

## BEFA UNIT II

### DEMAND ANALYSIS

In common parlance, demand means the desire for an object. But in economics demand is something more than this. According to Stonier and Hague, “Demand in economics means demand backed up by enough money to pay for the goods demanded”. This means that the demand becomes effective only if it is backed by the purchasing power. In addition to this, there must be willingness to buy a commodity.

Thus demand in economics means the desire backed by the willingness to buy a commodity and the purchasing power to pay.

In the words of “**Benham**” “The demand for anything at a given price is the amount of it which will be bought per unit of time at that Price”.

Hence, demand refers to the amount of commodity which an individual consumer is willing to purchase at given price in a given period. The demand is said to exist when the following three conditions are fulfilled.

1. Desire to purchase
2. Ability to pay
3. Willing to pay

Ex: A beggar may have desire to purchase a car but he cannot pay money for it.

Ex: A miser does not purchase a car but he can pay money for it.

### DEMAND FUNCTION

Demand function is a function which describes a relationship between one variable and its determinants. The demand function for a good relates the quantity of good which consumers demand during a given period to the factors which influence the demand. Quantity demanded is dependent variable and all the factors are independent variables. The factors can be built up into a demand function. The demand function can be mathematically expressed as follows:

$$Q = f(P, I, T, P_1..P_n, E_p, E_i, A, O)$$

Q = Quantity demanded  
f = Function of  
P = Price of goods itself  
I = Income of consumers  
T = Taster and preferences  
P<sub>1</sub>..P<sub>n</sub> = Price of related goods  
E<sub>p</sub> = Expectation about future price  
E<sub>i</sub> = Expectation about future income  
A = Advertisement  
O = Other factors

### LAW OF DEMAND:

Law of demand shows the relationship between price and quantity demanded of a commodity in the market. In the words of Marshall, “the amount demand increases with a fall in price and diminishes with a rise in price”.

## BEFA UNIT II

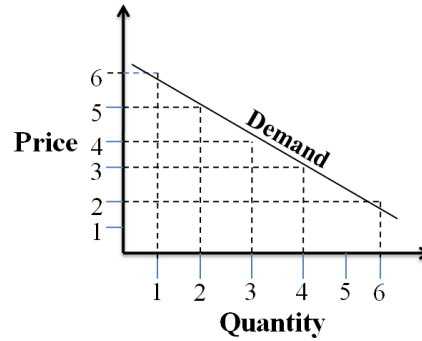
The law of demand states that “ **other things remaining constant, the higher the price of the commodity, the lower is the demand and lower the price, higher is the demand**”. It is called as **ceteris paribus** (Latin phrase meaning other things constant.)

The law of demand may be explained with the help of the following demand schedule.

***Demand Schedule:***

Price of Apple (In. Rs.)	Quantity Demanded
2	6
3	4
4	3
5	2
6	1

***Demand Curve:***



When the price falls from Rs. 6 to 5, quantity demand increases from 1 to 2. In the same way as price falls, quantity demanded increases. On the basis of the demand schedule, we can draw the demand curve. The above demand curve shows the inverse relationship between price and quantity demanded of apple. It is downward sloping.

### ***Assumptions:***

Law of demand is based on certain assumptions:

1. There is no change in consumers taste and preferences.
2. Income should remain constant.
3. Prices of other goods should not change.
4. There should be no substitute for the commodity
5. The commodity should not confer at any distinction
6. The demand for the commodity should be continuous
7. People should not expect any change in the price of the commodity

## EXCEPTIONS TO LAW OF DEMAND

According to law of demand, other things being constant, as the price increases, the demand for the commodity decreases and vice-versa. But this is not true all the time. In some cases, as the price increases, the demand for the commodity will also increase and the demand decreases when the price decreases. All these cases are considered as exceptions to the law of demand.

When price increases from OP to Op1, quantity demanded also increases from OQ to OQ1 and vice versa. The following are the exceptions to the law of demand.

### ***1. Giffen goods or Giffen paradox:***

The Giffen good or inferior good or cheap good is an exception to the law of demand. The demand for these goods varies directly with the variations in prices i.e., there exists direct relation between the quantity demanded and the price of the commodity. Giffen goods may or may not exist in the real world.

## BEFA UNIT II

Giffen goods are named after

Sir Robert Giffen. He has conducted a survey on American laboring families who consume bread and meat. The survey revealed that they spend more of their income on bread because it is their staple food or main food and less of their income on meat. When price of bread increases, after purchasing bread, they don't have surplus money to buy meat. So, the rise in the price of bread forced the people to buy more bread by reducing the consumption of meat and thus raised the demand for bread. The goods like bajra, barley, gram, millets, vegetables fall under the category of Giffen goods.

### **2. Goods of status**

In some situations, certain commodities are demanded just because they are expensive or prestige goods and are usually used as status symbols to display one's wealth in the society. Examples of such commodities are diamonds, air conditioned car, duplex houses etc. as the price of these commodities increase, they are more considered as status symbols and hence their demand gets raised. This goes against the law of demand.

### **3. Ignorance:**

Sometimes, the quality of the commodity is judged by its price. Consumers think that the product is superior if the price is high. As such they buy more at a higher price.

### **4. consumer expectations of future prices**

If the price of the commodity is increasing, the consumers will buy more of it because of the fear that it increase still further. Similarly, if the consumer expects the future prices to decrease, he may not purchase the commodity thinking that the good may be of bad quality. This violates the law of demand.

### **5. Fear of shortage:**

During the times of emergency of war, People may expect shortage of a commodity. At that time, they may buy more at a higher price to keep stocks for the future.

### **6. Necessaries:**

In the case of necessities like rice, vegetables etc. people buy more even at a higher price.

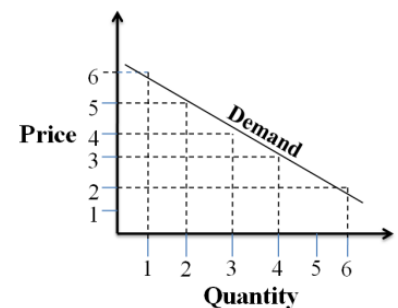
## DETERMINANTS OF DEMAND

There are several factors or determinants that affect the individual demand and market demand for a product. These factors are economic, social as well as political factors. The effect of all the factors on the amount demanded for the commodity is called Demand Function. These factors are as follows:

### **1. Price of the Commodity:**

The most important factor-affecting amount demanded is the price of the commodity. The amount of a commodity demanded at a particular price is more properly called price demand. The relation between price and demand is called the Law of Demand. The demand for a commodity varies inversely with its price. A decrease in price increases the purchasing power of consumers and an increase in the price decreases the purchasing power of the consumers.

### **2. Income of the Consumer:**

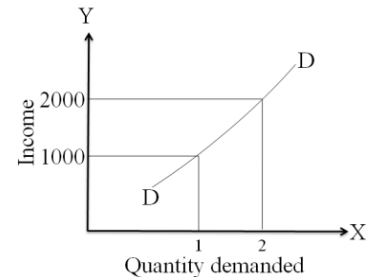


## BEFA UNIT II

The second most important factor influencing demand is consumer income. Individual consumer's income determines his purchasing ability. When other things remaining constant, if income increases, demand increases and vice-versa. An increase in income makes an individual to buy many commodities. The effect of income on demand can be analysed for normal goods, perishable goods and inferior goods.

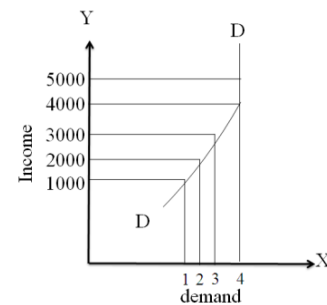
- a) **Normal goods:** Usually, the demand for a normal good goes in the same direction with consumer's income i.e., demand for normal goods is directly related to consumer's income.

