

The Manager

A manager gets things done through people in an organisation. He directs the resources such as men, materials, machines, money and technology. A manager is responsible for achieving the targeted results. The manager's task is to maximise the profits of the firm. In the process of fulfilling this task, he has to take several decisions such as planning the production, fixing the selling price, adding a particular product or dropping it from the product line, and the like. A knowledge of economics is essential for a manager to optimise⁺ costs and revenues for the firm.

MANAGERIAL ECONOMICS DEFINED

1. Spencer and 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".
2. Brigham and Pappas believe that managerial economics is "the application of economic theory and methodology to business administration practice".
3. Hague observes that "managerial economics is a fundamental academic subject which seeks to understand and to analyse the problems of business decision-making".
4. In the words of Pappas and Hirschey, managerial economics applies economic theory and methods to business and administrative decision-making. Because it uses the tools and techniques of economic analysis to solve managerial problems, managerial economics links traditional economics with decision sciences to develop important tools for managerial decision-making.
5. Salvatore observes that "Managerial economics refers to the application of economic theory and the tools of analysis of decision science to examine how an organisation can achieve its aims and objectives most efficiently".
6. Mote, Paul and Gupta view managerial economics as economics applied to problem solving at the level of the firm. Here, the problems refer to issues underlying the choices and allocation of resources, which are basically economic in nature and are faced by all the managers all the time.
7. Michael R. Baye defines managerial economics as "the study of how to direct scarce resources in a way that most efficiently achieves a managerial goal".
8. Haynes, Mote and Paul define managerial economics as 'economics applied in decision-making.' They consider this as a bridge between the abstract theory and the managerial practice.

From the above definitions, we can observe that managerial economics

- refers to the application of principles of economics to solve the managerial problems such as minimising cost or maximising production and productivity
- directs the utilisation of scarce resources in a goal-oriented manner
- seeks to understand and to analyse the problems of business decision-making
- facilitates forward planning
- examines how an organisation can achieve its aims and objectives most efficiently
- analyses and decides upon the 'economic' issues underlying the choice and allocation of resources. The managers at all levels have to find optimum solutions to such economic issues day-in and day-out.

⁺ Optimise means minimising costs and maximising revenues.

NATURE OF MANAGERIAL ECONOMICS

Managerial economics is, perhaps, the youngest of all the social sciences. Since it originates from Economics, it has the basic features of Economics, such as assuming that other things remaining the same (or the Latin equivalent *ceteris paribus*). This assumption is made to simplify the complexity of the managerial phenomenon under study in a dynamic business environment—so many things are changing simultaneously. This sets a limitation that we cannot really hold other things remaining the same. In such a case, the observations made out of such a study will have a limited purpose or value. Managerial economics also has inherited this problem from economics.

Further, it is assumed that the firm or the buyer acts in a rational manner (which normally does not happen). The buyer is carried away by the advertisements, brand loyalties, incentives and so on, and, therefore, the innate behaviour of the consumer will be rational is not a realistic assumption. Unfortunately, there are no other alternatives to understand the subject other than by making such assumptions. This is because the behaviour of a firm or a consumer is a complex phenomenon.

The other features of managerial economics are explained as below:

- (a) Close to microeconomics Managerial economics is concerned with finding the solutions for different managerial problems of a particular firm. Thus, it is more close to microeconomics.
- (b) Operates against the backdrop of macroeconomics The macroeconomic conditions of the economy are also seen as limiting factors for the firm to operate. In other words, the managerial economist has to be aware of the limits set by the macroeconomic conditions such as government industrial policy, inflation, and so on.
- (c) Normative statements A normative statement usually includes or implies the words 'ought' or 'should'. They reflect people's moral attitudes and are expressions of what a team of people ought to do. For instance, it deals with statements such as 'Government of India should open up the economy'. Such statements are based on value judgements and express views of what is 'good' or 'bad', 'right' or 'wrong'. One problem with normative statements is that they cannot be verified by looking at the facts, because they mostly deal with the future. Disagreements about such statements are usually settled by voting on them.
- (d) Prescriptive actions Prescriptive action is *goal oriented*. Given a problem and the objectives of the firm, it suggests the course of action from the available alternatives for optimal solution. It does not merely mention the concept, it also explains whether the concept can be applied in a given context or not. For instance, the fact that variable costs are marginal costs can be used to judge the feasibility of an export order.
- (e) Applied in nature 'Models' are built to reflect the real life complex business situations and these models are of immense help to managers for decision making. The different areas where models are extensively used include inventory control, optimisation, project management etc. In managerial economics, we also employ case study method to conceptualise the problem, identify the alternatives and determine the best course of action.
- (f) Offers scope to evaluate each alternative Managerial economics provides an opportunity to evaluate each alternative in terms of its costs and revenues. The managerial economist can decide which is the better alternative to maximise the profits for the firm.

(g) Interdisciplinary The contents, tools and techniques of managerial economics are drawn from different subjects such as economics, management, mathematics, statistics, accountancy, psychology, organisational behaviour, sociology, etc.

(h) Assumptions and limitations Every concept and theory of managerial economics is based on certain assumptions and as such their validity is not universal. Where there is change in assumptions, the theory may not hold good at all.

SCOPE OF MANAGERIAL ECONOMICS

The main focus in managerial economics is to find an optimal solution to a given managerial problem. The problem may relate to production, reduction or control of costs, determination of price of a given product or service, make or buy decisions, inventory decisions, capital management or profit planning and management, investment decisions or human resource management. While all these are the problems, the managerial economist makes use of the concepts, tools and techniques of economics and other related disciplines to find an optimal solution to a given managerial problem. This concept is explained in Fig. 1.1.

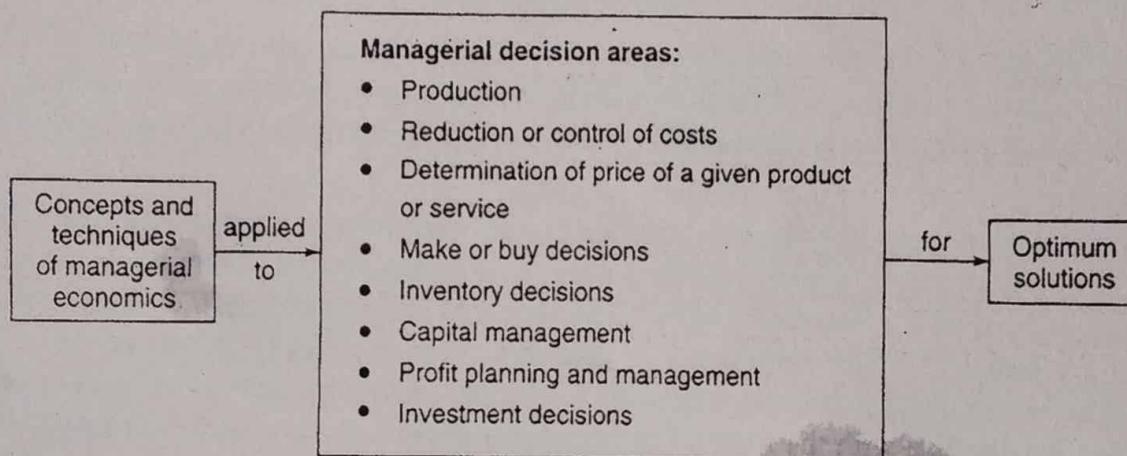


Fig. 1.1 Concepts, Decision Areas and Optimal Solutions in Managerial Economics

Managerial economics is concerned with the economic behaviour of the firm. At each stage of economic decision variable, certain assumptions are made. For instance, we assume that the firm always tries to maximise profit. The concept and techniques of economics set framework within which the managerial economist functions. The economist is concerned with analysis of the economy as a whole whereas the managerial economist is essentially concerned with making decisions in the context of a single firm.)

