

# mood-book



## **UNIT II: DEMAND AND SUPPLY ANALYSIS:**

**Elasticity of Demand:** Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

**Supply Analysis:** Determinants of Supply, Supply Function & Law of Supply

### **DEMAND ANALYSIS**

#### **Introduction & Meaning:**

Demand in common parlance 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". (Thus demand is always at a price for a definite quantity at a specified time.) Thus demand has three essentials – price, quantity demanded and time. Without these, demand has no significance in economics.

#### **LAW of Demand:**

Law of demand shows the relation 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".

A rise in the price of a commodity is followed by a reduction in demand and a fall in price is followed by an increase in demand, if a condition of demand remains constant.

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

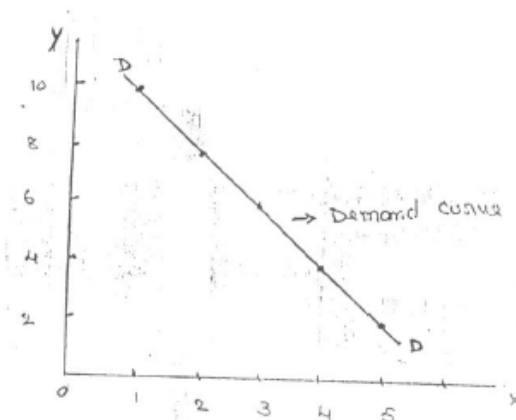
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The law of demand may be explained with the help of the following demand schedule.

*Demand Schedule.*

Price of Appel (In. Rs.)	Quantity Demanded
10	1
8	2
6	3
4	4
2	5

When the quantity the same way increases on we can draw



price falls from Rs. 10 to 8 demand increases from 1 to 2. In as price falls, quantity demand the basis of the demand schedule the demand curve.

The demand curve DD shows the inverse relation between price and quantity demand of apple. It is downward sloping.

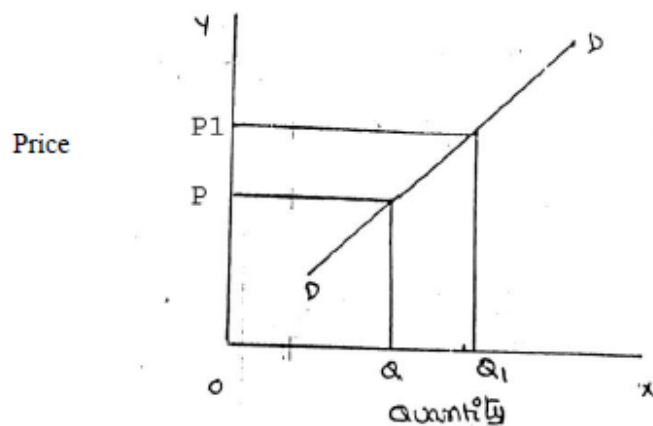
*Assumptions:*

Law is demand is based on certain assumptions:

1. This 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

*Exceptional demand curve:*

Some times the demand curve slopes upwards from left to right. In this case the demand curve has a positive slope.



When price increases from  $OP$  to  $OP_1$  quantity demanded also increases from  $OQ$  to  $OQ_1$  and vice versa. The reasons for exceptional demand curve are as follows.

*1. Giffen paradox:*

The Giffen good or inferior good is an exception to the law of demand. When the price of an inferior good falls, the poor will buy less and vice versa. For example, when the price of maize falls, the poor are willing to spend more on superior goods than on maize if the price of maize increases, he has to increase the quantity of money spent on it. Otherwise he will have to face starvation. Thus a fall in price is followed by reduction in quantity demanded and vice versa. "Giffen" first explained this and therefore it is called as Giffen's paradox.

*2. Veblen or Demonstration effect:*

'Veblen' has explained the exceptional demand curve through his doctrine of conspicuous consumption. Rich people buy certain good because it gives social distinction or prestige for example diamonds are bought by the richer class for the prestige it possess. If the price of diamonds falls poor also will buy it hence they will not give prestige. Therefore, rich people may stop buying this commodity.

*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. Speculative effect:*

If the price of the commodity is increasing the consumers will buy more of it because of the fear that it increase still further, Thus, an increase in price may not be accomplished by a decrease in 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.

### *5. Necessaries:*

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

## **Factors Affecting Demand:**

There are factors on which the demand for a commodity depends. 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:

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### *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. It is not only the existing price but also the expected changes in price, which affect demand.

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

The second most important factor influencing demand is consumer income. In fact, we can establish a relation between the consumer income and the demand at different levels of income, price and other things remaining the same. The demand for a normal commodity goes up when income rises and falls down when income falls. But in case of Giffen goods the relationship is the opposite.

### *3. Prices of related goods:*

The demand for a commodity is also affected by the changes in prices of the related goods also. Related goods can be of two types:

- (i). Substitutes which can replace each other in use; for example, tea and coffee are substitutes. The change in price of a substitute has effect on a commodity's demand in the same direction in which price changes. The rise in price of coffee shall raise the demand for tea;
- (ii). Complementary goods are those which are jointly demanded, such as pen and ink. In such cases complementary goods have opposite relationship between price of one commodity and the amount demanded for the other. If the price of pens goes up, their demand is less as a result of which the demand for ink is also less. The price and demand go in opposite direction. The effect of changes in price of a commodity on amounts demanded of related commodities is called Cross Demand.