Income	Demand
1000	1
2000	2



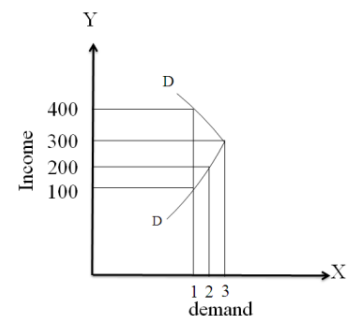
- b) **Perishable goods:** For perishable goods like foods, fruits, meat, vegetables, milk etc., whose life is very short, the quantity demanded raises with an increase in income, but after a certain level it remains constant even though the income raises.

Income	Demand for milk in Kg.
1000	1
2000	2
3000	3
4000	4
5000	4



- c) **Inferior goods:** The goods for which the demand decreases even though the income level increases are inferior goods or cheap good or ordinary goods.

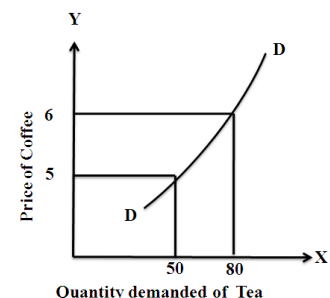
Income (Rs.)	Demand for ordinary ice-cream
100	1
200	2
300	3
400	1



### 3. Prices of related goods:

In a given market, if the price of one good influences the quantity demanded of another good, these two goods are said to be related goods. Two commodities in a given market are related to each other either as Substitutes or Complementary goods.

- a. **Substitutes:** When a want can be satisfied by alternative similar goods, they are said to be substitutes to each other. Ex: Tea and Coffee, Santhoor soap and Lux soap etc. The below graph indicates that as the price of coffee increases, the demand for tea increases.



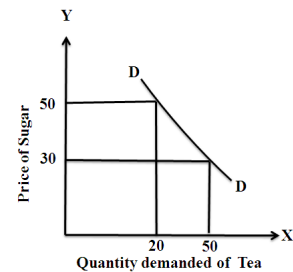
## BEFA UNIT II

Price of Coffee (Rs.)	Demand for Tea
5	50
6	80

There is direct relation between price of coffee and demand for Tea.

- b. **Complementary goods:** When a want can be satisfied by two or more goods in a combination. These goods are termed as complementary goods. In other words, if the price of one good increases, the demand for another good will decrease. Ex: Bread and Butter, Pen and Ink, Car and Petrol, Sugar and Tea and Shoe and Socks etc. The below table and graph indicate the indirect relationship between price of one good and demand for one good.

Price of Sugar (Rs.)	Demand for Tea
30	50
50	20



#### 4. *Tastes and habits of the Consumers:*

Irrespective of price of good and income levels of consumers, demand for many goods depends on consumers' tastes and habits. For example, the demand for ice-creams, chocolates, alcohol, tea, cigarettes etc depend on individual tastes and habits. In cases like, a strict vegetarian does not demand for meat at any price, whereas a non-vegetarian will buy meat at any price.

#### 5. *Wealth:*

The amount demanded of commodity is also affected by the amount of wealth as well as its distribution. The wealthier are the people; higher is the demand for normal commodities. If wealth is more equally distributed, the demand for necessities and comforts is more. On the other hand, if some people are rich, while the majorities are poor, the demand for luxuries is generally higher.

#### 6. *Population:*

Increase in population increases demand for necessities of life. The composition of population also affects demand. Composition of population means the proportion of young and old and children as well as the ratio of men to women. A change in composition of population has an effect on the nature of demand for different commodities.

#### 7. *Government Policy:*

Government policy affects the demands for commodities through taxation. Taxing a commodity increases its price and the demand goes down. Similarly, financial help from the government increases the demand for a commodity while lowering its price.

#### 8. *Expectations regarding the future prices and incomes:*

## BEFA UNIT II

If consumers expect changes in price of commodity in future, they will change the demand at present even when the present price remains the same. Similarly, if consumers expect their incomes to rise in the near future they may increase the demand for a commodity just now.

### **9. Climate and weather:**

The climate of an area and the weather prevailing there has a decisive effect on consumer's demand. In cold areas woolen cloth is demanded. During hot summer days, ice is very much in demand. On a rainy day, ice cream is not so much demanded.

### **10. State of business:**

The level of demand for different commodities also depends upon the business conditions in the country. If the country is passing through boom conditions, there will be a marked increase in demand. On the other hand, the level of demand goes down during depression.

## ELASTICITY OF DEMAND

Elasticity of demand explains the relationship between a change in price and consequent change in amount demanded. "Marshall" introduced the concept of elasticity of demand. Elasticity of demand shows the extent of change in quantity demanded to a change in price.

### **Definition Of Elasticity Of Demand:**

In the words of "Marshall", "The elasticity of demand in a market is great or small according as the amount demanded increases much or little for a given fall in the price and diminishes much or little for a given rise in Price"

**Elastic demand:** A small change in price may lead to a great change in quantity demanded. In this case, demand is elastic.

**In-elastic demand:** If a big change in price is followed by a small change in demanded then the demand is "inelastic".

## TYPES OF ELASTICITY OF DEMAND:

There are four types of elasticity of demand:

1. Price elasticity of demand
2. Income elasticity of demand
3. Cross elasticity of demand
4. Advertisement elasticity of demand

### **I. Price elasticity of demand:**

Marshall was the first economist to define price elasticity of demand. Price elasticity of demand measures changes in quantity demand to a change in Price. It is the ratio of percentage change in quantity demanded to a percentage change in price.

## BEFA UNIT II

$$E_p = \text{Price elasticity} = \frac{\text{Proportionate change in the quantity demand of commodity}}{\text{Proportionate change in the price of commodity}}$$

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

$Q_1$  = Old demand  
 $Q_2$  = New demand  
 $p_1$  = Old price  
 $p_2$  = New price

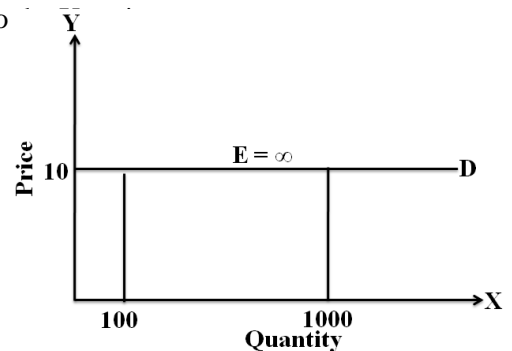
There are five cases of price elasticity of demand

### A. Perfectly elastic demand:

When small change in price leads to an infinitely large change in quantity demand, it is called perfectly or infinitely elastic demand. In this case  $E = \infty$ . Sometimes, even there is no change in the price, the demand changes in huge quantity. In case of perfect elastic demand, the demand for a commodity changes even though there is no change in price. This elasticity is very rarely found in practice. We can see a straight

Price	Demand
10	100
10	1000

line demand curve parallel to



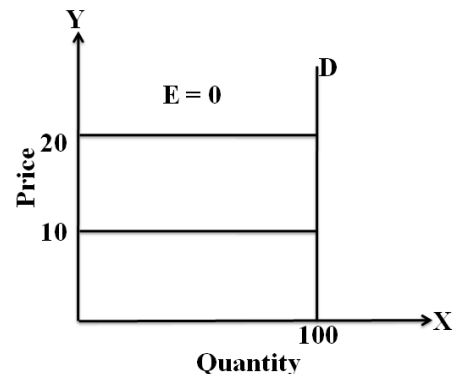
$$E_p = ((Q_2 - Q_1)/Q_1) / ((P_2 - P_1)/P_1)$$

$$E_p = (1000 - 100)/100 / (10 - 10)/10 = \infty$$

The demand curve is horizontal straight line. It shows that at Rs. 10 price any quantity is demanded and if price increases, the consumer will not purchase the commodity.

