

## UNIT – II

### ELASTICITY OF DEMAND

**Elasticity of Demand** : Elasticity of demand is the measure of the degree of change in the amount demanded of the commodity in response to a given change in price of the commodity, price of some related goods, or changes in consumers income.

#### Types of demand Elasticity

1. Price elasticity of demand
2. Income elasticity of demand
3. Cross elasticity of demand
4. Advertising or promotional elasticity of demand

**Price elasticity of demand**: The ratio of percentage of changes in demand of a commodity to a percentage changes in price of goods is called price elasticity.

$$E_p = \frac{\text{Proportionate changes in quantity demand}}{\text{Proportionate changes in price of commodity}}$$

$$E_p = \frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{P_2 - P_1}{P_1}}$$

$$E_p = \frac{\frac{\Delta Q}{Q_1}}{\frac{\Delta P}{P_1}}$$

$$E_p = \frac{\Delta Q}{Q_1} \times \frac{P_1}{\Delta P}$$

$$E_p = \frac{\Delta Q}{\Delta P} \times \frac{P_1}{Q_1}$$

$Q_1$  = Quantity of demand before price change

$Q_2$  = Quantity of demand after price change

$P_1$  = Price charged before price change

$P_2$  = Price charged after price change

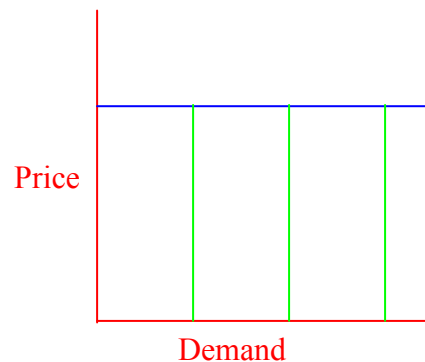
### Type of price elasticity

1. Perfectly elastic demand
2. Perfectly inelastic demand
3. Unit elasticity demand
4. Relatively elastic demand
5. Relatively inelastic demand

Perfectly elastic demand :  $E = \infty$

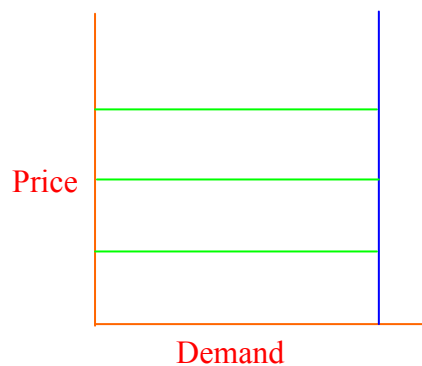
It is one in which a small change in price will cause a large change in amount demanded. A small rise in price reduces the demand to zero.

Demand is Endless  $E = \infty$



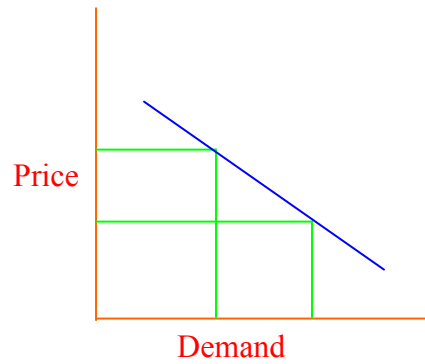
Perfectly Inelastic :  $E = 0$

Demand remains unchanged, whenever there is a change in price



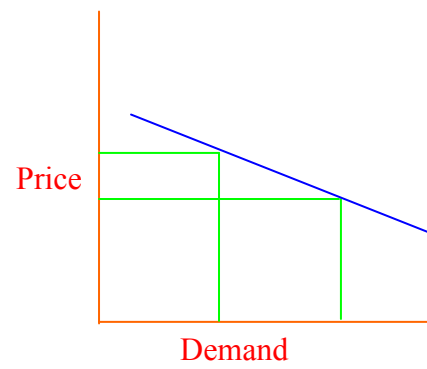
Unit Elasticity demand :  $E = 1$

The percentage of demand changes by exactly the same percentage as does the price changes.



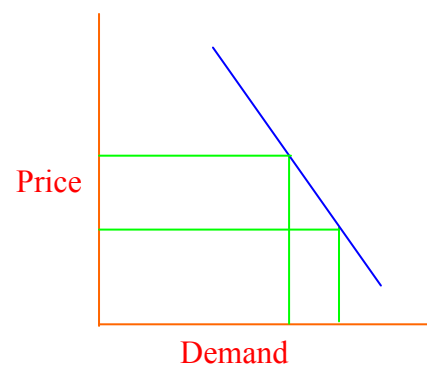
**Relatively Elastic Demand** :  $E > 1$

The demand changes by a larger percentage, than does the price changes.