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

The amount demanded also depends on consumer's taste. Tastes include fashion, habit, customs, etc. A consumer's taste is also affected by advertisement. If the taste for a commodity goes up, its amount demanded is more even at the same price. This is called increase in demand. The opposite is called decrease in demand.

#### *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:*

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. 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 three types of elasticity of demand:

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

**1. Price elasticity of demand:**

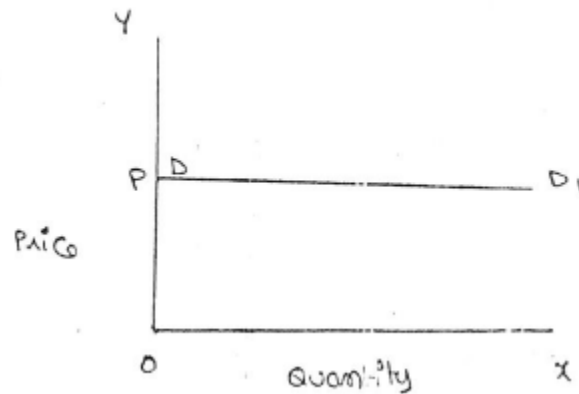
Marshall was the first economist to define price elasticity of demand. Price elasticity of demand measures changes in quantity demanded to a change in Price. It is the ratio of percentage change in quantity demanded to a percentage change in price.

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

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 demanded, it is called perfectly or infinitely elastic demand. In this case  $E = \infty$

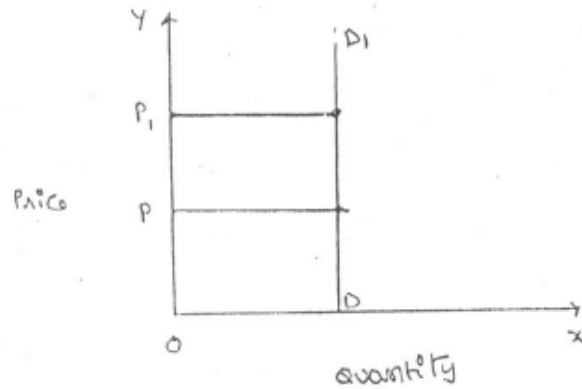




The demand curve DD1 is horizontal straight line. It shows the at "OP" price any amount is demand and if price increases, the consumer will not purchase the commodity.

### B. Perfectly Inelastic Demand

In this case, even a large change in price fails to bring about a change in quantity demanded.

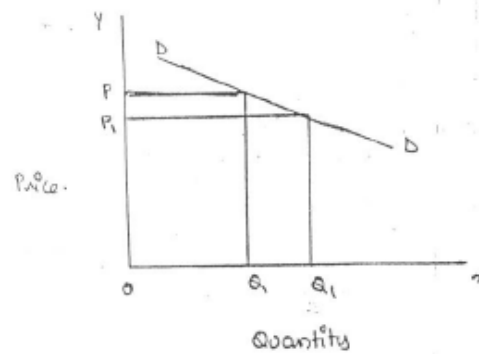


When price increases from 'OP' to 'OP', the quantity demanded remains the same. In other words the response of demand to a change in Price is nil. In this case 'E'=0.

### 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

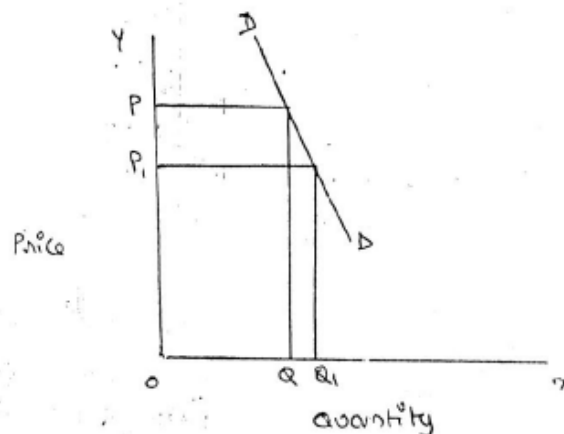
$E > 1$ . This demand curve will be flatter.



When price falls from 'OP' to 'OP1', amount demanded increases from "OQ" to "OQ1" which is larger than the change in price.

### D. Relatively in-elastic demand.

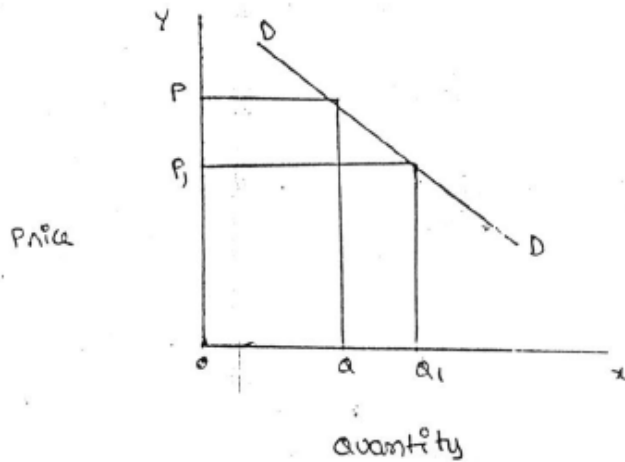
Quantity demanded changes less than proportional to a change in price. A large change in price leads to small change in amount demanded. Here  $E < 1$ . Demand curve will be steeper.