### B. Perfectly Inelastic Demand

A commodity is said to have perfectly inelastic demand, when even a large change in price of the commodity causes no change in the quantity demanded. The elasticity coefficient of perfectly inelastic demand is  $E_p = 0$ .



The shape of the demand curve for perfectly inelastic is vertical as shown below.

Price	Demand
10	100
20	100

$$E_p = ((Q_2 - Q_1)/Q_1) / ((P_2 - P_1)/P_1)$$

$$E_p = (100 - 100)/100 / (20 - 10)/10 = 0$$

## BEFA UNIT II

When price increases from Rs. 10 to Rs.20, the quantity demanded remains the same. In other words the response of demand to a change in Price is nil. In this case 'E'=0.

### C. Relatively elastic demand:

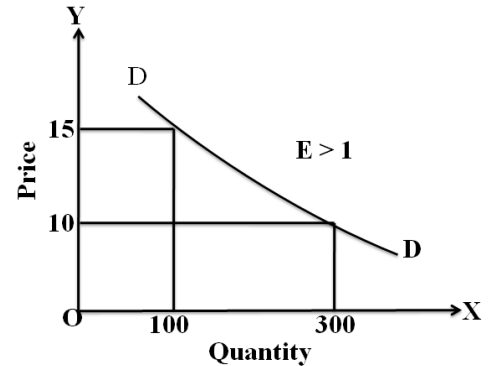
Demand changes more than proportionately to a change in price. i.e. a small change in price leads to a very big change in the quantity demanded. In this case  $E > 1$ . This demand curve will be flatter.

Price	Demand
10	300
15	100

$$E_p = ((Q_2 - Q_1)/Q_1) / ((P_2 - P_1)/P_1)$$

$$E_p = (100 - 300)/300 / (15 - 10)/10 = -1.34$$

When price increases from Rs.10 to Rs.15, quantity demanded decreases from 300units to 100units which is larger than the change in price.



### D. Relatively in-elastic demand.

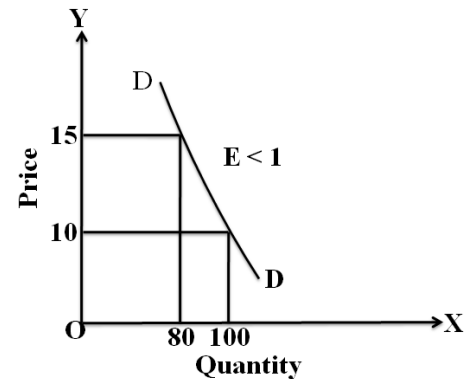
Quantity demanded changes less than proportional to a change in price. A large change in price leads to small change in quantity demanded. Here  $E < 1$ . Demand curve will be steeper.

Price	Demand
10	100
15	80

$$E_p = ((Q_2 - Q_1)/Q_1) / ((P_2 - P_1)/P_1)$$

$$E_p = (80 - 100)/100 / (15 - 10)/10 = -0.40$$

When price increases from Rs.10 to Rs.15 quantity demanded decreases from 100units to 80units, which is smaller than the change in price.

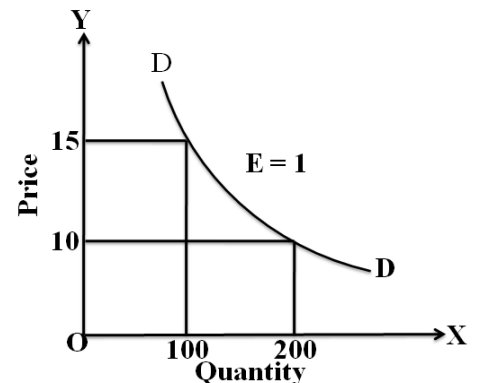


### E. Unitary elasticity of demand:

The change in demand is exactly equal to the change in price. When both are equal,  $E=1$  and elasticity is said to be unitary.

Price	Demand
10	200
15	100

$$E_p = ((Q_2 - Q_1)/Q_1) / ((P_2 - P_1)/P_1)$$





## BEFA UNIT II

$$E_p = (100 - 200)/200 / (15 - 10)/10 = -1$$

When price increases from Rs.10 to Rs.15, quantity demanded decreases from 200units to 100units. Thus a change in price has resulted in an equal change in quantity demanded so price elasticity of demand is equal to unity.

### II. Income elasticity of demand:

Income elasticity of demand shows the change in quantity demanded as a result of a change in income. Income elasticity of demand may be stated in the form of a formula.

$$E_I = \text{Income Elasticity} = \frac{\text{Proportionate change in the quantity demand of commodity}}{\text{Proportionate change in the income of the people}}$$

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

$Q_1$  = Old demand  
 $Q_2$  = New demand  
 $I_1$  = Old income  
 $I_2$  = New income

Income elasticity of demand can be classified in to five types.

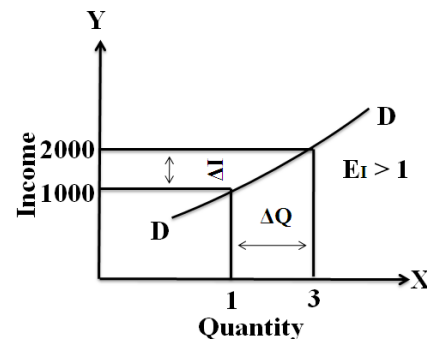
#### A. High income elasticity of demand:

In this case, an increase in come brings about a more than proportionate increase in quantity demanded. Symbolically it can be written as  $E_I > 1$ . This elasticity can be observed in the case of non-necessary goods such as TV, AC etc.

Income	Demand
1000	1
2000	3

$$E_I = ((Q_2 - Q_1)/Q_1) / ((I_2 - I_1)/I_1)$$

$$E_I = (3 - 1)/1 / (2000 - 1000)/1000 = 2$$

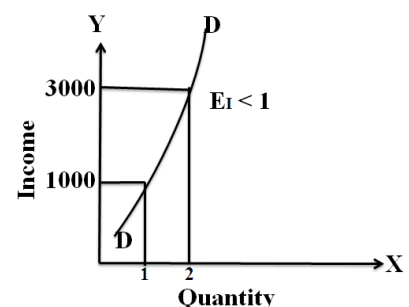


It shows high-income elasticity of demand. When income increases from Rs.1000 to Rs.2000, Quantity demanded increases from 1 unit to 3 units.

#### B. Low income elasticity of demand:

When income increases quantity demanded also increases but less than proportionately. In this case  $E < 1$ . The necessary goods such as rice, vegetables etc, have this type of elasticity.

Income	Demand
1000	1
3000	2



## BEFA UNIT II

$$E_I = ((Q_2 - Q_1)/Q_1) / ((I_2 - I_1)/I_1)$$

$$E_I = (2 - 1)/1 / (3000 - 1000)/1000 = 0.50$$

An increase in income from Rs.1000 to Rs.3000, brings an increase in quantity demanded from 1 unit to 2 units, But the increase in quantity demanded is smaller than the increase in income. Hence, income elasticity of demand is less than one.