**Relatively Inelastic Demand** :  $E < 1$

The demand changes by a small percentage than does the price changes.



### Income Elasticity of Demand :

Income elasticity of demand refers to the percentage change in amount demanded as a result of a given percentage change income of a consumer.

$$E_i = \frac{\text{Proportionate changes in quantity of demand}}{\text{Proportionate changes in income of the consumer}}$$

$$E_i = \frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{I_2 - I_1}{I_1}}$$

$$E_i = \frac{\frac{\Delta Q}{Q_1}}{\frac{\Delta I}{I_1}}$$

$$E_i = \frac{\Delta Q}{Q_1} \times \frac{I_1}{\Delta I}$$

$$E_i = \frac{\Delta Q}{\Delta I} \times \frac{I_1}{Q_1}$$

$Q_1$  = Quantity of demand before income change

$Q_2$  = Quantity of demand after income change

$I_1$  = Original income

$I_2$  = Change in income of the consumer

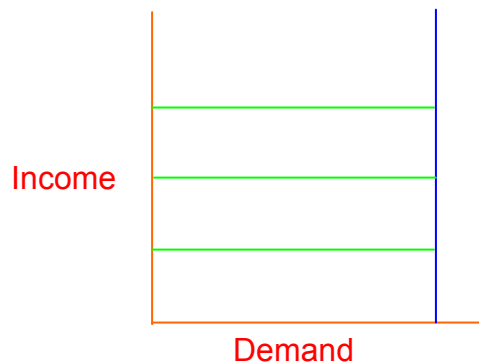
### Type of Income Elasticity of demand :

1. Zero income elasticity
2. Negative income elasticity
3. Positive income elasticity

Zero Income Elasticity :  $E_i = 0$

Where change in income will have no effect on the quantity demand

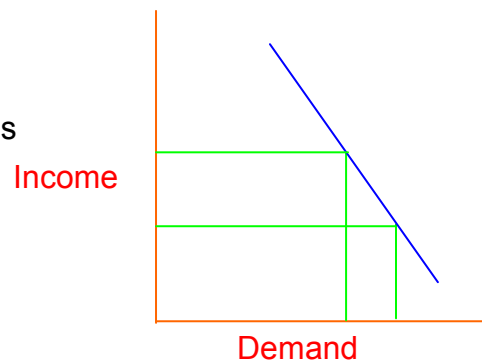
Ex : Salt



**Negative Income Elasticity** :  $E_i < 0$

Where a given increase in the consumers income is followed by a decline in the quantity demanded of a commodity

Ex : An increase in income might lead  
to shift his demand from bidies to cigarettes



**Positive Income Elasticity** :  $E_i > 0$

If an increase in income is associated with an increase in quantities demanded

1. Unity income elasticity of demand  $E_i = 1$
2. Income elasticity of demand greater than unity  $E_i > 1$
3. Income elasticity of demand less than unity  $E_i < 1$

**Cross Elasticity of Demand** :

The effect of a change in the prices of related goods upon the demand for a particular commodity may be determined by measuring the cross elasticity of demand.

$$E_c = \frac{\text{Proportionate changes in quantity of demand of a particular commodity}}{\text{Proportionate changes in price of related goods}}$$

$$E_c = \frac{\frac{\Delta Q_A}{Q_A}}{\frac{\Delta P_B}{P_B}}$$

$$E_c = \frac{\Delta Q_A}{Q_A} \times \frac{P_B}{\Delta P_B}$$

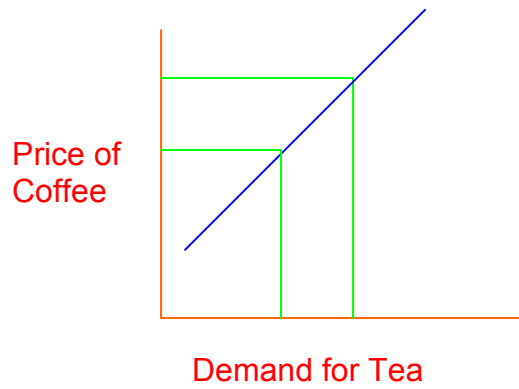
$\Delta Q_A$  = Change of demand of given goods