When price falls from "OP" to "OP1" amount demanded increases from OQ to OQ1, which is smaller than the change in price.

**E. Unit 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.



When price falls from 'OP' to 'OP1' quantity demanded increases from 'OP' to 'OP1', quantity demanded increases from 'OQ' to 'OQ1'. Thus a change in price has resulted in an equal change in quantity demanded so price elasticity of demand is equal to unity.

**2. Income elasticity of demand:**

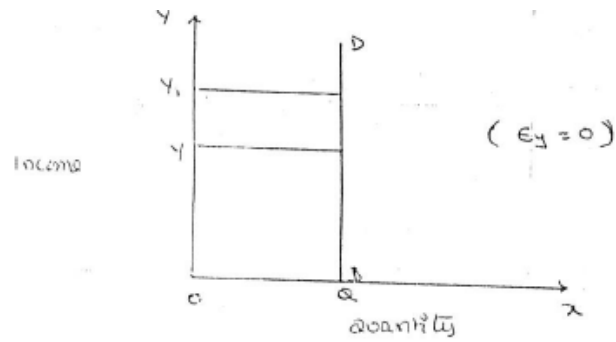
Income elasticity of demand shows the change in quantity demanded as a result of a change in income. Income elasticity of demand may be stated in the form of a formula.

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

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

**A. Zero income elasticity:**

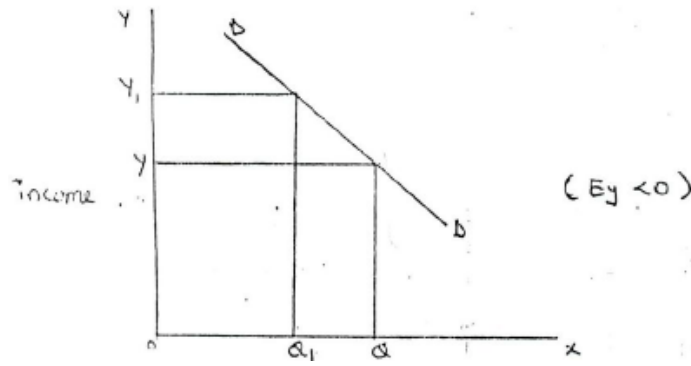
Quantity demanded remains the same, even though money income increases. Symbolically, it can be expressed as  $E_y=0$ . It can be depicted in the following way:



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

**B. Negative Income elasticity:**

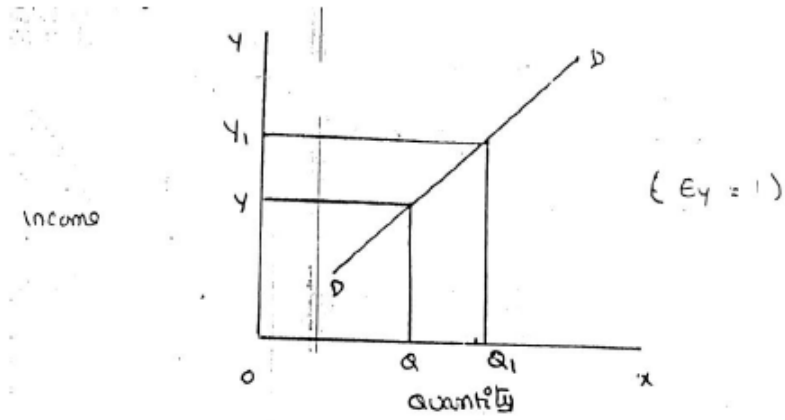
When income increases, quantity demanded falls. In this case, income elasticity of demand is negative. i.e.,  $E_y < 0$ .



When income increases from OY to OY1, demand falls from OQ to OQ1.

**c. Unit income elasticity:**

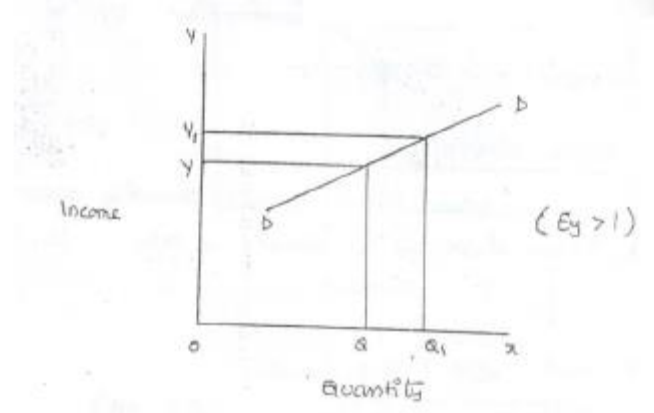
When an increase in income brings about a proportionate increase in quantity demanded, and then income elasticity of demand is equal to one.  $E_y = 1$



When income increases from OY to OY1, Quantity demanded also increases from OQ to OQ1.