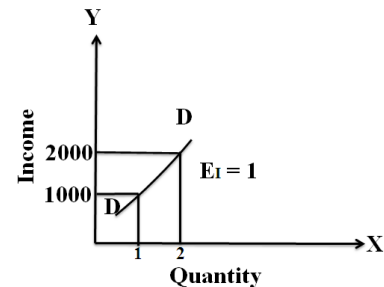
### C. Unitary income elasticity of demand:

A commodity is said to possess unitary income elasticity of demand, when the percentage change in the quantity demanded of a commodity and the percentage change in the consumer's income are equal. The elasticity coefficient is equal to one.  $E_I = 1$  and its demand curve is at an angle of  $45^\circ$  as shown below.

Income	Demand
1000	1
2000	2

$$E_I = ((Q_2 - Q_1)/Q_1) / ((I_2 - I_1)/I_1)$$

$$E_I = (2 - 1)/1 / (2000 - 1000)/1000 = 1$$



When income increases from Rs. 1000 to Rs.2000, Quantity demanded also increases from 1 unit to 2 units.

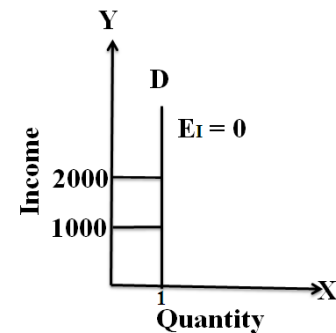
### D. Zero income elasticity of demand:

Quantity demanded remains the same, even though money income increases. Symbolically, it can be expressed as  $E_I = 0$ . Suppose, even our income increases, we don't purchase medicines in larger quantity. It can be depicted in the following way:

Income	Demand
1000	1
2000	1

$$E_I = ((Q_2 - Q_1)/Q_1) / ((I_2 - I_1)/I_1)$$

$$E_I = (1 - 1)/1 / (2000 - 1000)/1000 = 0$$



As income increases from OY to OY1, quantity demanded never changes.

### E. Negative Income elasticity of demand:

When an increase in consumer's income causes a decrease in the quantity demanded of a commodity and vice-versa, then the commodity is said to have negative income elasticity of demand. Ex: Inferior goods

## BEFA UNIT II

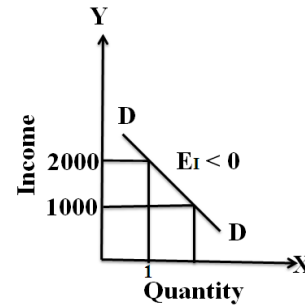
or low quality goods have negative income elasticity because they want to buy high quality goods as income increases. In this case, income elasticity of demand is negative. i.e.,  $E_I < 0$ .

Income	Demand
1000	2
2000	1

$$E_I = ((Q_2 - Q_1)/Q_1) / ((I_2 - I_1)/I_1)$$

$$E_I = (1 - 2)/2 / (2000 - 1000)/1000 = -0.50$$

When income increases from Rs. 1000 to Rs.2000, demand falls from 2 units to 1 unit.



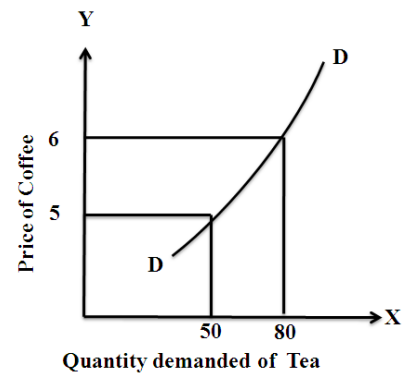
### III. Cross elasticity of Demand:

A change in the price of one commodity leads to a change in the quantity demanded of another commodity. This is called a cross elasticity of demand. The formula for cross elasticity of demand is:

$$E_C = \text{Cross elasticity} = \frac{\text{Proportionate change in the quantity demand of commodity "X"}}{\text{Proportionate change in the price of commodity "Y"}}$$

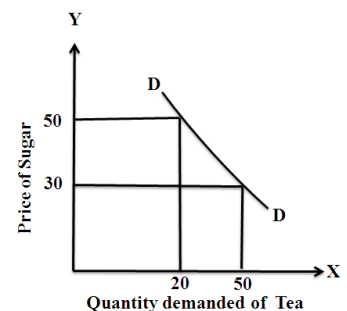
**a. In case of substitutes**, cross elasticity of demand is positive. Eg: Coffee and Tea

When the price of coffee increases, Quantity demanded of tea increases. Both are substitutes.



**b. In case of compliments**, cross elasticity is negative. If an increase in the price of one commodity leads to a decrease in the quantity demanded of another and vice versa.

When price of car goes up, the quantity demanded of petrol decreases. The cross-demanded curve has negative slope.



### IV. Advertisement elasticity of demand:

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.

$$E_A = \text{Advertisement elasticity} = \frac{\text{Proportionate change in the quantity demand of commodity}}{\text{Proportionate change in the advertising expenditure}}$$

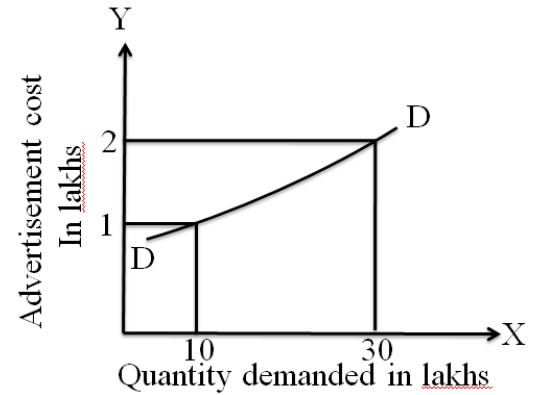
## BEFA UNIT II

Proportionate change in advertisement costs

$$E_A = \frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{A_2 - A_1}{A_1}}$$

Advertisement cost	Demand
Rs.1 Lakh	10 Lakh units
Rs. 2 Lakh	30 Lakh units

Q<sub>1</sub> = Old demand  
Q<sub>2</sub> = New demand

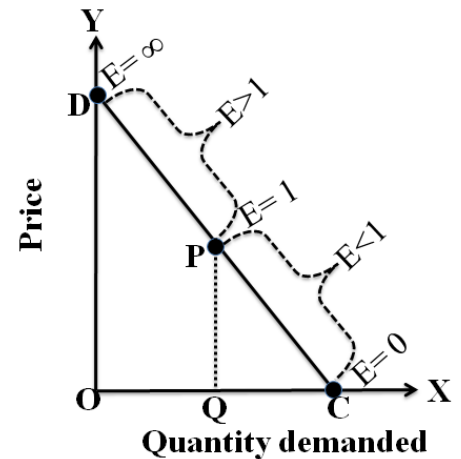


### MEASUREMENT OF ELASTICITY OF DEMAND

#### 1) Point Elasticity of Demand:

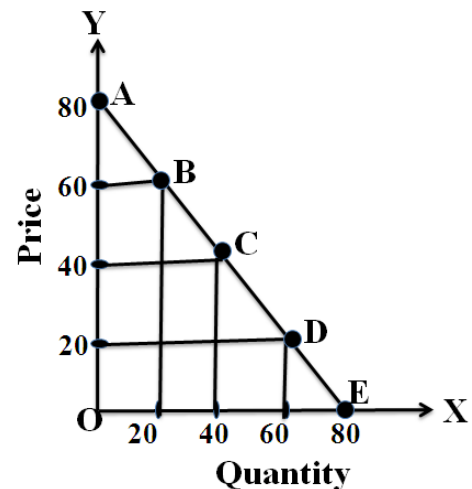
Point elasticity is the price elasticity of demand at a specific point on the demand curve instead of over a range of it. A demand curve does not have the same elasticity throughout its entire length. In general, elasticity differs at different points on a given demand curve. Point elasticity does not hold good in the case of perfectly elastic and perfectly inelastic. In these cases, the demand curves possess a single elasticity throughout its entire length.

