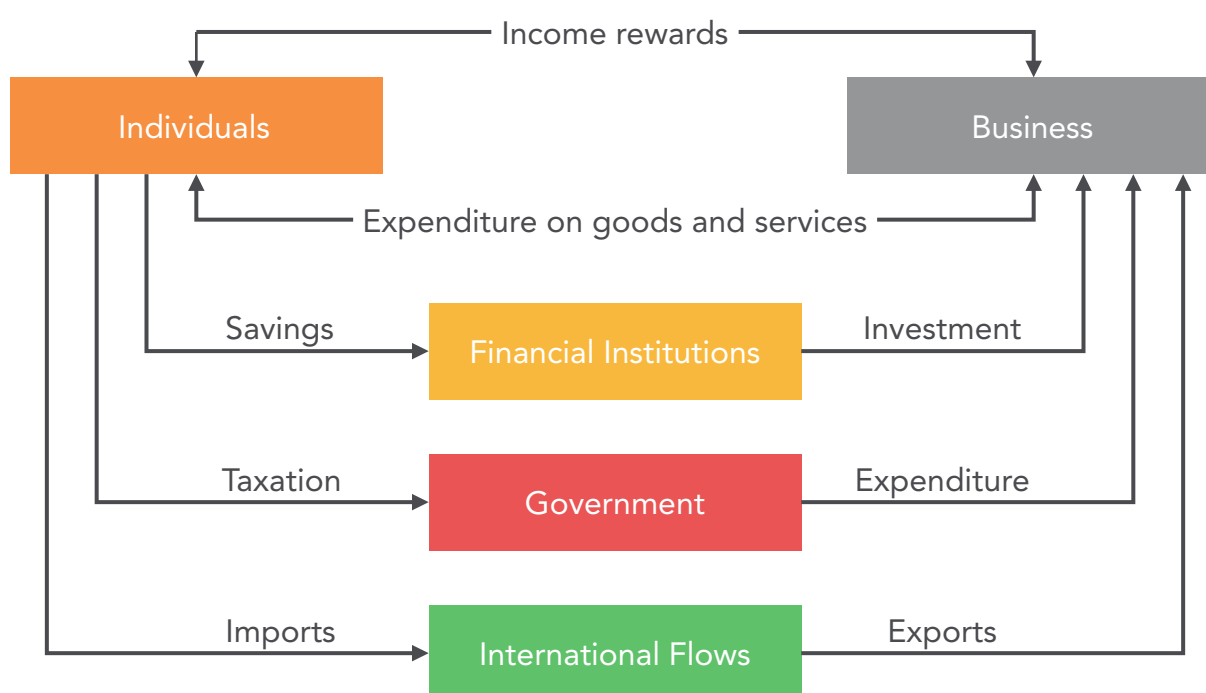


Fig. 6/1 Circular Flow of Income Model

- **Individuals:** This sector consists of all individuals in the economy. These individuals are the owners of productive resources. They are the consumers in the economy. These individuals supply factors of production such as labour and enterprise to businesses, which they use to produce goods and services. As a reward for supply of these resources to companies, individuals receive income – rent, wages, interest and profit.
  - **Effect on economy:** Individuals spend their income either on goods produced within the country or on the goods imported from foreign countries. If they buy foreign goods, this is a withdrawal from the circular flow of income. If government imposes direct or indirect taxes on the income and expenditure of individuals, it is also a withdrawal from the circular flow of income.
- **Businesses:** This sector consists of all the business firms which are engaged in the production and distribution of goods and services. It does not include financial services. It concerns all their activities which are involved with buying factors of production and using them to produce and sell goods and services. In fact, individuals and businesses are independent.
  - **Effect on economy:** If businesses do not have much confidence about future growth, it will have an effect on the amount of investment as well as on the circular flow of income. Some businesses may not pay dividends but keep the profits. This type of saving is called withdrawal from the circular flow.
- **Financial institutions:** This sector consists of all those institutions which are engaged in the borrowing and lending of money. They may act as intermediaries between those who save and those who borrow money. Financial institutions perform the function of encouraging savings from investments.
  - **Effect on economy:** The savings encouraged by financial institutions are affected by several factors like interest rates, inflation, and the confidence consumers have about the future prospects of economy. This in turn has an effect on the circular flow of income.
- **Government:** Government is involved in the satisfaction of community wants. It obtains the resources to do so through imposing taxes on the other sectors of the economy. It uses this tax revenue to undertake various government expenditures.
  - **Effect on economy:** When the government raises taxes, it is a withdrawal. When it reduces its expenditure, it is an injection. Depending upon the withdrawal or injection situation by the government, individual consumers as well as companies pay less or more tax. This leads to an effect on the circular flow of income.