The Main Areas of Managerial Economics

The main areas of applications in managerial economics are discussed below:

1. Demand Decision The analysis and forecasting of demand for a given product and service is the first task of the managerial economist. The behavioural implications such as the needs of the customers, responses to a given change in the price or supply are analysed in a scientific manner. The impact of changes in prices, income levels and prices of alternative products/services are assessed and accordingly

the decisions are taken to maximise the profits. Demand at different price levels at different points of time is forecast to plan the supply accordingly and initiate changes in price, if necessary, to enlarge the customer base and gain more profits. Determination of elasticity of demand and demand forecasting constitute the strategic issues that the managerial economist handles in a scientific way.

2. Input-output Decision Here, the costs of inputs in relation to output are studied to optimise the profits. Production function and cost functions are estimated given certain parameters. The behaviour of costs at different levels of production is assessed here. Some costs are fixed, some are semi-variable and others are perfectly variable. The quantity of production increases, remains constant or decreases with additional increase in the inputs. This decision deals with changes in the production following changes in inputs which could be substitutes or complementary. The entire focus of this decision is to optimise (maximise) the output at minimum cost. It is necessary for the manager to know the relationship between the cost and output both in the short-run and long-run to position his products amidst the competitive environment.

3. Price-output Decision Here, the production is ready and the task is to determine price these in different market situations such as perfect market and imperfect markets ranging from monopoly, monopolistic competition, duopoly and oligopoly.

The features of these markets and how price is determined in each of these competitive situations is studied here. The pricing policies, methods, strategies and practices constitute crucial part of the study of managerial economics.

4. Profit-related Decisions Here, we employ the techniques such as break even analysis, cost reduction and cost control and ratio analysis to ascertain the level of profits. In break even analysis, we are concerned with profit planning and control. We determine break even point beyond which the firm starts getting profits. In other words, if the firm produces less than break even point, it loses. We can also plan the production needed to attain a given level of profits in the short-run. Cost reduction and cost control deal with the strategies to reduce the wastage and thereby reduce the costs. These indirectly enhance the level of profits. Ratio analysis helps to determine the liquidity, solvency and profitability of the activities of the firm. There are certain ratios used to analyse and interpret the profitability of the firm given a set of accounting data.

5. Investment Decisions Investment decisions are also called capital budgeting decisions. These involve commitment of large funds, which determine the fate of the firm. These decisions are irreversible. Hence the manager needs to be more attentive while committing his scarce funds, which have alternative uses. The allocation and utilisation of the investments is of paramount importance. Capital has a cost. It is expensive. Hence, it is to be utilised in such a way as to maximise the return on the capital invested. It is necessary to study the cost of capital, choice of capital structure and investment projects before the funds are committed.

6. Economic Forecasting and Forward Planning Economic forecasting leads to forward planning. The firm operates in an environment which is dominated by the external and internal factors. The external factors include major forces such as government policy, competition, employment, labour, price and income levels and so on. These influence its decisions relating to production, human resources, finance and marketing. The internal factors include its policies and procedures relating to finance, people, market and products. It is necessary to forecast the trends in the economy to plan for the future in terms of investments, profits, products and markets. This will minimise the risk and uncertainty about the future.

LINKAGES WITH OTHER DISCIPLINES

Managerial economics is closely linked with many other disciplines such as economics, accountancy, mathematics, statistics, operations research, psychology and organisational behaviour. Let us see these linkages in detail:

Economics Managerial economics is the offshoot of economics and hence the concepts of managerial economics are basically economic concepts. If economics deals with theoretical concepts, managerial economics is the application of these in the real life. In the process of addressing various managerial problems, several empirically estimated functions such as demand function, cost function, revenue function and so on are extensively used. Economics and managerial economics, both are concerned with the problems of scarcity and resource allocation. If the economist is concerned with study of 'markets', the managerial economist is interested in studying the impact of such markets on the performance of a given firm. Economics provides to the managerial economist

- an understanding of general economic environment within which the firm operates
- a framework to solve the resource allocation problems.

Operations Research Decision making is the main focus in operations research and managerial economics. If managerial economics focuses on 'problems of decision making', operations research focuses on solving the managerial problems. In other words, operations research is the tool for finding the solutions for many a managerial problem. 'Model building' is one area of common exercise. It is used to establish economic and logical relationships among the given variables. The Operations Research Models such as linear programming, queuing, transportation, optimisation techniques and so on, are extensively used in solving the managerial problems. Optimisation is an interesting word. It refers to both minimisation of costs and maximisation of revenues.

Mathematics Managerial economist is concerned with estimating and predicting the relevant economic factors for decision making and forward planning. In this process, he extensively makes use of the tools and techniques of mathematics such as algebra, calculus, exponentials, vectors, input-out tables and such other. Mathematics facilitates derivation and exposition of economic analysis.

Statistics Statistics deals with different techniques useful to analyse the cause and effect relationships in a given variable or phenomenon. It also empowers the manager to deal with the situations of risk and uncertainty through its techniques such as probability. The business environment for the managerial economist is full of risk and uncertainty and he extensively makes use of the statistical techniques such as averages, measures of dispersion, correlation, regression, time series, interpolation, probability, and so on. These techniques enhance the relevance of the conceptual base in managerial economics.

Accountancy The accountant provides accounting information relating to costs, revenues, receivables, payables, profits/losses etc. and this forms the basis for the managerial economist to act upon. This forms authentic source of data about the performance of the firm. The main objective of accounting function is to record, classify and interpret the given accounting data. The managerial economist profusely depends upon accounting data for decision making and forward planning.

Psychology Consumer psychology is the basis on which managerial economist acts upon. How the customer reacts to a given change in price or supply and its consequential effect on demand/profits—is the main focus of study in managerial economics. We assume that the behaviour of the consumer is

always rational, which in reality is not so. Psychology contributes towards understanding the behavioural implications, attitudes and motivations of each of the microeconomic variables such as consumer, supplier/seller, investor, worker or an employee.

Organisational Behaviour Organisational behaviour enables the managerial economist to study and develop behavioural models of the firm integrating the manager's behaviour with that of the owner. This further analyses the economic rationality of the firm in a focussed way.