It can be observed that elasticity at point C where the demand curve touches the X axis is equal to zero and at point D where the demand curve meets the price axis, the elasticity is infinity. At mid point P, the elasticity is equal to one. At all the points between P and C, the elasticity is greater than zero and less than one and at all the points between P and D, the elasticity is higher than one and less than infinity. Thus the range of values of elasticity is between zero and infinity.



The following graph simplifies the concept of point elasticity. To calculate point elasticity at any point on the demand curve, the below equation is used. We take mid - point of the demand curve as point C where elasticity is one. When we move to the right direction from point C, elasticity of demand decreases i.e.,  $E < 1$  and elasticity of demand increases i.e.,  $E > 1$ , when we move to the left direction from the point C.

$$E_d = \frac{\text{Right From Mid-Point}}{\text{Left From Mid-Point}}$$



## BEFA UNIT II

The elasticity at point C can be calculated as:

$$Ed = CE/CA = 40/40 = 1$$

Elasticity at point D can be calculated as under:

$$Ed = DE/DA = 20/60 = 0.33 \text{ (} E < 1 \text{)}$$

Elasticity at point B can be calculated as under:

$$Ed = BE/BA = 60/20 = 3 \text{ (} E > 1 \text{)}$$

Elasticity at point A can be calculated as under:

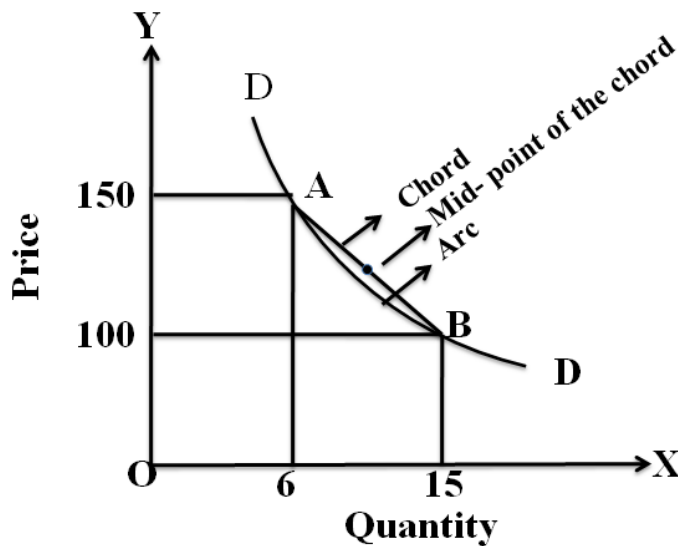
$$Ed = AE/A = 80/0 = \infty$$

Elasticity at point E can be calculated as under:

$$Ed = E/EA = 0/80 = 0$$

### 2) Arc Elasticity or Mid-Point Method:

Arc elasticity of demand is the average elasticity over a segment of the demand curve. In point elasticity, we find elasticity on straight line demand curve. We cannot always find a demand curve in the form of straight line. A demand curve is not linear. So, how do we find elasticity on such a curve? What we do is that we have to identify two points, say point A and point B and then draw a chord (a straight line joining two points on a curve) between these two points. Join these two points with a straight line. What happens is we get a straight line with arc (a part of a curve). Now, how do we find elasticity between these two points? We have a formula for that: The following graph presents the clear meaning of the arc elasticity.



$$\text{Arc Elasticity} = \frac{\frac{Q_2 - Q_1}{Q_2 + Q_1}}{\frac{P_2 - P_1}{P_2 + P_1}} = \frac{\frac{15 - 6}{15 + 6}}{\frac{100 - 150}{100 + 150}} = 2.14$$

## FACTORS AFFECTING ELASTICITY OF DEMAND

Elasticity of demand depends on many factors.

### 1. Nature of commodity:

Elasticity or in-elasticity of demand depends on the nature of the commodity i.e. whether a commodity is a necessity, comfort or luxury, normally; the demand for Necessaries like salt, rice etc is inelastic. On the other band, the demand for comforts and luxuries is elastic.

## **BEFA UNIT II**

### ***2. Availability of substitutes:***

Elasticity of demand depends on availability or non-availability of substitutes. In case of commodities, which have substitutes, demand is elastic, but in case of commodities, which have no substitutes, demand is inelastic.

### ***3. Variety of uses:***

If a commodity can be used for several purposes, then it will have elastic demand. i.e. electricity. On the other hand, demand is inelastic for commodities, which can be put to only one use.

### ***4. Postponement of demand:***

If the consumption of a commodity can be postponed, then it will have elastic demand. On the contrary, if the demand for a commodity cannot be postponed, then demand is inelastic. The demand for rice or medicine cannot be postponed, while the demand for Cycle or umbrella can be postponed.

### ***5. Amount of money spent:***

Elasticity of demand depends on the amount of money spent on the commodity. If the consumer spends a smaller amount for example a consumer spends a little amount on salt and matchboxes. Even when price of salt or matchbox goes up, demand will not fall. Therefore, demand is inelastic in case of clothing a consumer spends a large proportion of his income and an increase in price will reduce his demand for clothing. So the demand is elastic.

### ***6. Time:***

Elasticity of demand varies with time. Generally, demand is inelastic during short period and elastic during the long period. Demand is inelastic during short period because the consumers do not have enough time to know about the change in price. Even if they are aware of the price change, they may not immediately switch over to a new commodity, as they are accustomed to the old commodity.

### ***7. Range of Prices:***

Range of prices exerts an important influence on elasticity of demand. At a very high price, demand is inelastic because a slight fall in price will not induce the people to buy more. Similarly at a low price also demand is inelastic. This is because at a low price all those who want to buy the commodity would have bought it and a further fall in price will not increase the demand. Therefore, elasticity is low at very high and very low prices.

## **BEFA UNIT II**

### **SIGNIFICANCE/IMPORTANCE OF ELASTICITY OF DEMAND**

(or)

#### **ELASTICITY OF DEMAND IN DECISION-MAKING**

The concept of elasticity is very useful to the producers and policy makers alike. It is very valuable tool to decide the extent of increase or decrease in price for a desired change in the quantity demanded for the products and services in the firm or the economy. The practical importance of this concept will be clear from the following application.

##### ***1. Price fixation:***

A knowledge of elasticity of demand may help the businessman to make a decision whether to cut or increase, the price of his product or to shift the burden of any additional cost of production on to the consumers by charging high price. Each seller under monopoly and imperfect competition has to take into account elasticity of demand while fixing the price for his product. If the demand for the product is inelastic, he can fix a higher price.

##### ***2. Production:***

The elasticity of demand helps the businessman to decide about production. A businessman choose the optimum product mix on the basis of elasticity of demand for various products. The products having more elastic demand are preferred by the businessman. The sale of such products can be increased with a little reduction in their prices. Hence elasticity of demand helps the producers to take correct decision regarding the level of output to be produced.

##### ***3. prices of factors of production:***

A factor with an inelastic demand can always command a higher price as compared to a factor relatively elastic demand. This helps the trade unions in knowing that where they can easily get the wage rate increased. Bargaining capacity of trade unions depend upon elasticity of demand for workers services. Elasticity of demand also helps in the determination of rewards for factors of production. For example, if the demand for labour is inelastic, trade unions will be successful in raising wages. It is applicable to other factors of production.

##### ***4. International Trade:***

Elasticity of demand helps in finding out the terms of trade between two countries. Terms of trade refers to the rate at which domestic commodity is exchanged for foreign commodities. Terms of trade depends upon the elasticity of demand of the two countries for each other goods. A country will benefit from international trade when it fixes lower price for exports items whose demand is price elastic and high price for those exports whose demand is inelastic. The demand for imports should be elastic for a fall in price and inelastic for raise in price. The terms of trade between the two countries also depends upon the

## BEFA UNIT II

elasticity of demand of exports and imports. If the demand is inelastic, the terms of trade will be in favour of the seller country. If the demand is elastic, the terms of trade will be in favour of the buyer country.