- **International trade:** Consumers in one country demand goods and services imported from a foreign country. Thus, international trade grows continuously.
  - **Effect on economy:** When there is more demand of foreign goods, it means injection in the economy of the exporting country, and withdrawal in the economy of the importing country.

## 6.2 THE MULTIPLIER EFFECT

Every time there is an injection of new demand into the circular flow there is likely to be a multiplier effect. This happens because an injection of extra income leads to more spending. This creates more income.

The multiplier effect can be used in any situation where there is a new injection into the economy. Examples of such situations include the following:

- When government funds building of new motorway/highway;
- When there is an increase in exports;
- When there is a reduction in interest rates or tax rates, or when the exchange rate falls.

A withdrawal from the circular flow will lead to a downward multiplier effect. Therefore, whenever there is an increased withdrawal, such as rise in savings, import or taxation, there is a downward multiplier effect on the rest of the economy.



# 7 COSTS, REVENUES AND INVESTMENTS

## 7.1 MARGINAL COST

The marginal cost of production is the increase in total cost as a result of producing one extra unit. It is computed in situations where the breakeven point has been reached. It means that the fixed costs have already been absorbed by the already produced items and only the variable costs have to be accounted for. It is the variable cost associated with the production of one more unit.

Marginal costs are not constant. They are variable costs consisting of labour and material costs plus an estimated portion of fixed costs such as administrative overheads and selling expenses. For example, a factory may be operating at the highest capacity with all the workers working normal full-time hours. If production is increased by one more unit, it would mean paying overtime wages. In this case the marginal cost will be higher than the current variable cost per unit.

The marginal cost and average cost can differ greatly. For example, it costs \$1000 to produce 100 units of a product, and \$1020 to produce 101 units. The average cost per unit is \$10 but the marginal cost of the extra 1 unit is \$20.

### 7.1.1 IMPORTANCE OF MARGINAL COSTS

The concept of marginal cost is very important in resource allocation. It is so because for maximum results management must allocate its resources where the marginal revenue over the marginal cost is the maximum. It helps in analysing optimum levels of production for a company. Profit maximising output is achieved when marginal cost equals marginal revenue.

The importance of marginal costs varies greatly from industry to industry and from product to product. The marginal cost of making jewellery is likely to be high because the materials and skilled labour are expensive. On the other hand, the marginal cost of producing software or recorded software is much less.

## 7.2 TOTAL, AVERAGE AND MARGINAL REVENUES

Revenue may be defined as the total amount of cash obtained by a company by selling goods or services during a particular period of time. The concept of revenue relates to total revenue, average revenue and marginal revenue.

- **Total revenue:** It is the total sale proceeds of a company selling a commodity at a given price. If a company sells 3 units of commodity at \$24, its total revenue is  $3 \times 24 = 72$ . It can be represented as follows:
  - $TR = P \times Q$
  - ( $TR = \text{Total Revenue}; P = \text{Price}; Q = \text{Units of quantity}$ )
- **Average revenue:** It is the average receipt from sale of certain units of commodity. It is obtained as follows:
  - $AR = TR/Q$
  - ( $AR = \text{Average Revenue}; TR = \text{Total Revenue}; Q = \text{Quantity sold}$ )
- **Marginal revenue:** It is defined as the change in TR (Total Revenue) resulting from per unit addition in sales. It is the total revenue earned by selling one more unit in addition to N units of commodity. It is obtained as follows:
  - $MR = TR_n - TR_{n-1}$
  - ( $MR = \text{Marginal Revenue}; TR_n = \text{Total Revenue}; TR_{n-1} = \text{Total Revenue of additional 1 unit}$ )

### 7.2.1 IMPORTANCE OF MARGINAL REVENUES

It is very important for a company to know what its marginal revenues are. Marginal revenue is extra money that goes to general expenses and, in the end, to earning. Hence it is a very important number for businesses that want to focus on profitability. Marginal revenue shows how much increasing production increases total sales.

The concept of marginal revenue can be used to pinpoint the optimum level of production to maximum profit. The optimum level of production is the level of output where marginal revenue is equal to marginal cost. The company managers can realise that:

- If marginal revenue exceeds marginal cost, producing an extra unit is profitable;
- If marginal cost is greater than marginal revenue, the company loses money by making an extra unit.
- When marginal cost and marginal revenue are equal, the company cannot gain profit by producing more and it loses profit if it cuts production.

## 8 INVESTMENT APPRAISAL

### 8.1 INTRODUCTION

Investment appraisal is a means of assessing whether an investment project is worthwhile or not. Investment project could be the purchase of a new PC for a small firm, a new piece of equipment in a manufacturing plant, a whole new factory etc. It is used in both public and private sectors. Investment here means the purchase of productive capacity, not buying stocks or shares or investing in a bank. It is used to buy equipment, machinery or to build a new plant in order to increase production capacity.