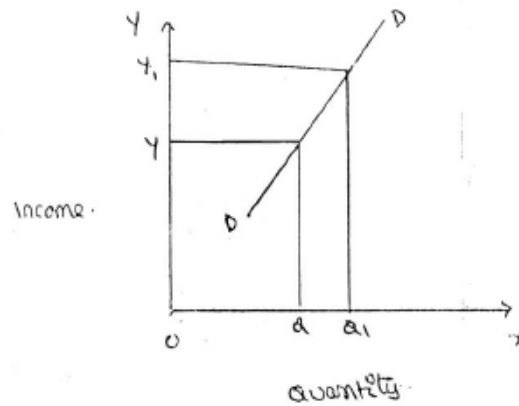
**d. Income elasticity greater than unity:**

In this case, an increase in come brings about a more than proportionate increase in quantity demanded. Symbolically it can be written as  $E_y > 1$ .



**E. Income elasticity less than unity:**

When income increases quantity demanded also increases but less than proportionately. In this case  $E < 1$ .



An increase in income from  $OY$  to  $OY_1$ , brings what an increase in quantity demanded from  $OQ$  to  $OQ_1$ , But the increase in quantity demanded is smaller than the increase in income. Hence, income elasticity of demand is less than one.

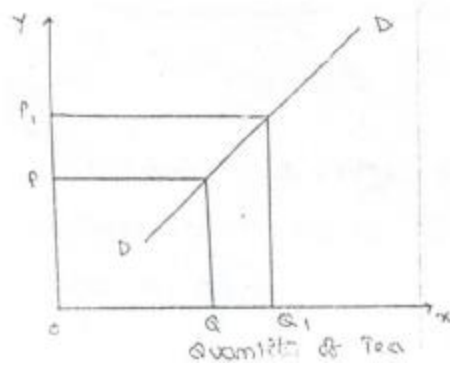
**3. Cross elasticity of Demand:**

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:

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

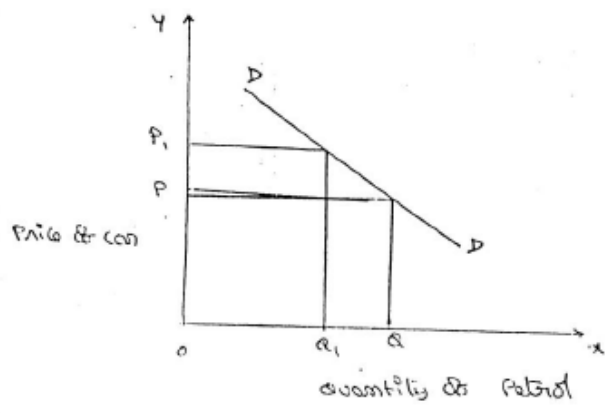
a. In case of substitutes, cross elasticity of demand is positive. Eg. Coffee and Tea

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



Price of Coffee

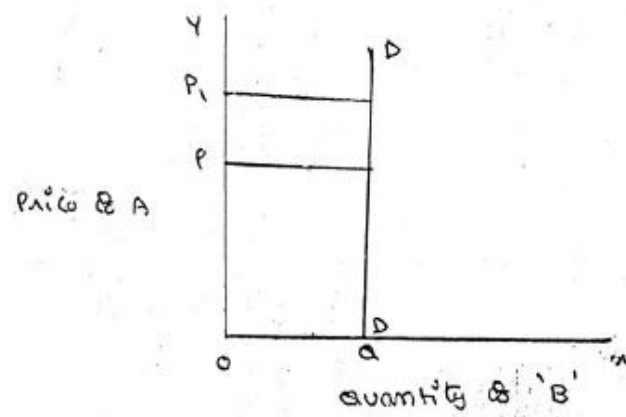
b. **In case of compliments**, cross elasticity is negative. If increase in the price of one commodity leads to a decrease in the quantity demanded of another and vice versa.



$$E_c = \frac{\% \Delta Q_1}{\% \Delta P_1} \text{ (Negative)}$$

When price of car goes up from OP to OP1, the quantity demanded of petrol decreases from OQ to OQ1. The cross-demanded curve has negative slope.

c. **In case of unrelated commodities**, cross elasticity of demanded is zero. A change in the price of one commodity will not affect the quantity demanded of another.



Quantity demanded of commodity "b" remains unchanged due to a change in the price of 'A', as both are unrelated goods.

### Factors influencing the 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.

*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 in elastic.

*3. Variety of uses:*

If a commodity can be used for several purposes, than it will have elastic demand. i.e. electricity. On the other hand, demanded 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, than it will have elastic demand. On the contrary, if the demand for a commodity cannot be postpones, than demand is in elastic. 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 for example a consumer spends a little amount on salt and matchboxes. Even when price of salt or matchbox goes up, demanded will not fall. Therefore, demand is 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.

### **Importance of Elasticity of Demand:**

The concept of elasticity of demand is of much practical importance.

#### *1. Price fixation:*

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:*

Producers generally decide their production level on the basis of demand for the product. Hence elasticity of demand helps the producers to take correct decision regarding the level of output to be produced.

#### *3. Distribution:*

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.

## **5. Public Finance**

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:**

The concept of elasticity of demand enables the government to decide about nationalization of industries.

## **Demand Forecasting**

### **Introduction:**

The information about the future is essential for both new firms and those planning to expand the scale of their production. Demand forecasting refers to an estimate of future demand for the product.

It is an 'objective assessment of the future course of demand'. In recent times, forecasting plays an important role in business decision-making. Demand forecasting has an important influence on production planning. It is essential for a firm to produce the required quantities at the right time.

It is essential to distinguish between forecasts of demand and forecasts of sales. Sales forecast is important for estimating revenue cash requirements and expenses. Demand forecasts relate to production, inventory control, timing, reliability of forecast etc. However, there is not much difference between these two terms.