$Q_A$  = Demand of given goods

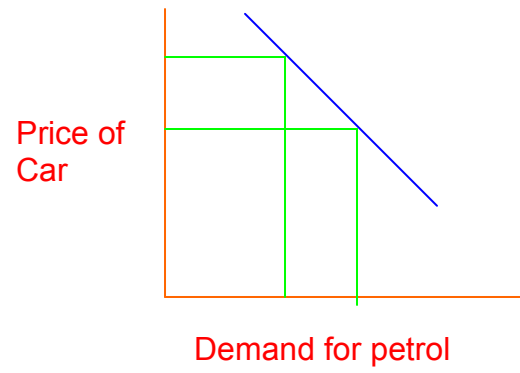
$\Delta P_B$  = Change in price of related goods

$P_B$  = Price of related goods

Ex : Substitute goods



Complementary goods



### **Advertising or Promotional Elasticity of Demand :**

This direct relationship between the amount of money spent on advertising and its impact on sales.

$$E_a = \frac{\text{Proportionate changes in quantity of demand for particular product X}}{\text{Proportionate changes in advertisement cost}}$$

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

$A_1$  = Amount spent on advertisement before change

$A_2$  = Amount spent on advertisement after change

**Demand Forecasting** : Demand forecasting refers to an estimate of future demand for the product. "It is an objective assessment of the future course of demand". It is an vital role in business decision making. The survival and prosperity of a business firm depend on its ability to meet the consumers' needs efficiently and adequately. Demand forecasting has an important influence on production planning.

### **Type of Demand Forecasting :**

**Short – term demand forecasting** : Short – term demand forecasting is for a limited period usually for one year. It relates to policies regarding sales, purchase, price and finances taking existing production capacity of the firm short term forecasting are essential for formulating suitable price policies, If the business people expect a rise in the prices of raw materials or shortages, they may buy early.

**Long – term forecasting** : In long – term forecasting the business should know that about the long – term demand for the product planning of a new plant or expansion of an existing unit depends on long – term demand.

### **Method of Demand Forecasting :**

**I. Survey Method** : Under this method, information about the consumers' requirement and opinion of experts are collected by interviewing them. Survey method can be divided into three types viz., consumers' survey method, sales force opinion method and experts' opinion method.

i) Consumers survey method : In this method, the consumers are contacted personally to know about their plans and preferences regarding the consumption of the product. A list of all potential buyers would be drawn and each buyer will be approached and asked how much he plans to buy the listed product in future.

This method may be undertaken in three ways. Complete enumeration method, sample surveys method and consumer's end use method.

a) Complete enumeration method : Under this method all the consumers of the product are interviewed based on which forecast is made. As first hand information is collected this method is free from bias. However, this method is impracticable as the consumers are numerous and scattered.

b) Sample survey method : In this method, a sample of customers is selected for interview. A sample may be random sampling or stratified sampling. This method is easy, less costly and also highly useful. Correct sampling and cooperation of the consumers is essential for the success of this method.

c) End – use method : Under this method, the demand for the product from different sectors such as industries, consumers, export and import are found out. This data helps in changing the future course of demand. But for this method industries should provide their production plans and input-output coefficients.

ii) Sale – Force Opinion method : The men who are closest to the market(viz., salesmen) are questioned and their responses (or reactions) are aggregated. The advantages of this method are that it is cheap and easy, in the sense that it does not involve any elaborate statistical measurement.

iii) Experts' Opinion Method : Obtaining views from a group of specialists outside the firm has possible advantages of speed and cheapness. This method is best suited in situations where intractable changes are occurring, e.g., forecasting future technological states. It is possible that in cases where basic data are lacking experts may give divergent views, but even then it is possible for the manager to adopt his thinking on the basis of these views.



**II. Statistical Methods** : for forecasting the demand for goods and services in the long – run, statistical and mathematical methods are used considering the past data.

i) **Trend Projection Method** : These are generally based on analysis of past sales patterns. These methods dispense with the need for costly market research because the necessary information is often already available in company files in terms of different times, that is, a timer series data.

a) **Fitting a trend line**: Under this method actual sales data is drawn on a chart and estimating by observation where the trend line lies. That line can be extended further towards a future period and the corresponding sales graph can be read from the graph.

b) **Least square method**: This method uses statistical data to find the trend line which best fits the available data. Here it is assumed that there is proportional (linear) change in sales over a period of time. In such a case, the trend line equation is in linear form. Where this assumption does not hold good, the equation can be in non-linear form.