### ***5. Tax policies:***

The government can impose higher taxes and collect more revenue if the demand for the commodity on which a tax is to be levied is inelastic. On the other hand, in case of a commodity with elastic demand high tax rates may fail to bring in the required revenue for the government. Elasticity of demand helps the government in formulating tax policies. For example, for imposing tax on a commodity, the Finance Minister has to take into account the elasticity of demand.

### ***6. Nationalization of public utilities:***

The nationalization of public utility services can also be justified with the help of elasticity of demand. Demand for public utilities such as electricity, water supply, post and telegraph, public transportation etc., is generally inelastic in nature. If the operation of such utilities is left in the hands of private individuals, they may exploit the consumers by charging high prices. Therefore, in the interest of general public, the government owns and runs such services.

## DEMAND FORECASTING

Forecasting is predicting or expecting the needs of the consumers in future. Forecasting the demand for its products is the essential function for an organization irrespective of its nature. Forecasting customer demand for products and services is a proactive process of determining what products are needed, where, when and in what quantities. So, demand forecasting is a customer focused activity. It supports other planning activities such as capacity planning, inventory planning and even overall business planning. Many organizations follow it as a custom to completely and accurately forecast the demand of its products regularly. Demand forecasting is not helpful at the firm level but also at national level. The need for demand forecasting arises due to the following purposes.

- It serves as a road map for production plans.
- It plays a significant role in situations of uncertain production or demand.
- It facilitates the managers to line up their business activities.
- It is a basis for export and import policy and fiscal policy.
- It can help businessman to take decisions regarding inputs of production process such as labor, capital etc.

## CHARACTERISTICS OF GOOD DEMAND FORECASTING

1.It is in terms of specific quantities



## **BEFA UNIT II**

2. It is undertaken in an uncertain atmosphere.
3. A forecast is made for a specific period of time which would be sufficient to take a decision and put it into action.
- 4 .It is based on historical information and the past data.
- 5 .It tells us only the approximate demand for a product in the future.
- 6 .It is based on certain assumptions.
- 7 .It cannot be 100% precise as it deals with future expected demand

Demand forecasting is the activity of estimating the quantity of a product or service that consumers will purchase. Demand forecasting involves techniques including both informal methods, such as educated guesses, and quantitative methods, such as the use of historical sales data or current data from test markets. Demand forecasting may be used in making pricing decisions, in assessing future capacity requirements, or in making decisions on whether to enter a new market.

### **STEPS IN DEMAND FORECASTING**

#### **1. Determining the objectives**

The first step in this regard is to consider the objectives of sales forecasting carefully.

#### **2. Period of forecasting**

Before taking up forecasting, the company has to decide the period of forecasting — Whether it is a short-term forecast or long-term research.

#### **3. Scope of forecast**

The next step is to decide the scope of forecasting— Whether it is for the products, or for a particular area or total industry or at the national/international level.

#### **4. Sub-dividing the task**

Sub-dividing the task into homogeneous groups, according to product, area, activities or consumers. The figure of sales forecasting shall be the sum total of the sales forecasts of all the groups.

#### **5. Identify the variables**

The different variables or factors affecting the sales should be identified so that due weight age may be given to those different factors.

#### **6. Selecting the method**

Appropriate method of sales forecasting is selected by the company taking into account all the relevant information, purpose of forecasting and the degree of accuracy required.

## BEFA UNIT II

### 7. Collection and analysis of data

Necessary data for the forecast are collected, tabulated, analyzed and cross-checked. The data are interpreted by applying the statistical or graphical techniques, and then to draw necessary deductions there from.

### 8. Study of correlation between sales forecasts and sales promotion plans

Making the forecast reliable, the sales promotion plans such as advertising, personal selling and other sales programmes should be reviewed. A study of correlation between sales forecasts and sales promotion plans should be made in order to establish their role in promoting the sales.

### 9. Competitors activities

Volume of sales of a company is largely affected by the activities of competitors and, therefore, the forecaster must also study the competitors' activities, policies, programmes and strategies.

### 10. Preparing final sales forecasts

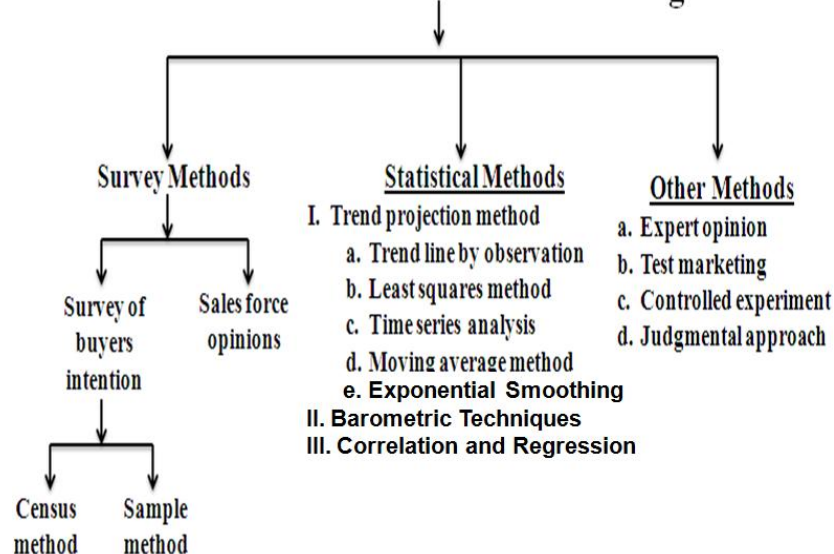
The preliminary sales forecasts figure should be reviewed and final sales forecast figures should be arrived at after making all adjustments.

### 11. Evaluation and adjustments

The figures of final sales forecasts form the basis for the operations of the company in the next period. The actual sales performance in the forthcoming period should be reviewed and evaluated from time to time viz, monthly, quarterly, half-yearly or yearly and so on. The forecast figures should be revised in the light of difficulties experienced during actual performance. At the end of the forecast period, actual performance should be reviewed and rectified while forecasting the demand for the next period.

### METHODS OF FORECASTING:

#### Methods of Demand Forecasting



## **BEFA UNIT II**

Several methods are employed for forecasting demand. All these methods can be grouped under survey method, statistical method and other methods. Survey methods and statistical methods are further subdivided in to different categories.

### **I. Survey Method:**

#### **A. Survey of buyers intention:**

To anticipate what buyers are likely to do under a given set of circumstances, a most useful source of information would be the buyers themselves. It is better to draw a list of potential buyers. Approach each buyer to ask how much does he plans to buy of the given product at a given point of time under particular conditions.

##### **1. Census method:**

If the company wishes to elicit the opinion of all the buyers, this method is called census method. This method is not only time-consuming but also costly. Suppose there are 10,000 buyers for a particular product. if the company gets the opinion of all these ten thousand customers, this method is known as census method.

##### **2. Sample method:**

If the company selects a group of buyers who can represent the whole population, this method is called the sample method. A survey of buyers based on sample basis can be completed faster with relatively lower cost. Normally a questionnaire is designed to elicit the information. There are specialized organizations to collect the information from the potential buyers, ex: ORG-Marg. Etc.

#### **B. Sales force opinions:**

The sales people are those who are in constant touch with the main and large buyers of a particular market, and hence they constitute anther valid source of information about the likely sales of a product. the sales force is capable of assessing the likely reactions of the customers of their territories quickly, given the company's strategy. It is less costly as the survey can be conducted instantaneously through telephone, fax or video-conference, and so on. The data thus collected, forms another valid source of reliable information.