### Types of demand Forecasting:

Based on the time span and planning requirements of business firms, demand forecasting can be classified in to 1. Short-term demand forecasting and

2. Long – term demand forecasting.

#### *1. Short-term demand forecasting:*

Short-term demand forecasting is limited to short periods, usually for one year. It relates to policies regarding sales, purchase, price and finances. It refers to existing production capacity of the firm. Short-term forecasting is essential for formulating a suitable price policy. If the business people expect of rise in the prices of raw materials or shortages, they may buy early. This price forecasting helps in sale policy formulation. Production may be undertaken based on expected sales and not on actual sales. Further, demand forecasting assists in financial forecasting also. Prior information about production and sales is essential to provide additional funds on reasonable terms.

#### *2. Long – term forecasting:*

In long-term forecasting, the businessmen should know about the long-term demand for the product. Planning of a new plant or expansion of an existing unit depends on long-term demand. Similarly a multi product firm must take into account the demand for different items. When forecasts are made covering long periods, the probability of error is high. It is very difficult to forecast the production, the trend of prices and the nature of competition. Hence quality and competent forecasts are essential.

Prof. C. I. Savage and T.R. Small classify demand forecasting into time types. They are 1. Economic forecasting, 2. Industry forecasting, 3. Firm level forecasting. Economic forecasting is concerned with the economics, while industrial level forecasting is used for inter-industry comparisons and is being supplied by trade association or chamber of commerce. Firm level forecasting relates to individual firm.

### Methods of forecasting:

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

#### 1. Survey Method:

Under this method, information about the desires of the consumer and opinion of experts are collected by interviewing them. Survey method can be divided into four types viz., Opinion survey method; expert opinion; Delphi method and consumers interview methods.

*a. Opinion survey method:*

This method is also known as sales-force composite method (or) collective opinion method. Under this method, the company asks its salesman to submit estimate of future sales in their respective territories. Since the forecasts of the salesmen are biased due to their optimistic or pessimistic attitude ignorance about economic developments etc. these estimates are consolidated, reviewed and adjusted by the top executives. In case of wide differences, an average is struck to make the forecasts realistic.

This method is more useful and appropriate because the salesmen are more knowledge. They can be important source of information. They are cooperative. The implementation within unbiased or their basic can be corrected.

*B. Expert opinion method:*

Apart from salesmen and consumers, distributors or outside experts may also e used for forecasting. In the United States of America, the automobile companies get sales estimates directly from their dealers. Firms in advanced countries make use of outside experts for estimating future demand. Various public and private agencies all periodic forecasts of short or long term business conditions.

*C. Delphi Method:*

A variant of the survey method is Delphi method. It is a sophisticated method to arrive at a consensus. Under this method, a panel is selected to give suggestions to solve the problems in hand. Both internal and external experts can be the members of the panel. Panel members one kept apart from each other and express their views in an anonymous manner. There is also a coordinator who acts as an intermediary among the panelists. He prepares the questionnaire and sends it to the panelist. At the end of each round, he prepares a summary report. On the basis of the summary report the panel members have to give suggestions. This method has been used in the area of technological forecasting. It has proved more popular in forecasting. It has provided more popular in forecasting non-economic rather than economic variables.

*D. Consumers interview method:*

In this method the consumers are contacted personally to know about their plans and preference 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. He would be asked the proportion in which he intends to buy. This method seems to be the most ideal method for forecasting demand.

## 2. 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. Time series analysis or trend projection methods:*

A well-established firm would have accumulated data. These data are analyzed to determine the nature of existing trend. Then, this trend is projected into the future and the results are used as the basis for forecast. This is called as time series analysis. This data can be presented either in a tabular form or a graph. In the time series past data of sales are used to forecast future.

### *b. Barometric Technique:*

Simple trend projections are not capable of forecasting turning points. Under Barometric method, present events are used to predict the directions of change in future. This is done with the help of economics and statistical indicators. Those are (1) Construction Contracts awarded for building materials (2) Personal income (3) Agricultural Income. (4) Employment (5) Gross national income (6) Industrial Production (7) Bank Deposits etc.

### *c. Regression and correlation method:*

Regression and correlation are used for forecasting demand. Based on past data the future data trend is forecasted. If the functional relationship is analyzed with the independent variable it is simple correlation. When there are several independent variables it is multiple correlation. In correlation we analyze the nature of relation between the variables while in regression; the extent of relation between the variables is analyzed. The results are expressed in mathematical form. Therefore, it is called as econometric model building. The main advantage of this method is that it provides the values of the independent variables from within the model itself.

## Supply Analysis

**Supply** is a fundamental economic concept that describes the total amount of a specific good or service that is available to consumers.

**Supply** can relate to the amount available at a specific price or the amount available across a range of prices if displayed on a graph.

The **Law of Supply and Demand** is a fundamental and foundational principle of economics. The law of supply and demand is a theory that describes how supply of a good and the demand for it interact. Generally, if supply is high and demand low, the corresponding price will also be low. If supply is low and demand is high, the price will also be high. This theory assumes market competition in a capitalist system.

## **Nature of Supply:**

Our object is to find out and study the factors which influence the quantities of a good that suppliers wish to produce and offer for sale.