CHAPTER SUMMARY

- Every activity aimed at earning or spending money is called economic activity.
- Adam Smith, defined economics as a science of wealth.
- The human welfare dimension, given by Alfred Marshal, changed the total orientation of economics.
- Pigou defines economics as the study of economic welfare.
- Robbins defines economics as the study of human behaviour as a relationship between endless wants and scarce means having alternative uses.
- Keynes' definition further enhanced the scope of economics to include the theories of employment and income.
- Managerial economics is a perfect blend of management and economics.
- Management is the art of getting things done through people.
- Economics is the study of human beings who rationally relate their limited resources with their unlimited wants to get maximum satisfaction.
- Economics consists of two branches: microeconomics and macroeconomics.
- Microeconomics is the study of an individual, a firm or an industry. Microeconomics is also called *theory of the firm or price theory*.
- Macroeconomics is the study of aggregates of individuals or *firms*. The important tools of Macroeconomics are national income analysis, balance of payments, and theories of employment and income.
- Managerial economics is defined as application of economic principles to solve different management problems such as how to earn more profits with the given limited resources.
- Managerial economics is prescriptive, interdisciplinary and application oriented in nature. It is normative in the sense that it tells what the manager should do to deal with a particular problem.
- The scope of managerial economics includes certain concepts and techniques applied to different managerial decision areas to find optimal solutions.
- The main areas of applications in managerial economics include: a) demand decision b) Input-output decision c) price-output decision d) profit-related decision e) investment decision and f) economic forecasting and forward planning.
- Most of the concepts and the techniques used in Managerial Economics are drawn from Economics, Psychology, Organisational Behaviour, Mathematics and Accounting.

DEMAND ANALYSIS

What is Demand?

Every want supported by the willingness and ability to buy constitutes demand for a particular product or service. In other words, if I want a car and I cannot pay for it, there is no demand for the car from my side.

A product or service is said to have demand when three conditions are satisfied:

- Desire on the part of the buyer to buy
- Willingness to pay for it
- Ability to pay the specified price for it.

Unless all these conditions are fulfilled, the product is not said to have any demand.

Nature and Types of Demand

Demand always implies at a given price. How much is the quantity demanded at a given level of price? This is the volume of demand. The use and characteristics of different products affect their demand. In other words, a product with more number of uses is naturally more in demand than one with a single use. The nature of demand is better understood when we see these variations given below:

1. Consumer Goods vs Producer Goods Consumer goods refers to such products and services which are capable of satisfying human need. Goods can be grouped under consumer goods and producer goods. Consumer goods are those which are available for ultimate consumption. These give direct and immediate satisfaction. Examples are bread, apple, rice, and so on. Producer goods are those which are used for further processing or production of goods/services to earn income. Examples are machinery or a tractor, and such others. These goods yield satisfaction indirectly. These are used to produce consumer goods. There could be cases where a given product may be both a producer good and also a consumer good. For instance, take the case of paddy. A farmer having ten bags of paddy may use five bags for his personal consumption and the other five bags as seeds for the next crop. In such a case, paddy is both producer good and a consumer good. The demand for producer goods is 'indirect', whereas the demand for the consumer goods is 'direct'. Also, it is possible that consumer good for one can become producer good for another. A microwave oven at home is a consumer good and the same in a hotel is a producer good.

2. Autonomous Demand vs Derived Demand Autonomous demand refers to the demand for products and services directly. The demand for the services of a super speciality hospital can be considered as autonomous whereas the demand for the hotels around that hospital is called a derived demand. In case of a derived demand, the demand for a product arises out of the purchase of a parent product. If there is no demand for houses, there may not be demand for steel, cement, bricks, and so on. Demand for houses is autonomous whereas demand for these inputs is derived demand.

3. Durable vs Perishable Goods Here the demand for goods is classified based on their durability. Durable goods are those goods which give service relatively for a long period. The life of perishable goods is very less, may be in hours or days. Examples of perishable goods are milk, vegetables, fish, and such. Rice, wheat, sugar and such others can be examples of durable goods. Given certain freezing facilities, the life of perishable goods can be extended for some time. Products such as TV, refrigerator and washing machines and so on are useful for a longer period and hence they are classified as consumer durables.

4. Firm Demand vs Industry Demand The firm is a single business unit whereas industry refers to the group of firms carrying on similar activity. The quantity of goods demanded by a single firm is called firm demand and the quantity demanded by the industry as a whole is called industry demand. One construction company may use 100 tonnes of cement during a given month. This is firm demand. The construction industry in a particular state may have used ten million tonnes. This is industry demand.

A *demand schedule* presents the details of the quantity demanded at different prices. A demand schedule may be for an individual or firm, and also for a market or industry. Table 2.3 illustrates the individual demand schedule which shows the quantity of rice demanded at different price levels. It can be noted that as the price decreases, the quantity demanded is increasing.

In market demand schedule, the *aggregate* quantity demanded by all the firms or the customers is furnished. Table 2.4 illustrates market demand schedule.

Table 2.3

Individual Demand Schedule

Price (Rs.)	Quantity Demanded (kg of rice)
15	10
14	12
13	15
12	20
11	25
10	30

Table 2.4

Market Demand Schedule

Price (Rs.)	Quantity Demanded (Bags of rice)
15	100
14	120
13	150
12	200
11	250
10	300

5. Short-run Demand vs Long-run Demand Joel Dean defines short-run demand as 'the demand with its immediate reaction to price changes, income fluctuations and so on. Long-run demand is that demand which will ultimately exist as a result of the changes in pricing, promotion or product improvement, after enough time is allowed to let the market adjust itself to the given situation'.

The 'short-run' and 'long-run' cannot be clearly defined other than in terms of duration of time. The demand for a particular product or service in a given region for a particular day can be viewed as short-run demand. The demand for a longer period for the same region can be viewed as long-run demand. The existing demand based on the available tastes and technology at the current price is short-run demand. The demand that can be created in the long-run by changes in the design as a result of changes in technology is long run demand.

Short-run refers to a period of shorter duration and long-run refers to the relatively period of longer duration. In short-run, additional changes cannot be initiated in terms of expansion or hiring of additional plant and so on. You cannot expand the output overnight. The short-run is a period in which the firms can adjust their production by changing variable factors such as materials and labour. They cannot change fixed factors such as technology or capital. The long-run is a period relatively long so that all factors of production including capital can be adjusted to meet the market requirements.

The following example illustrates these concepts. The Steel Authority of India (SAIL) is operating its furnaces at 80 percent capacity when an unexpected increase in the demand for steel occurs as a result of the Gujarat earthquake. To adjust to the higher demand for steel, SAIL can increase its production by allowing overtime to its present staff, hiring more technical and non-technical staff and operating its furnaces more efficiently and effectively. All these factors are variable in nature and hence they can be increased in the short-run. The company is said to increase its production in the short-run.

On the other hand, if the company finds, in the years to come, an increase in the per capita steel consumption in the economy, it may reassess its capital requirements. Also it may add latest production processes. The period ahead of the company is said to be long-run. Thus in the long-run, all factors of production (including fixed and variable) can be adjusted; the total amount of production of steel will be higher. As a result of effective and efficient production processes, the cost of production per tonne of steel can be lower.

Both time and variable inputs such as materials and labour are required to produce goods and services with efficiency. Therefore, it is necessary to distinguish two different time periods in production and cost analysis.

This concept of short-run and long-run holds paramount importance in the study of managerial economics. Some of the cost concepts are also based on this classification.

6. New Demand vs Replacement Demand New demand refers to the demand for the new products and it is the addition to the existing stock. In replacement demand, the item is purchased to maintain the asset in good condition. The demand for cars is new demand and the demand for spare parts is replacement demand. Replacement demand may also refer to the demand resulting out of replacing the existing assets with the new ones. Many companies announce exchange schemes for TVs, washing machines and so on. They would like to tap the replacement demand. Normally when the market is saturated, producers would like to come out with exchange options.