The estimating linear trend equation of sales is written as

$$S = x + y(T)$$

Where x and y have been calculated from past data S is sales and T is the year number for which the forecast is made: to find the values of x and y, the following normal equations have to be stated and solved:

$$\begin{aligned}\sum S &= N x + y \sum T \\ \sum ST &= x \sum T + y \sum T^2\end{aligned}$$

Where S is the sales; T is the year number, n = number of years

c) **Time Series Analysis** : This method attempts to build seasonal and cyclical variation into the estimating equation

$$S = a + b + c$$

S = Sales, a = Trend, b = Season trend, C = Cycle trend

d) **Moving Average Method** : This method is based on past sales data and it is used for short – term forecasting and it is based on assumption that the future is the average of past performance.

ii) **Barometric Techniques** : Present events are used to predict the directions of change in future. This is done with the help of economic and statistical indicators. Indicators like building materials, personal income, agricultural income, employment, gross national income, industrial production.

Ex : 1. Construction contracts sanctioned, to forecast demand for building Materials

2. Personal income for predicting the demand for consumer goods

3. Agriculture income to forecast the demand for agricultural inputs

iii) Simultaneous Equation Method : This method is more practical in the sense that it requires to estimate the future values of only predetermined variables. It is an improvement over regression method where as in regression equation, the value of both exogenous (Independent) and endogenous (Dependent) variables have to be predicted. It is no better than regression method. It inherits all the limitations of regression method. It is difficult to compute where the number of equations is larger.

iv) Correlation and Regression Methods :

a) Correlation Method: Correlation describes the degree of association between two variables such as sales and advertisement expenditure. When the two variables tend to change together, then they are said to be correlated. The extent to which they are correlated is measured by correlation coefficient. If the high values of one variable are associated with the high values of another, they are said to be positively correlated.

b) Regress Analysis : This is a statistical technique by which the demand is forecasted with the help of certain independent variables. There are types of regression analysis.

i) Simple Regression : In this analysis is used when the quantity demanded is taken as a function of a single independent variable

ii) Multiple Regression : In this analysis is used to estimate demand as a function of two or more independent variables that varies simultaneously.

### III. Other Methods :

i) Test Marketing : The manufactures favor to test their product or service in a limited market as test – run before they launch their products nationwide. Based on the results of test marketing, valuable lessons can be learnt on how consumer reacts to the given product and necessary changes can be introduced to gain wider acceptability. To forecast the sales of a new product or the likely sales of an established product in a new channel of distribution or territory, it is customary to find test marketing in practice **Ex:** Automobile companies.

ii) Market Experimentation: This method involving giving a sum of money to each consumer with which he is asked to shop around in a simulated market. Consumer behavior is then studied by varying the price, quality, packing, advertisement, colour etc.

iii) Judgmental Approach : If the management is unable to use any of the above method they have to make their own judgment in forecasting the demand

Ex : According to the anticipated changes of the budget, the demand can be estimated depending upon the change expected, income levels and needs of the customers like Cell phone, Computers etc.

Factors Governing Demand Forecasting : There are several factors which govern the forecasting process. There are

a) Nature of Demand : Market demand for particular product or service is not a single number but it is a function of a number of factors. For instance, higher volumes of sales can be realized with higher levels of advertising or promotion efforts.

b) Types of Forecast : Base on the period under forecast, the demand forecast can be of two types i) Short – run forecast ii) Long – run forecast

i) Short – run forecast : A short – range forecast of the total demand for a particular product helps to provide a basis for ordering raw materials, to plan and schedule production activities, to seek short – term finance, and so on.

ii) Long – run Forecast : A long – run forecast provides information for major strategic decisions that result in extension or reduction of limiting resources. A long – run forecast can be an effective basis to make an allocation for necessary long – run finance.

c) Forecasting Level : Forecasting may be at the firm level, industry level, national level or at the global level.

**Firm level** means estimating the demand for the product and services offered by a single firm,

**Industry level** means the aggregate demand estimated for the goods and services of all the firms constitutes the industry level.

**National level** means it is worked out based on level of income and saving of the consumers.

**Global level** means globalization and deregulation, the entrepreneurs have started exploring the foreign markets for which the global level forecasts are utilized.

d) Degree of Orientation : Demand forecasts can be worked out based on total sales or product/service – wise sales for a given time period. Forecasts in terms of total sales can be viewed as general forecast whereas product/service – wise or region or customer segment – wise forecast is referred to as specific forecast.

e) Nature of goods : The goods are classified into producer goods, consumer goods, consumer durables and services. The patterns of forecasting in each of these differ.

f) New Products : It is relatively easy to forecast demand for established products or products which are currently in use. If a firm wants to deal in detergents, it can find access to the industry demand for the detergents and market share of each competitor. It is up to this individual new firm and its ingenuity to create its own customer base by pulling customers of the other competitors through strategy.