However, a study of the theory of supply requires a background knowledge of certain pertinent facts. For example, we must know at the outset who the suppliers are, what are their objectives, what do they sell, and so on.

## **Suppliers:**

In general, we use the term 'suppliers' to refer to organisations that make decisions about how many goods to supply at various prices and in different market situations. We use various other terms to refer to suppliers such as sellers, producers, businesses and enterprises. In short, the organisations responsible for supply of goods are called suppliers.

We assume that supply decisions are made by a single individual—the supplier. He (she) is treated as the basic unit of behaviour on the supply side of markets, just as the consumer is taken as the basic unit of behaviour on the demand side.

## **Sellers' Objectives:**

We initially assume that the objective or goal of a supplier is to make as much profit as possible. When a supplier succeeds in achieving this goal, he is said to have reached the optimal point. We do find similarity between the consumer's goal of utility maximisation and the supplier's goal of profit maximisation. In this context, it is interesting to note that profits can be measured in terms of money, but utility (or consumer satisfaction) cannot be directly observed or measured.

## **Time:**

As in the theory of demand, the focus is on the quantity of a commodity offered for sale per period of time. This quantity is a flow such as Maruti cars per month or chocolates per week, etc. Thus, in all diagrams, we measure quantity per period of time (on the horizontal axis).

## **Price-takers:**

We consider situations in which the number of sellers is so large that none of them can alter the market price by selling a little more or a little less.

Each supplier or trader is so small that he can exert little, if any, influence on price. So he takes the price as given and makes the decision regarding how much to offer for sale at a particular price per unit of time. This is known as price-taking behaviour. The suppliers are assumed to be price-takers.

In real life, however, we find few producers of certain commodities like motor cars or refrigerators or soaps. They can affect the market prices to some extent through their own behaviour.

## **Determinants of the Quantity Supplied of a Commodity the Supply Function:**

**There are five major determinants of the quantity supplied of a commodity in a particular market:**

1. The price of the commodity
2. The prices of other commodities
3. The prices of factors of production
4. The objectives of producers, and
5. The state of technology (or the art of production).

**This list of factors can be summarised in a supply function:**

$$q_x = S (P_x, P_y, P_z, f_1, f_2, \dots, f_n, O, T, \text{ etc.})$$

where  $q_x$  is the quantity supplied of commodity  $x$ ,  $p_x$  is its own price,  $p_y$  and  $p_z$  are the prices of other commodities,  $f_1, f_2, \dots, f_m$  are the prices of the factors of production,  $O$  is the objective of the firm and  $T$  is the state of technology. In fact, the goals of producers and the state of technology determine the form of the function  $S$ . Here  $q_x$  is the dependent variable and all other variables on the right-hand side are independent variables. Thus  $q_x$  is the function of all the variables shown on the right hand side. It means that  $q_x$  depends on all the factors listed on the right side of the above equation.

Thus the quantity supplied of a commodity depends on a number of factors. The following factors bear relevance in this context.

### **Price of the Commodity:**

The most important factor influencing the quantity supplied of a commodity is the price of the commodity under consideration. To start with, we assume that price is the only factor determining supply. We ignore the other influencing variables. So we make the ceteris paribus assumption here also. We assume all other variables influencing the supply decisions of producers remain un-changed.

The basic hypothesis in the theory of supply is that the quantity of a commodity a producer will offer for sale is positively associated with the price of the commodity. This is another way of saying that the quantity rises as price rises and the quantity falls as price falls. The reason is easy to find out.

The higher the price of a good the greater is the chance of making profit. Thus, the greater is the incentive to produce more and offer it for sale in the market. However, there are certain important exceptions to this type of producer behaviour.



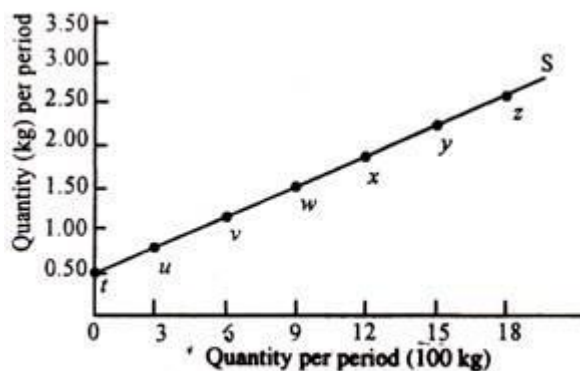
We may now illustrate the relationship between price and quantity supplied with hypothetical data for a producer of carrots. The data can be presented either in the form of a schedule or a graph. Table 8.1 is a supply schedule of carrots.

**Table 8.1: A Producer's Supply Schedule for Carrots**

Preference point	Price (Rs. per kg)	Quantity supplied (in kg)
<i>t</i>	0.50	0
<i>u</i>	1.00	300
<i>v</i>	1.50	600
<i>w</i>	2.00	900
<i>x</i>	2.50	1,200
<i>y</i>	3.00	1,500
<i>z</i>	3.50	2,000

It shows the quantities supplied at different prices. For example, nothing would be offered for sale when price is 50 paise per kg. If price rises to Re. 1 per kg, 300 kg will be supplied. If price rises to Rs. 1.50, 600 kg will be supplied, and so forth. Each price-quantity combination is shown by a reference letter as u, v, etc. for ready reference.