7. Total Market and Segment Market Demand Let us take the consumption of sugar in a given region. The total demand for sugar in the region is the total market demand. The demand for sugar from the sweet-making industry from this region is the segment market demand. The market segmentation concept is very useful because it enables the study of its specific requirements, if any, such as taste and preferences, and so on. A market segment can be defined in terms of specific criteria such as location, age, sex or income and so on. The aggregate demand of all the segment markets is called the total market demand.

The different concepts of demand discussed above may imply certain commonalities. But each concept has a specific purpose and utility for the managerial economist for the purpose of decision making and forward planning.

Factors Determining Demand

The demand for a particular product depends on several factors. The following factors determine the demand for a given product:

- Price of the product (P)
- Income level of the consumer (I)
- Tastes and preferences of the consumer (T)

- (d) Prices of related goods which may be substitutes/complementary (P_R)
- (e) Expectations about the prices in future (E_P)
- (f) Expectations about the incomes in future (E_I)
- (g) Size of population (S_p)
- (h) Distribution of consumers over different regions (D_c)
- (i) Advertising efforts (A)
- (j) Any other factor capable of affecting the demand. (O)

Demand Function

Demand function is a function which describes a relationship between one variable and its determinants. It describes how much quantity of goods is bought at alternative prices of good and related goods, alternative income levels, and alternative values of other variables affecting demand. Thus, the demand function for a good relates the quantity of a good which consumers demand during a given period to the factors which influence the demand. The above factors can be built up into a demand function.

Mathematically, the demand function for a product A can be expressed as follows:

$$Q_d = f(P, I, T, P_R, E_P, E_I, S_p, D_c, A, O)$$

Where Q_d refers to quantity of demand and it is a function of the following variables: P refers to price of the product; I refers to Income level of the consumer; T refers to tastes and preferences of the consumer; P_R refers to prices of related goods (substitutes/complementary); E_P refers to expectations about the prices in future; E_I refers to expectations about the incomes in future, S_p refers to size of population; D_c refers to distribution of consumers over different regions; A refers to advertising efforts and O refers to any other factors capable of affecting the demand.

The impact of some of these determinants on demand can be described as follows:

- (a) **Price of the product** Demand for a product is inversely related to its price. In other words, if price rises, the demand falls and vice versa. This is the price demand function showing the price effect on demand.
- (b) **Income of the consumer** As the income of the consumer or the household increases, there is tendency to buy more and more upto a particular limit. The demand for product X is directly related to the income of the consumer.
- (c) **Prices of substitutes or complementaries** The demand for product X is determined by the prices of its related products: substitutes or complementaries. If there is an increase in the price of a substitute, the demand for product X will go up and vice versa. Similarly, if the price of complementary goods (to product X) goes up, the demand for product X will fall.
- (d) **Tastes and preferences** If the tastes and preferences of the consumers change, then there is change in the product demanded also. Most of the companies keep changing their products and services, as and when the customer's tastes and preferences change. In some cases, the companies take advantage of technological changes and upgrade their products and services. Such changes in the technology can be advantageously used to meet the specific requirements of the customers. Thus, they try to change the tastes and preferences of the consumers through public awareness campaigns, advertisements in the media.

Law of Demand

The Law of Demand states: *Other things remaining the same, the amount of quantity demanded rises with every fall in the price and vice versa.*

The law of demand states the relationship between price and demand of a particular product or service. It makes an assumption that all other demand determinants remain the same or do not change.

Assumptions of the Law of Demand

The phrase '*other things remaining the same*' is the assumption under the law of demand. Here, other things include income level of the consumer, tastes and preferences of the consumer, prices of related goods, expectations about the prices or incomes in the future, size of population, advertising efforts, and any other factor capable of affecting the demand.

To study the impact of change in demand because of changes in price, it is assumed that all the above factors affecting demand are assumed to remain the same. The law does not hold good if any one of these factors tend to change. Such an assumption also forms the limitation of the law of demand.

Operation of the Law of Demand

The law of demand explains that with every fall in the price of a particular product, its demand goes on increasing and vice versa. This holds good as long as other determinants of demand do not change. Once there is change in the other demand determinants, the Law does not hold good.

From Fig. 2.3, it can be seen that in the normal course, at OP price, the quantity demanded is OQ. If the price falls from P to P_1 , then the higher quantity OQ_1 is bought. DD is the demand curve. This shows that there is an *inverse* relationship between the demand and the price. It can be seen that the demand curve is sloping downwards from left to right.

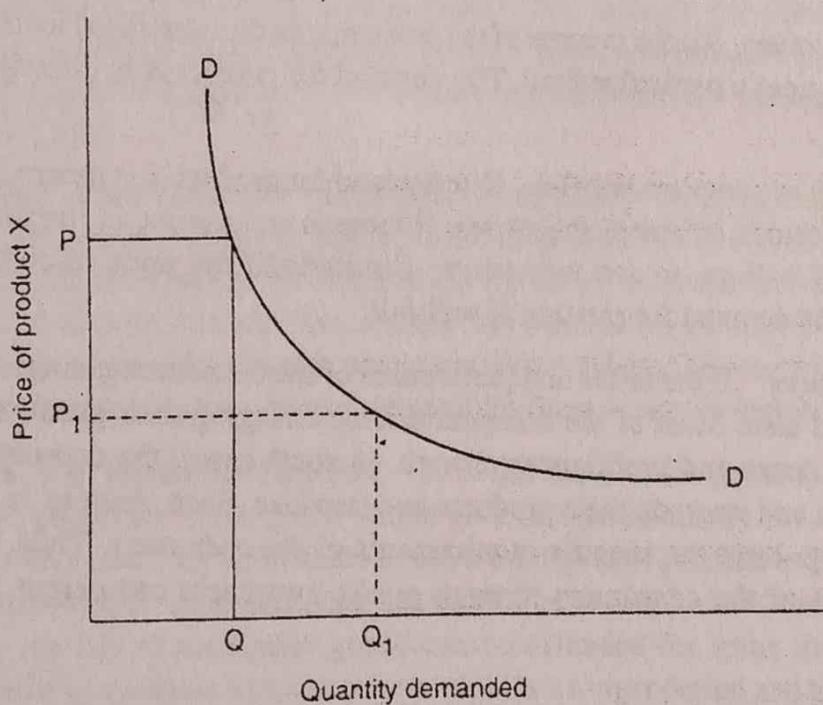


Fig. 2.3 Demand Curve

There are certain exceptions to this law. In other words, the law does not hold good in the following cases:

1. *Where there is a shortage of necessities feared* If the customers fear that there could be shortage of necessities, then this law does not hold good. They may tend to buy more than what they require immediately, even if the price of the product increases.
2. *Where the product is such that it confers distinction* Products such as jewels, diamonds and so on, confer distinction on the part of the user. In such a case, the consumers tends to buy (to maintain their prestige) even though there is increase in its price. Such products are called 'veblen' goods.
3. *Giffens' paradox* People whose incomes are low purchase more of a commodity such as broken rice, bread etc (which is their staple food) when its price rises. Conversely when its price falls, instead of buying more, they buy less of this commodity and use the savings for the purchase of better goods such as meat. This phenomenon is called Giffens' paradox and such goods are called inferior or giffen goods.
4. *In case of ignorance of price changes* At times, the customer may not keep track of changes in price. In such a case, he tends to buy even if there is increase in price.

In case of these exceptions, the demand curve slopes upwards. An exceptional demand curve is shown in Fig. 2.4.