### **II. Statistical Methods:**

Statistical method is used for long run forecasting. In this method, statistical and mathematical techniques are used to forecast demand. This method relies on past data.

#### **A. Trend projection methods**

##### **1. Trend line by observation:**

## BEFA UNIT II

This method of forecasting trend is elementary, easy and quick as it involves merely the plotting the actual sales data on a chart and then estimating just by observation where the trend line lies. The line can be extended towards a future period and corresponding sales forecast read from the graph.

### 2. Least squares method:

Here, certain statistical formulas are used to find the trend line which best fits the available data. It is assumed that there is a proportional change in sales over period of time. In such a case, the trend line equation is in 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 equations have to be used.

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

Where  $S$  is the sales;  $T$  is the year number,  $N$ = number of years.

### 3. Times series analysis:

Time series forecasting is the use of a model to predict future values based on previously observed values. The first step in making estimates for the future consists of gathering information from the past. In this connection one usually deals with statistical data which are collected, observed or recorded at successive intervals of time. Such data are generally referred to as time series. Thus when we observe numerical data at different points of time the set of observations is known as time series. It may be noted that any or all of the components may be present in any particular series. The components are Secular trend(Long term trend), Seasonal trend , Cyclical trend (periods in the business cycle such as prosperity, decline, depression, improvement), Irregular trend(also called as erratic or accidental or random variations in business). From the following equation future sales can be measured. The constants  $T, S, C, I$  are calculated from past data.

$$Y = T + S + C + I$$

$Y$  = Future sales  
 $T$  = Secular trend  
 $S$  = Seasonal trend  
 $C$  = Cyclical trend  
 $I$  = Irregular trend

### 4. Moving average method:

This method considers that the average of past events determine the future events. As the name itself suggests, under this method, the average keeps on moving depending up on the number of years selected. This method is easy to compute.

### 5. Exponential Smoothing

It is the most popular technique used for short-run forecasts. Unlike in moving average method, in this method, all time periods are given varying weights. Recent values are given higher weights and distance past values are given lower values. The reason is that the recent past reflects more in nearest future.

The following formula is used for exponential smoothing.

## BEFA UNIT II

$$F_{t+1} = \alpha A_t + (1 - \alpha)F_t$$

$$F_{t+1} = \text{New forecast}$$

$\alpha$  = Smoothing constant; its value lies between 0 and 1

$$A_t = \text{Last period actual value}$$

$$F_t = \text{Last period forecast value}$$

If  $\alpha$  is higher, higher weight is given to the most recent information.  $\alpha$  is calculated on the basis of past data. If there were fluctuations in past data, the  $\alpha$  value is high.

### C. Barometric techniques:

Under the barometric technique, one set of data is used to predict another set. In other words, to forecast demand for a particular product or service, use some other relevant indicator (which is known as barometer) of future demand. Ex: The demand for cable TV may be linked to the number of new houses occupied in a given area or demand for new houses in a particular area.

### D. Correlation and Regression method:

Correlation and regression methods are statistical techniques. 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. Of these two variables, one is dependent variable and the other is independent. If the high values of one variable are associated with the high values of another, they are said to be positively correlated. Similarly, if the high values of one variable are associated with the low values of another, then they are said to be negatively correlated. Correlation coefficient ranges between +1 and -1. When the correlation coefficient is zero, it indicates that the variables under study are not related at all.

In regression analysis, an equation is estimated which 'best fits' in the sets of observations of dependent variables and independent variables. The best estimate of the true underlying relationship between these variables is thus generated. The dependent (unknown) variable is then forecast based on this estimated equation, for a given value of the independent (known) variable. With the help of the following equation future sales can be calculated.

$$Y = a + bX$$

Y = Dependent variable  
X = Independent variable  
a & b = Constants

a & b values can be calculated with the following equations.

$$\begin{aligned}\Sigma Y &= Na + b\Sigma X \\ \Sigma XY &= a\Sigma X + b\Sigma X^2\end{aligned}$$

### III. Other Methods

#### a) Experts opinion:

Well-informed persons are called experts. Experts constitute yet another source of information. These persons are generally the outside experts and they do not have any vested interests in the results of a particular survey.

## BEFA UNIT II

### *b) Test marketing:*

It is likely that opinions given by buyers, salesmen or other experts may be, at times, misleading. This is the reason why most of the manufacturers favour 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 consumers react 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.

### *c) Controlled experiments:*

Controlled experiments refer to such exercises where some of the major determinants of demand are manipulated to suit to the customers with different tastes and preferences, income groups, and such others. It is further assumed that all other factors remain the same. In this method, the product is introduced with different packages, different prices in different markets or same markets to assess which combination appeals to the customer most.

### *d) Judgment approach:*

When none of the above methods are directly related to the given products or services, the management has no alternative other than using its own judgment.

## SUPPLY

In economics, we have two forces: the producer, who makes things, and the consumer, who buys them. **Supply** is the producer's willingness and ability to supply a given good at various price points, holding all else constant. An increase in price will increase producers' revenues, so they'll be willing to supply more; a decrease in price will reduce revenues, and so producers will supply less.

## LAW OF SUPPLY

**Definition:** Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market.

In the Words of Dooley, “The law of supply states that other things remaining the same, higher the prices the greater the quantity supplied and lower the prices the smaller the quantity supplied”.

### **Assumption of the Law :**

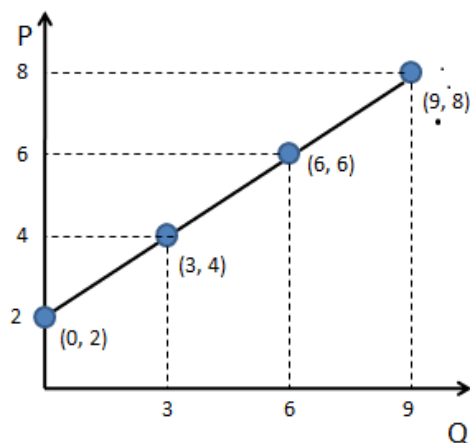
1. It is assumed that incomes of buyers and sellers remain constant.
2. It is assumed that the tastes and preferences of buyers and sellers remain constant.
3. Cost of all the factors of production is also assumed to be constant.
4. It is also assumed that the level of technology remains constant.
5. It is also assumed that the commodity is divisible.
6. Law of supply states only a static situation.

**Description:** Law of supply depicts the producer behavior at the time of changes in the prices of goods

## BEFA UNIT II

and services. When the price of a good rises, the supplier increases the supply in order to earn a profit because of higher prices.

Price (Rs)	Quantity Supplied
2	0
4	3
6	6
8	9



The above diagram shows the supply curve that is upward sloping (positive relation between the price and the quantity supplied). When the price of the good was at P4, suppliers were supplying Q3 quantity. As the price starts rising, the quantity supplied also starts rising.

### SUPPLY FUNCTION

$$S_x = f(p_x, p_f, o, \dots, T, t, s)$$

The supply function is the mathematical expression of the relationship between supply and those factors that affect the willingness and ability of a supplier to offer goods for sale.

$SX$  = Supply of goods X

$PX$  = Price of goods X

$PF$  = Factor input employed (used) for production.

- Raw material
- Human resources
- Machinery

$O$  = Factors outside economic sphere.

$T$  = Technology.

$t$  = Taxes.

$S$  = Subsidies

There is a functional (direct) relationship between price and supply.