The data presented in Table 8.1 can be presented in the form of a graph as in Fig. 8.1. Both Table 8.1 and Fig. 8.1 give the same information. For example, points u, v, etc. in Fig. 8.1 show the same thing as the same points in Table 8.1. In fact Fig. 8.1 is a graphical representation of Table 8.1.



**Fig. 8.1. A Producer's Supply Curve**

The supply curve does not start from the origin. It starts from point t. In other words, the supply curve has an intercept. It cuts the vertical axis at a positive price. The implication is that there must exist a positive price for any quantity of a commodity to be offered at all. If price is less than this nothing will be offered for sale.

In this context Alfred Marshall referred to the reservation price of a commodity. In Fig. 8.1 a price greater than 50 p per kg is essential to produce and offer any output of carrots. If price were less than 50 p per kg, the minimum cost per unit could not be covered and output (quantity supplied) would be zero.

The smooth line through point's t to z is the producer's supply curve. Like the demand curve it is also the locus of alternative price- quantity combinations. It shows the different quantities offered for sale at seven different prices shown in the table as also at all intermediate prices.

For example, from Fig. 8.1 we can find out how much will be offered for sale at a price of Rs. 2.75 per kg. All we have to do is to locate the price on the vertical axis, draw a horizontal line from this point which cuts the supply curve at a particular point and then draw a perpendicular from that point. This point here indicates that when price is Rs. 2.75 per kg. the quantity offered for sale is 1,350 kg.

### **The Main Force behind the Supply Curve:**

The supply curve is upward sloping, because the sellers normally feel that the higher the price of a commodity the larger the quantity that can profitably be offered for sale in the market place. We have already put forward a similar argument while accounting for the downward slope of the demand curve that consumers are willing to buy a large amount of a commodity when its price is low.

We noted that the demand curve of a commodity is downward sloping due to the operation of a fundamental psychological law, viz., the law of diminishing marginal utility. We also noted that a consumer reaches the point of maximum utility (or satisfaction) when, faced with the market price of the commodity, he buys that quantity at which the marginal utility of the last unit purchased is equal to its market price.

Now we put forward a similar argument to account for the upward slope of the supply curve. The supply curve of a commodity is upward sloping due to the operation of the Law of Increasing Marginal Cost. Marginal cost increases due to the operation of a fundamental technological law of economics, viz., the Law of Diminishing (Marginal) Returns.

Each level of output that can be produced is associated with some level of cost. It is a matter of common knowledge that the larger the volume of output, the greater the total cost of production. In order to produce more output the producer has to use more capital and employ more workers. Both the factors have to be acquired at a cost (by paying their existing market prices).

So with an increase in the volume of output total cost rises (just as the consumer's total utility rises with an increase in the consumption of a commodity). The extra cost associated with an extra unit of output is called marginal cost. It shows how fast costs rise with an increase in output. If, for instance, the total cost of producing 10 units of output is Rs. 300 and the total cost producing 11 units is 335, then the marginal cost, i.e., the cost of producing the 11th unit is Rs. 335 – Rs. 300 = Rs. 35.

In the short run the production capacity of the business firm remains fixed. Therefore, more output can be produced by using more of the variable factor. Labour is usually treated as the variable factor. However, as more and more workers are

employed in the production process, keeping other factors constant, total product (output) increases no doubt. But marginal product falls. Every extra worker gradually makes less and less contribution to the total product of an enterprise.

This is due to the operation of the Law of Diminishing Returns, which is also known as the Law of Increasing Marginal Cost. Due to diminishing returns marginal cost rises, i.e., each unit produced adds more to total cost than the previous unit. Suppose the producer in our previous example decides to produce the 12th unit.

He observes that total cost increases from Rs. 335 to Rs. 375. So marginal cost is Rs. 40 which is higher than the marginal cost (MC) of producing the 11th unit (Rs. 35). Marginal cost rises because more and more pressure is created on the firm's limited production capacity. Thus, the production process becomes less and less efficient with an increase in the volume of production.

**A producer, whose objective is profit maximisation, will reach the optimum point when a condition is satisfied, i.e., marginal cost is equal to the given market prices of the product:**

$$MC = P.$$

In fact, a consumer maximises utility when  $MU = P$ , i.e., when he equates his marginal utility of a commodity with its price. Thus the two rules of optimization are similar in nature.

Now what is the logic of the  $MC = P$  rule? Suppose, at the current level of output of a producer MC is less than P. This means that by producing and selling one extra unit he will add more to his sales revenue than to his cost. So he will have an extra incentive to produce one more unit of output and make profit. Thus, if the objective of the producer is to maximize profit he should increase his output when marginal cost is less than price.

Suppose, on the contrary, at the present level of output marginal cost exceeds price. This means that the last unit produced adds more to cost (MC) than it adds to his revenue (the price that he receives by selling it).

Thus he incurs a loss by producing the last unit of output. So it should not be produced. In other words, whenever MC exceeds price, extra output should not be produced. If output is reduced more money can be saved than earned.

So, when  $MC < P$  output should be increased and when  $MC > P$ , output should be curtailed. Thus it logically follows that only when  $MC = P$  there is no incentive to alter the volume of output.

We have just discovered how to derive producer's supply curve. Since at the profit – maximising level of output  $MC = P$ , the MC curve of the producer is indeed the supply curve. In our previous example the MC of the 11th unit was Rs. 35 and the MC of the 12th unit was Rs. 40. If the market price of the product is Rs. 40, the producer would surely produce the 12th unit.