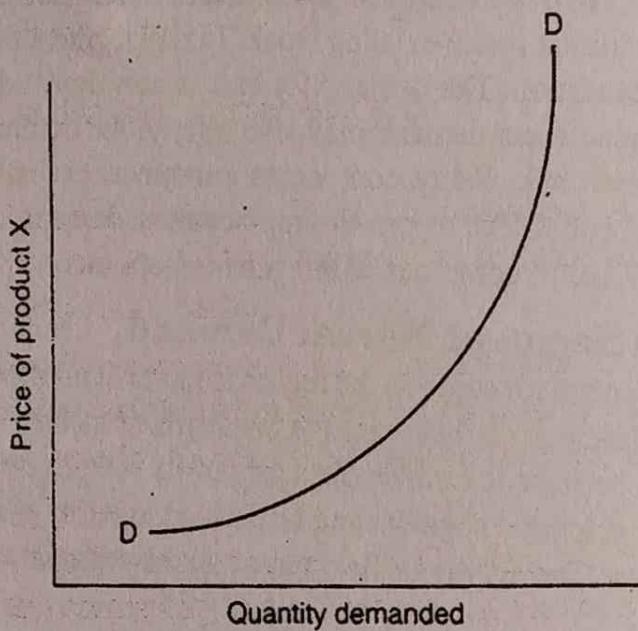


Fig. 2.4 An Exceptional Demand Curve

Change in Demand

The increase or decrease in demand due to change in the factors other than price is called change in demand. Change in demand leads to a shift in the demand curve to the right or to the left.

Increase in Demand

If the consumers are willing and able to buy more of Rainbow shirts at the same price, the result will be a increase in demand. The demand curve will shift to the right as shown in Fig. 2.5.

DEMAND ANALYSIS—II: ELASTICITY OF DEMAND

3

Learning Objectives

After completing this chapter, you should be able to understand

- elasticity of demand and its types
- factors affecting elasticity of demand
- measurement of elasticity
- significance of elasticity of demand

INTRODUCTION

In the previous chapter, you have studied the laws governing consumer behaviour, concepts of demand, laws governing demand and changes in price and quantity demanded. There, you were concerned only with direction of changes in prices and quantities demanded. These changes are not so far quantified. Measuring these changes is necessary to study the changes in quantity demanded in relation to changes in price, income or prices of substitutes/ complementaries and there by take important decision whether to increase the price or reduce the price without suffering a loss in demand for goods and services.

This chapter explains the concept of elasticity of demand, its types, factors affecting elasticity of demand, how to measure elasticity and make use of the concept of elasticity of demand in our day-to-day life.

ELASTICITY OF DEMAND

Most of the times, it is not enough to understand the increase or decrease in price and its consequential impact of change in the quantity demanded. It is necessary to find out the extent of increase or decrease in each of the variables for taking certain managerial decisions. This paves the way for the concept of elasticity of demand.

¹ The term 'elasticity' is defined as *the rate of responsiveness in the demand of a commodity for a given change in price or any other determinants of demand*. In other words, it explains the extent of change in

quantity demanded because of a given change in the other determining factors, may be price or any other factor(s).

Measurement of Elasticity

The elasticity is measured in the following ways:

- Perfectly elastic demand
- Perfectly inelastic demand
- Relatively elastic demand
- Relatively inelastic demand
- Unity elasticity

These are explained below.

(a) Perfectly Elastic Demand When any quantity can be sold at a given price, and when there is no need to reduce price, the demand is said to be *perfectly elastic*. In such cases, even a small increase in price will lead to complete fall in demand. This is illustrated in Fig. 3.1(a).

Figure 3.1(a) reveals that the quantity demanded increases from OQ to OQ_1 , from OQ_1 to OQ_2 even though there is no change in price. Price is fixed at OP.

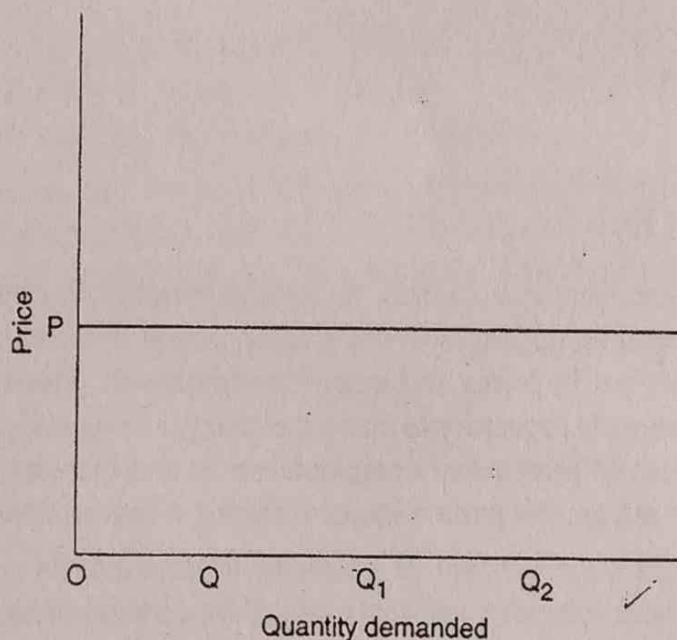


Fig. 3.1(a) *Perfectly Elastic Demand*

(b) Perfectly Inelastic Demand When a significant degree of change in price leads to little or no change in the quantity demanded, then the elasticity is said to be *perfectly inelastic*.

In other words, the demand is said to be perfectly inelastic when there is no change in the quantity demanded even though there is a big change (increase or decrease) in price.

Figure 3.1(b) reveals that there is no change in the quantity demanded though there is change in price, say increase or decrease. In other words, despite the increase in price from OP to OP_1 , the quantity demanded has not fallen down. Similarly, though there is a fall in the price from OP_1 to OP_2 , the quantity demanded remains unchanged.

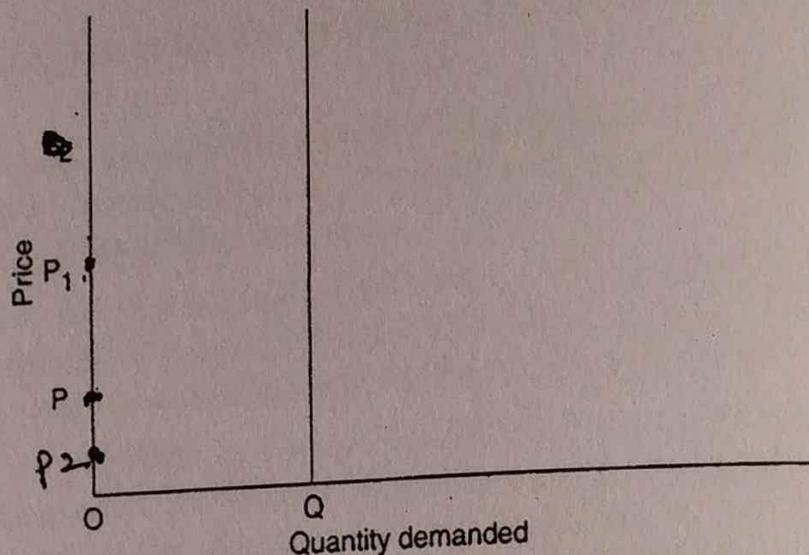


Fig. 3.1(b) Perfectly Inelastic Demand

The concepts of perfectly elastic and perfectly inelastic demand do not manifest in real life.