# **BEFA UNIT II**

## **DETERMINANTS OF SUPPLY**

### **1. Number of Sellers**

Greater the number of sellers, greater will be the quantity of a product or service supplied in a market and vice versa. Thus increase in number of sellers will increase supply and shift the supply curve rightwards whereas decrease in number of sellers will decrease the supply and shift the supply curve leftwards. For example, when more firms enter an industry, the number of sellers increases thus increasing the supply.

### **2. Prices of Resources**

Increase in resource prices increases the production costs thus shrinking profits and vice versa. Since profit is a major incentive for producers to supply goods and services, increase in profits increases the supply and decrease in profits reduces the supply. In other words supply is indirectly proportional to resource prices. Increase in resource prices reduces the supply and the supply curve is shifted leftwards whereas decrease in resource prices increases the supply and the supply curve is shifted rightwards.

### **3. Taxes and Subsidies**

Taxes reduce profits, therefore increase in taxes reduce supply whereas decrease in taxes increase supply. Subsidies reduce the burden of production costs on suppliers, thus increasing the profits. Therefore increase in subsidies increase supply and decrease in subsidies decrease supply.

### **4. Technology**

Improvement in technology enables more efficient production of goods and services. Thus reducing the production costs and increasing the profits. As a result supply is increased and supply curve is shifted rightwards. Since technology in general rarely deteriorates, therefore it is needless to say that deterioration of technology reduces supply.

### **5. Suppliers' Expectations**

Change in expectations of suppliers about future price of a product or service may affect their current supply. However, unlike other determinants of supply, the effect of suppliers' expectations on supply is difficult to generalize. For example when farmers suspect the future price of a crop to increase, they will withhold their agricultural produce to benefit from higher price thus reducing the supply. In case of manufacturers, when they expect the future price to increase, they will employ more resources to increase their output and this may increase current supply as well.

### **6. Prices of Related Products**

Firms which are able to manufacture related products (such as air conditioners and refrigerators) will shift their production to a product the price of which increases substantially related to other related product(s) thus causing a reduction of supply of the products which were produced before. For example a firm which produces cricket bats is usually able to manufacture hockey sticks as well. When the price of



## BEFA UNIT II

hockey sticks increases, the firm will produce more hockey sticks and less cricket bats. As a result, the supply of cricket bats will be reduced.

### 7. Prices of Joint Products

When two or more goods are produced in a joint process and the price of any of the product increases, the supply of all the joint products will be increased and vice versa. For example, increase in price of meat will increase the supply of leather.

## ADDITIONAL IMPORTANT INFORMATION

### TYPES OF DEMAND

#### 1. Consumer goods demand Vs Producer goods demand

Consumer goods are those goods which satisfy the human needs. These goods are available for ultimate consumption and give direct satisfaction. Ex: Rice, Bread, Apple etc.

Producer goods are those goods which are used to produce consumer goods and these goods give indirect satisfaction to consumers.

#### 2. Autonomous demand Vs Derived demand

The direct demand for goods and services is called as autonomous demand. It is independent demand. Ex: The demand for college is autonomous demand.

The demand for goods whose demand depends upon the demand of main goods is called as derived demand. Ex: The demand for canteen food is derived demand. Because, if there is no demand for college, there will be no demand for canteen food.

#### 3. Durable goods demand Vs Perishable goods demand

Durable goods are those goods which give services for longer period. Ex: TV. Computer, Furniture etc.

Perishable goods are those goods whose life may be in hours or days. Ex: Milk, Bread, Fish etc.

#### 4. Firm demand Vs Industry demand

The firm is a single business unit. The quantity of goods demanded by a single firm is called firm demand.

Industry refers to the group of companies producing similar goods. The quantity demanded by industry (all companies) is called industry demand. Ex: Demand for computers by one college is called firm demand. Demand for computers by all colleges is called industry demand.

#### 5. Short – run demand Vs Long – run demand

Short – run refers to shorter duration. In short-run, additional changes cannot be initiated in terms of expansion of the business. In this period, the firm can adjust their production by changing variable factors such as materials and labor. Fixed factors such as capital, technology etc, cannot be changed.

The long-run is a period relatively long so that all factors of production including capital can be adjusted to meet the market requirements.

#### 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.

Ex: The demand for car is new demand and the demand for spare part is called replacement demand.

#### 7. Total Market demand Vs Segment Market demand

## **BEFA UNIT II**

The demand for product in the entire market is called total market. The demand for product in particular location, from particular age group or income group of people is called segment market demand.

Ex: The demand for sugar in entire Telangana state is total market demand for sugar. The demand for sugar in Hyderabad is segment market demand.

### **FACTORS GOVERNING/INFLUENCING DEMAND FORECASTING**

#### **1. Types of Goods:**

Types of goods affect the demand forecasting process to a larger extent. Goods can be producer's goods, consumer goods, or services. Apart from this, goods can be established and new goods. Established goods are those goods which already exist in the market, whereas new goods are those which are yet to be introduced in the market.

Information regarding the demand, substitutes and level of competition of goods is known only in case of established goods. On the other hand, it is difficult to forecast demand for the new goods. Therefore, forecasting is different for different types of goods.

#### **2. Competition Level:**

Competition level influences the process of demand forecasting. In a highly competitive market, demand for products also depends on the number of competitors existing in the market. Moreover, in a highly competitive market, there is always a risk of new entrants. In such a case, demand forecasting becomes difficult and challenging.

#### **3. Price of Goods:**

Price acts as a major factor that influences the demand forecasting process. The demand forecasts of organizations are highly affected by change in their pricing policies. In such a scenario, it is difficult to estimate the exact demand of products.

#### **4. Level of Technology:**

Level of technology constitutes an important factor in obtaining reliable demand forecasts. If there is a rapid change in technology, the existing technology or products may become obsolete. For example, there is a high decline in the demand of floppy disks with the introduction of compact disks (CDs) and pen drives for saving data in computer. In such a case, it is difficult to forecast demand for existing products in future.

#### **5. Economic Viewpoint:**

Economic view point plays a crucial role in obtaining demand forecasts. For example, if there is a positive development in an economy, such as globalization and high level of investment, the demand forecasts of organizations would also be positive.

#### **6. Time Period of Forecasts:**

## **BEFA UNIT II**

Time period acts as a crucial factor that affects demand forecasting. The accuracy of demand forecasting depends on its time period.

### **a. Short Period Forecasts:**

Refers to the forecasts that are generally for one year and based upon the judgment of the experienced staff. Short period forecasts are important for deciding the production policy, price policy, credit policy, and distribution policy of the organization.

### **b. Long Period Forecasts:**

Refers to the forecasts that are for a period of 5-10 years and based on scientific analysis and statistical methods. The forecasts help in deciding about the introduction of a new product, expansion of the business, or requirement of extra funds.

## **7. Level of Forecasts:**

Level of forecasts influences demand forecasting to a larger extent. A demand forecast can be carried at three levels, namely, macro level, industry level, and firm level. At macro level, forecasts are undertaken for general economic conditions, such as industrial production and allocation of national income. At the industry level, forecasts are prepared by trade associations and based on the statistical data.

Moreover, at the industry level, forecasts deal with products whose sales are dependent on the specific policy of a particular industry. On the other hand, at the firm level, forecasts are done to estimate the demand of those products whose sales depend on the specific policy of a particular firm. A firm considers various factors, such as changes in income, consumer's tastes and preferences, technology, and competitive strategies, while forecasting demand for its products.

## **8. Nature of Forecasts:**

Nature of forecasts constitutes an important factor that affects demand forecasting. A forecast can be specific or general. A general forecast provides a global picture of business environment, while a specific forecast provides an insight into the business environment in which an organization operates. Generally, organizations opt for both the forecasts together because over-generalization restricts accurate estimation of demand and too specific information provides an inadequate basis for planning and execution.