Investment, therefore, assumes that the investment will yield future income. Investment appraisal is all about assessing this income against the cost of investment.

### 8.2 INVESTMENT TECHNIQUES

The main investment techniques are:

- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Accounting Rate of Return (ARR)
- Payback Period (PBP)

#### 8.2.1 NET PRESENT VALUE (NPV)

It takes into account that money values change with time. Value of money is affected by interest rates. NPV helps to take these factors into consideration. It shows what an investment would have earned with an alternative investment.

- **Example:**
  - *Project 'A' costs \$1,000,000.*
  - *After 5 years the cash returns = \$110,000 (10%).*
  - *If the investment of \$1 million was done into a bank offering interest at 12% the returns would be greater.*

- **The Principle:**

- *We have to see how much one would have to invest to earn \$100 in one year's time if the interest rate was 5%.*
- *Let us assume that the present value of \$100 in a year's time is B, then:*
- $\$100 = B + \{B \times 5/100\}$
- *(i. e. borrowing + interest for 1 year) i.e.  $\$100 = B \{1 + 5/100\} = B \times 1.05$*
- $B = \$100/1.05 = \$95.24$
- *The amount would need to be = \$95.24*

- **Discounting:** Discounting is the process of adjusting the value of money from its present value in the future. The key to discounting is the rate of interest. The business chooses the most appropriate rate for the life of the project. It then identifies the discounting factor. The amount of money is then multiplied by the discounting factors to convert it to its Net Present Value (NPV):

- $PV \text{ (Present Value)} = \text{Future Value} \div (1 + i)^n$
- *Where  $i$  = interest rate*
- $n$  = number of years
- *The PV of \$1 @ 10% in 1 year is 0.9090.*
- *If one invested 0.9090 today and the interest rate was 10% one would have \$1 in a year's time.*
- *This process is referred to as "Discounting Cash Flow".*

The decision rule is that the value is placed on future benefits. The future benefits are discounted, and then a total of discounted values is obtained. Thus, positive NPV increases shareholder wealth.

### 8.2.2 INTERNAL RATE OF RETURN (IRR)

The IRR is the rate of interest (or discount rate) that makes the Net Present Value = Zero.

IRR allows the risk associated with an investment because it:

- Helps measure the worth of an investment;
- Allows the firm to assess whether an investment in the machinery etc. would yield a better return based on internal standards of return;
- Allows comparison of projects with different initial outlays; and
- Sets the cash flows to different discount rates.

- **Example:** The initial investment of a project is \$210. After 1 year there is a cash inflow of \$233. After that there is no cash inflow. This can be calculated as follows:  

$$- \quad 233 - 210 \div 210 \{ \times 100 \} = 10.95\%$$

The decision rule is that if the IRR of a project is higher than the capital, it is good.

It is not directly related to shareholder wealth because it does not always give the correct signals and is not better than NPV.

### 8.2.3 ACCOUNTING RATE OF RETURN (ARR)

It is a comparison of the profit generated by the investment with the cost of the investment. We can define it as follows:

- $ARR = \text{Average annual return on profit} \div \text{Initial cost of investment} \times 100 = \%$
- **Example:**
  - *An investment is expected to yield cash flows of \$10,000 annually for the next 5 years, i.e.,  $\$10,000 \times 5 = \$50,000$ .*
  - *The initial cost of investment is \$20,000.*
  - *Total profit therefore is:  $\$50,000 - \$20,000 = \$30,000$ .*
  - *Annual profit =  $\$30,000/5 = \$6,000$ .*
  - *$ARR = 6000/20,000 \times 100 = 30\%$ .*
  - *It suggests that every \$1 worth of investment yields an average 30c return each year.*

The decision rule is that if a project has an ARR greater than the pre-defined rate it will be acceptable.

It does not directly relate to shareholder wealth because it may lead to decisions which are impractical. For example, it is not how a business arrives at a pre-defined rate.

### 8.2.4 PAYBACK PERIOD (PBP)

The Payback Period is a simple technique for appraising different investment projects. To be able to compare projects we need to have information on how much the project costs and the expected cash flows are likely to generate over its lifetime. We can define it as follows:

-  $\text{Payback} = \text{Days/weeks/months} \times \text{Initial Investment} \div \text{Total Cash Received}.$

• **Example:**

- *A machine costs \$600,000.*
- *It produces items that generate a profit of \$5 each on a production run of 60,000 units per year.*

	Year 1	Year 2	Year 3
Income	255,000	255,000	255,000

-  $\text{Payback} = 36 \text{ (months)} \times 600,000 \div 765,000 = 28.33 \text{ months} = 2 \text{ years } \& 4 \text{ months}.$

The decision rule is that if the PBP is shorter, it is acceptable. For this, it needs to be defined what the maximum period is.

It does not take into account increase in wealth but is mainly concerned with profits gained out of the short-term projects.

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