(c) Relatively Elastic Demand The demand is said to be relatively elastic when the change in demand is more than the change in the price. Figure 3.1(c) reveals that the quantity demanded increases from OQ_1 to OQ_2 because of a decrease in price from OP_1 to OP_2 . The extent of increase in the quantity demanded is greater than the extent of fall in the price.

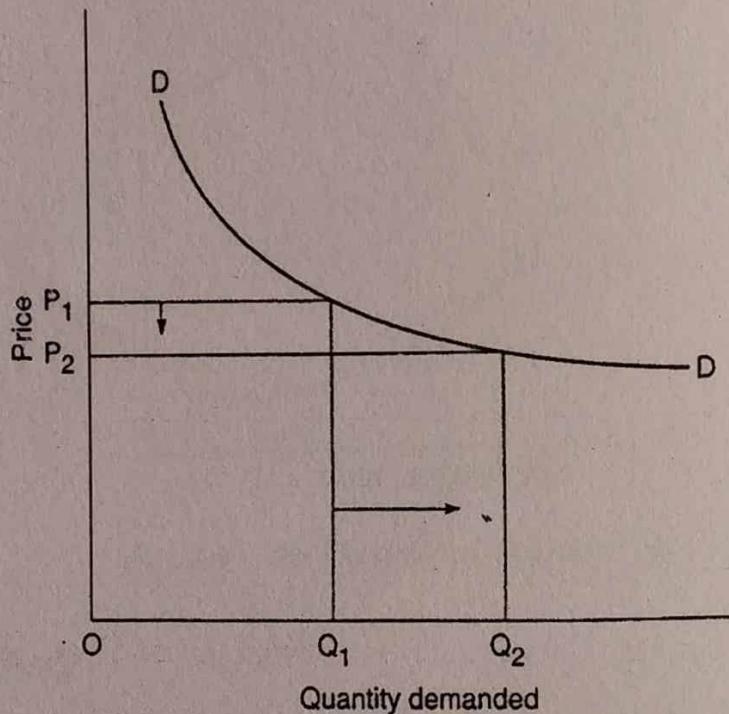


Fig. 3.1(c) Relatively Elastic Demand

(d) Relatively Inelastic Demand The demand is said to be relatively inelastic when the change in demand is less than the change in the price. This is illustrated in Fig. 3.1(d).

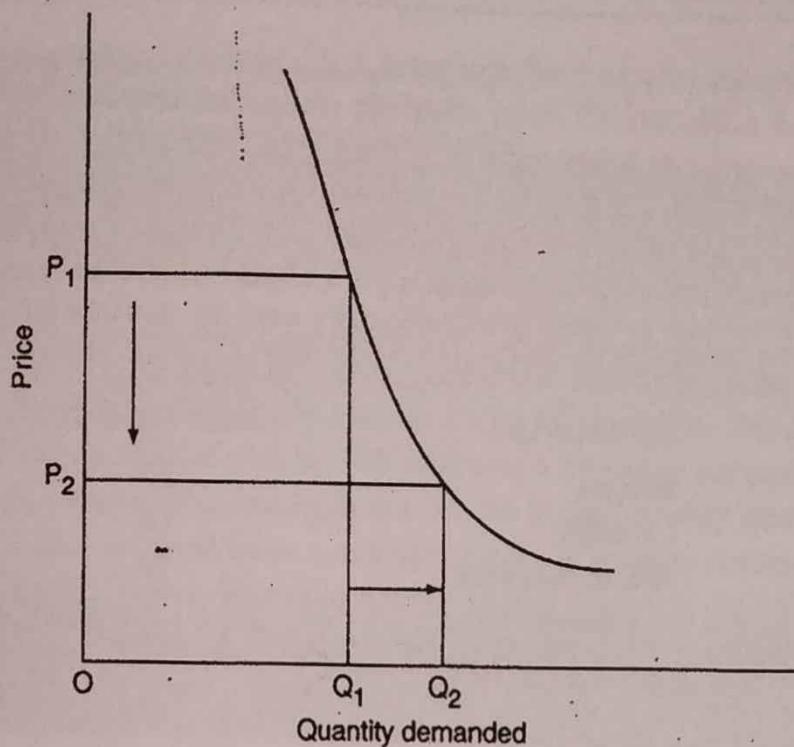


Fig. 3.1(d) Relatively Inelastic Demand

Figure 3.1(d) reveals that the quantity demanded increases from OQ_1 to OQ_2 because of a decrease in price from OP_1 to OP_2 . The extent of increase in the quantity demanded is lesser than the extent of fall in the price.

(e) Unity Elasticity The elasticity in demand is said to be unity when the change in demand is equal to the change in price. This is illustrated in Fig. 3.1(e).

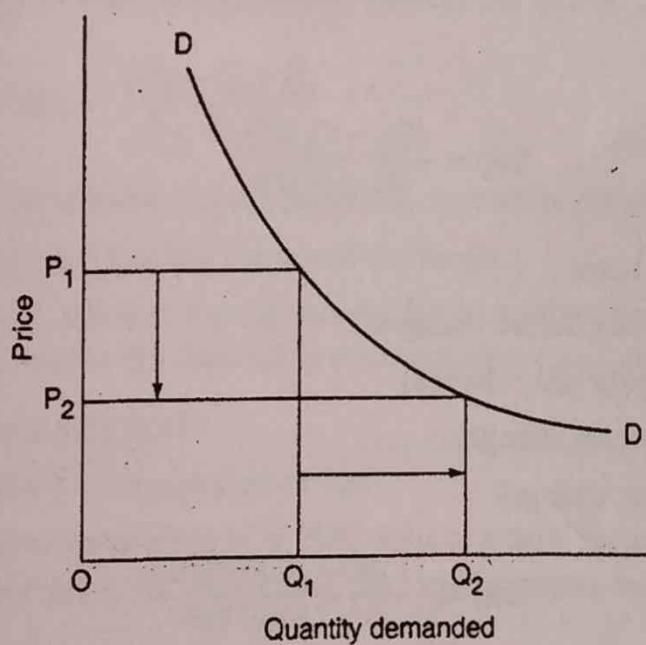


Fig. 3.1(e) Unity Elasticity

Figure 3.1(e) reveals that the quantity demanded increases from OQ_1 to OQ_2 because of a decrease in price from OP_1 to OP_2 . The extent of increase in the quantity demanded is equal to the extent of fall in the price.

Types of Elasticity

The following are the four types of elasticity of demand:

- Price elasticity of demand
- Income elasticity of demand
- Cross elasticity of demand
- Advertising elasticity of demand

These are explained below:

(a) Price Elasticity of Demand Elasticity of demand in general refers to price elasticity of demand. In other words, it refers to the quantity demanded of a commodity in response to a given change in price. Price elasticity is always negative which indicates that the customer tends to buy more with every fall in the price. The relationship between the price and the demand is inverse.

It is measured as follows:

$$\text{Price elasticity of demand} = \frac{\text{Proportionate change in the quantity demanded for product X}}{\text{Proportionate change in the price of X}}$$

The same is expressed as

$$E_{dp} = \frac{(Q_2 - Q_1)/Q_1}{(P_2 - P_1)/P_1}$$

Where Q_1 is the quantity demanded before price change, Q_2 is quantity demanded after price change, P_1 is the price before change and P_2 is the price after change:

The price is said to be elastic, when the proportionate change in quantity demanded is more than the proportionate change in price. For instance, a 5 percent fall in the price results in an increase of 20 percent in the quantity demanded, the price is said to be elastic, which implies that the elasticity is more than one ($e > 1$).

Box 3.1 Concept of Price Elasticity and Impact on Revenue Summarised

Price elasticity of demand What this means Impact on Price

$ED > 1$ (elastic demand) Percentage change in quantity demanded greater than percentage change in Price Revenue increases with every fall in price

$ED = 1$ (Unity elasticity) Percentage change in quantity demanded is equal to percentage change in Price Revenue remains unchanged even though there is fall in the price

$ED < 1$ (Inelastic demand) Percentage change in quantity demanded less than percentage change in Price Revenue decreases when price is lowered

Significance of price elasticity of demand It is necessary that the trader should be aware of the impact of changes in the quantity demanded for a given change in price. He can take a decision as to how much he can supply if he is aware of the likely change in quantity demanded as a result of change in price.

Box 3.3 Situation Analysis: Price Elasticity

In each situation, state whether demand is price elastic, price inelastic or unity elasticity.

- A 10% rise in the price of refrigerators leads to a 10% fall in quantity demanded.
- The quantity of cars demanded rises by 14% following a 5% fall in car prices.
- A 10% rise in the cinema ticket rate leads to a 5% fall in their quantity demanded.
- A 3% change in price of petrol leads to a 0.05% change in quantity demanded
- A 10% increase in the wages of construction workers
- A 20% increase in the deluxe interior fittings

(b) **Income Elasticity of Demand** Income elasticity of demand refers to the quantity demanded of a commodity in response to a given change in income of the consumer.

Income elasticity is normally positive, which indicates that the consumer tends to buy more and more with every increase in income.

It is measured as follows:

$$\text{Income elasticity of demand} = \frac{\text{Proportionate change in quantity demanded for product X}}{\text{Proportionate change in income}}$$

The same is expressed as

$$Ed_i = \frac{(Q_2 - Q_1)/Q_1}{(I_2 - I_1)/I_1}$$

Where Q_1 is the quantity demanded before change, Q_2 is quantity demanded after change

I_1 is income before change and I_2 is the income after change.

A positive income elasticity indicates that the demand for the product rises more quickly than the rise in disposable income. In other words, the demand is more responsive to a change in income.

Example 4 Elastic income demand ($e > 1$):

Determine the Income elasticity of demand given that

- the quantity demanded for product M is 1000 units at a daily income of Rs. 100.
- the daily income declines to Rs. 80 and the quantity demanded decreases to 700 units.

Solution

$$Ed_i = \frac{(Q_2 - Q_1)/Q_1}{(I_2 - I_1)/I_1}$$

Let us define these variables here.

$$Q_1 = 1000 \text{ units (quantity before change)}$$

$$Q_2 = 700 \text{ units (quantity after change)}$$

$$I_1 = \text{Rs. } 100 \text{ (daily income before change)}$$

$$I_2 = \text{Rs. } 80 \text{ (daily income after change)}$$

$$\begin{aligned} Edi &= \frac{(700 - 1000)/1000}{(80 - 100)/100} \\ &= 1.5 \end{aligned}$$

Edi is 1.5, which means that for a 10 percent fall in income, there is a decrease in demand by 15 percent. Where the numerical value of elasticity is more than one, the price demand is *relatively elastic*. In other words, the percentage of decrease in quantity demanded is more than the percentage of fall in income. In times of depression, the incomes fall and consequently the demand for the goods and services also decrease.

Similarly the inelastic income demand and unity income demand can be determined.

Significance of income elasticity In determining the effects of changes in business activity, it is necessary for the trader to be aware of the income elasticity of demand for given commodities. With the help of income elasticity of demand, he can estimate the likely changes in the demand for his product as a result of changes in the national income. Income elasticity will help us in knowing whether a commodity is a superior good, normal good or an inferior good. If the income elasticity is positive and greater than one, it is a *superior good*. The superior goods such as automobiles and refrigerators can be advertised in business magazines for better attention from the consumers. Retail show rooms also can be located where high income group customers find it convenient to shop. If the income elasticity is positive and less than or equal to one, it is a *normal good*. If the income elasticity is negative, it is an *inferior good*. Knowledge of the nature of goods helps in allocating advertisement budget.

Box 3.4 Situation Analysis: Income Elasticity

In each situation, state whether income elasticity of demand is positive or negative. Explain the reason in each case.

- Salt
- Electricity
- Holidays in Singapore
- Colour Television
- Tubeless tyres (used in imported cars)

(c) Cross Elasticity of Demand Cross elasticity of demand refers to the quantity demanded of a commodity in response to a change in the price of a related good, which may be substitute or complement.

It is measured as follows:

$$\text{Cross elasticity of demand} = \frac{\text{Proportionate change in quantity demanded for product X}}{\text{Proportionate change in price of product Y}}$$

The same is expressed as

$$Ed_c = \frac{(Q_2 - Q_1)/Q_1}{(P_2y - P_1y)/P_1y}$$

Where Q_1 is the quantity demanded before change, Q_2 is quantity demanded after change, P_1y is the price before change and P_2y is the price after change in the case of product Y .

Cross elasticity is always positive for substitutes (which means that the demand for tea goes up if there is an increase in the price of coffee) and negative for complements (which means that if there is an increase in the price of sugar, the demand for coffee tends to fall).

Example 5 Inelastic cross demand ($e < 1$):

Determine the cross elasticity of demand given that

- the quantity demanded for product M is 1000 units at a daily income of Rs. 100.
- the daily income declines to Rs. 80 and the quantity demanded decreases to 700 units.

Solution

$$Ed_c = \frac{(Q_2 - Q_1)/Q_1}{(P_2y - P_1y)/P_1y}$$

Let us define these variables here.

$Q_1 = 1000$ kg (quantity of coffee demanded before change)

$Q_2 = 1200$ kg (quantity of coffee demanded after change)

$P_1y = \text{Rs. } 20$ (price of sugar per kg. before change)

$P_2y = \text{Rs. } 30$ (price of sugar per kg after change)

$$\begin{aligned} Ed_p &= \frac{(1200 - 1000)/1000}{(30 - 20)/20} \\ &= 0.4 \end{aligned}$$

Since Ed_p is 0.4 it means that for a 10 percent increase in the price of sugar, there is an increase in demand by 4 percent. Where the numerical value of elasticity is less than one, the cross demand is *relatively inelastic*. In other words, the percentage increase in quantity demanded of coffee is less than the percentage increase in price of a related good say sugar. Sugar and coffee are complements. The increase in price of sugar has shown its impact on the demand for coffee by marginalising the percentage of increase.

Similarly, the elastic cross demand (where $e > 1$) and unity cross demand (where $e = 1$) can be determined.

Box 3.5 Situation Analysis: Cross Elasticity

In each situation, state whether the cross elasticity of demand is positive or negative.

- Rice and vegetables
- Car and scooters
- Computers and related software
- Bank loans and Number of industries

Significance of cross elasticity of demand Knowledge of cross elasticity of demand helps a firm to estimate the likely effect of pricing decisions of its traders dealing in related products on sales. It also helps in defining industry.

(d) Advertising Elasticity It refers to increase in the sales revenue because of change in the advertising expenditure. In other words, there is a direct relationship between the amount of money spent on advertising and its impact on sales. Advertising elasticity is always positive.

$$\text{Advertising elasticity} = \frac{\text{Proportionate change in quantity demanded for product X}}{\text{Proportionate change in advertisement costs}}$$

The same is expressed as

$$Ed_a = \frac{(Q_2 - Q_1)/Q_1}{(A_2 - A_1)/A_1}$$

Where Q_1 is the quantity demanded before change, Q_2 is quantity demanded after change A_1 is the amount spent on advertisement before change and A_2 is the amount spent on advertisement after change.

Box 3.6 Elasticity Concept: How Airlines Industry Benefits

The concept of elasticity of demand is useful to every businessman equally. The stakes in airline industry are huge and hence this example highlights how risk is minimised by following elasticity concept.

Basic service remains the same, by providing some other related facilities, Airlines charges its customers differently.

For instance, it has two classes: Business class and Economy class.

Business Class passengers are assumed to have low elasticity and hence are charged relatively higher. Because of their tight schedule, they have a compulsion to travel at the earliest through for a higher fare. Economy class passengers normally have high elasticity and hence are charged lower. They respond very sharply to price increases. They may even postpone to take advantages in the fare, if any. However, if the travel is urgent, one may even travel by Business class also.

It is common to find airlines offering special incentives to the frequent flyers such as special discounts for early bookings, group bookings, allowing more luggage, etc.

The advertising elasticity is said to be high when even a small percentage change in the advertising expenditure results in a large percentage of change in the level of quantity demanded or sales.

Example 6 Elastic advertising demand ($e > 1$):

Determine the advertising elasticity of demand given that

- the quantity demanded for product M is 1,00,000 units per day at a monthly advertising budget of Rs. 10,000
- the monthly advertising budget is slashed to Rs. 5,000; the quantity demanded will fall down to 30,000 units per day.

DEMAND FORECASTING

Demand forecasting refers to an estimate of future demand for the product. It is essential to firm for planning to expand the scale of their production operations.

Its main objective is assessment of the future course of demand. In recent times, forecasting plays an important role in business decision making at the right time.

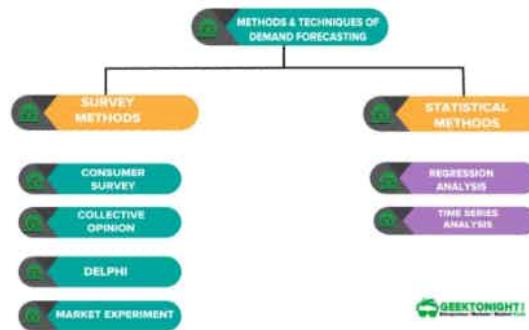
There is a difference b/w forecasting demand and sales. Demand forecasting relating to production, inventory control, timing etc. Whereas sales forecasting relates to revenue cash requirements and expenses.

As per Prof. C I Savage and T R Small demand forecasting classified into 3 levels, They are

- A) Economic Level
- B) Industry Level
- C) Firm Level.

Economic Level forecasting is concerned with the Economics, while industrial level forecasting is used for inter industry comparisions and is being supplied by trade association or chamber of commerce. Firm level forecasting relates to individual firm.

Methods of forecasting: various methods are used for forecasting demand. Broadly they are divided into 2 ways.



1) **SURVEY METHOD:** Under this method, information about desires of the consumers and opinion of experts are collected by interviewing them. Again survey method can be divided as,

a) **Consumer (Opinion) Survey Method:**

When the demand is to be forecasted for a short period of one year than the best method is to ask the customer what they are preferring to buy. Thus, every potential customer under this method is directly interviewed. There are three ways to the survey in this method.

First, you have to start with a complete enumeration method. Here all the potential customers are asked about their future buying plans. Then it is followed by a sample survey method. In this, a sample of buyers is selected scientifically. Only these people are interviewed.

The last one is the end use method. This method is specifically used for forecasting the demand for various inputs.

b) **Collective Opinion Method:** This method is generally used by the salesman of a company. They use it successfully predict the sales of a company in the region. Thus, for predicting future sales, individual estimates are calculated. Then based on several factors like product designs, selling price, ad campaigns, etc these demands are reviewed.

c) **Delphi method:**

Under this method, a panel is selected to give suggestions for solving the problems. Both internal and external experts can be the members of the panel. Panel members are kept apart from each other and express their views in an anonymous manner. There is also a coordinator who acts as intermediary among the panelists. He prepares a questionnaires and sends it to the panelists. At the end of each round it prepares a summary report. On the basis of summary report the panel members gives suggestions. This method has been used in the area of technological forecasting.

d) **Market Expert/ Expert opinion method:** Apart from the salesmen, consumers, distributors and outside experts may also be used for the forecasting. In USA Automobile companies get sales estimates directly from their dealers. Firms in advanced countries make use of outside experts for estimating future demand.

2) **STATISTICAL METHODS:** It is used for long run forecasting. Under this method, statistical and mathematical techniques are used to forecast demand. This methods depends or relies on past data. This also be classified as,

a) **Regression Analysis Method:** The demand function for a product is estimated where demand is dependent variable and variables that determine the demand are independent variable.

If only one variable affects the demand, then it is called single variable demand function. Thus, simple regression techniques are used.

Simple regression is the relationship between two variables where one is independent variable and the other is dependent variable.

The equation to calculate simple regression is as follows:

$$Y = a + bx$$

Where, y = estimated value of y for a given value of x

B = amount of change in y produced by a unit change in x

A and b = constants

b) **Time Series / Trend Projection Methods:**

Trend projection or least square method is the classical method of business forecasting. In this method, a large amount of reliable data is required for forecasting demand. In addition, this method assumes that the factors, such as sales and demand, responsible for past trends would remain the same in future.

In this method, sales forecasts are made through analysis of past data taken from previous year's books of accounts. In case of new organizations, sales data is taken from organizations already existing in the same industry. This method uses time-series data on sales for forecasting the demand of a product.

c) **Barometric Method:**

In barometric method, demand is predicted on the basis of past events or key variables occurring in the present. This method is also used to predict various economic indicators, such as saving, investment, and income. This method was introduced by Harvard Economic Service in 1920 and further revised by National Bureau of Economic Research (NBER) in 1930s.

This technique helps in determining the general trend of business activities. For example, suppose government allots land to the XYZ society for constructing buildings. This indicates that there would be high demand for cement, bricks, and steel.

The main advantage of this method is that it is applicable even in the absence of past data. However, this method is not applicable in case of new products. In addition, it loses its applicability when there is no time lag between economic indicator and demand.

SUPPLY

In Economics, supply refers to the amount of that producer and firms are willing to sell at a given price when all other factors being held constant.

In other words of Meyer, "Supply is a schedule of the amount of good that would be offered for sale at all possible prices at any period of time e.g., a day, a week or a month and so on".

Individual supply: it refers to quantity of a commodity that an individual firm is willing and able to offer for a sale for a given price during a given period of time.

Market Supply: it refers to the quantity of a commodity that all the firms are willing and able to offer for a sale at a given price during a given period of time.

Supply Schedule

Supply schedule is a table showing the relationship between price and quantity supply of commodity.

Price of Coke	Quantity Supply of coke
5	2
10	4
15	6

Positive relationship between price and demand

Price ↑ Qs ↑

Price ↓ Qs ↓
□ □ □

Supply Curve

Supply curve is the graphical representation of the supply schedule; it shows how much of a good or service producer want to sell at any given price.