Thus as soon we come to know what is the producer's MC, we can find out what will be produced at each market price. In fact, the supply schedule presented in Table 8.1 is the producer's MC schedule. For example, the MC of producing 1,500 kg of carrots must have been Rs. 3. Otherwise the producer would not have produced 1,500 kg when the price was Rs. 3 per kg.

A profit-maximising firm will produce that level of output for which  $MC = P$ . The MC curve of a price-taking producer is indeed the supply curve. Since the MC increases with an increase in the volume of production, the supply curve is upward sloping (from left to right).

### **Other Determinants of Supply:**

The quantity supplied of a commodity depends not only on its own price but on certain other factors as well. Here we assume that the price of the product under consideration remains constant. This enables us to consider the effects of other variables on supply.

We still remain the ceteris paribus assumption, i.e., while considering the effect of a particular variable we ignore the other influencing factors (assuming that they retain constant during the period under consideration). Or, in other words, we examine the effect of one variable at a time, keeping all other variables fixed.

### **Other proximate determinants of supply are the following:**

#### **1. Prices of Other Goods:**

Since resources have alternative uses, the quantity supplied of a commodity depends not only on its own price but also on prices of other commodities. So we have to consider the possibility of substitution in production.

If, for instance, the market price of wheat increases the jute farmers would probably switch over to wheat production without much difficulty. Thus, land may be diverted from jute to wheat in the event of a change in the relative price of the two products.

Here the absolute price of jute remains unchanged. But its relative price has fallen. On the other hand the relative price of wheat has increased due to a rise in its own (above) price. So more wheat and less jute will be produced by farmers (since land has alternative uses). Thus we see competitiveness in the production process.

We also see complementarity in production. There are certain commodities which, for technical reasons, are to be produced jointly such as sugar and khandsari, mutton and skins. Here the basic product is called the main product and the other is treated as the by-product.

Such products are said to be in joint supply. Thus a rise in the market price of mutton will increase the quantity of leather supplied. It is because the quantity of skin available for tanning into leather increases automatically with an increase in the output of mutton. Thus mutton and leather are jointly supplied.

## **2. Cost of Production:**

Supply depends on cost of production. The producer's decision to supply one extra unit is based on the concept of marginal cost. Therefore, any change in cost of production, other things remaining the same, will affect the quantity supplied of a commodity.

If cost of production increases the same quantity cannot be offered for sale unless the market price of the product also rises. This explains why there is a direct (positive) relation between price and quantity supplied of a commodity.

In fact, the supply schedule is another name of the MC schedule. Let us assume that in Table 8.1 the cost of producing carrot increases by 50 paise per kg at all level of output due to a rise in rent per acre or due to rise in agricultural wages.

If this happens the same quantity of carrot will not be offered for sale. Instead the quantity offered will now fall. For example, only 600 kg will now be supplied if price rises to Rs. 2.00 (= Rs. 1.50 + Re. 0.50). Similarly, 1,500 kg will be offered for sale if price rises to Rs. 3.50 per kg and so forth.

### **Production cost may rise due to the following two reasons:**

#### **(a) Changes in Factor Prices:**

If the price of a factor of production (such as seed or fertiliser) rises, the cost of production (of carrot) will surely increase. If the market price of carrots remains constant (as per *ceteris paribus* assumption) production will be less profitable than before.

Thus the same quantity cannot be offered for sale at the same time. The quantity supplied will fall. A fall in the price of a factor will have an exactly opposite effect. If the price of picture tubes falls a larger quantity of TV sets may be offered for sale at the same price.

#### **(b) Technological Change:**

Cost of production depends not only on factor prices but on factor productivity as well. At a fixed point of time factor productivity (i.e., the ratio of output to input) remains constant due to unchanged technology (i.e., the art of production). But if we consider a long period of time we observe technological progress.

In fact, the recent fall in the market price of computers, hi-fi equipment, etc. is largely due to technological progress and not much due to the intensity of competition. No doubt, technological progress has been really spectacular in the electronics industry in the last two decades. In fact, at a fixed point of time, what an economy can produce and how it can produce

desired goods and services largely depends on what is known. In the long run knowledge changes and with it the arts of production. Hence there are changes in supplies of commodities.

### **3. Objectives of Producers:**

The quantity offered for sale also depends on the goal (objective) of the producer. The producer's primary goal is profit maximisation. But this is not the only goal. There may be other goals as well.

**A supplier may offer a large quantity of a commodity at a moderate price because he has a two-fold objective:**

(i) high growth rate for its sales and

(ii) high profit.

So to capture the market in the long run, it can deliberately supply a large quantity at a low price in the short run. Thus some short-run profit may be sacrificed to make high profits in the long run. Similarly, the owner of a small retail store may prefer to see a TV serial on Sunday. Hence he may keep his shop closed just to satisfy his personal motive.

### **4. Producers Income:**

Some small producers aim at a target profit or return per month. If the price of the product they sell rises they can offer a smaller quantity and still earn the same amount. Thus, in the event of a rise in market price, producers may decide to produce and sell less rather than more of a commodity.

### **5. Expectations about the Future:**

Producers may and often do react to unexpected changes in any of the determinants of supply. If they can anticipate such a change they do react to it if, for instance, the market price of an item like cement is likely to rise after few months, producers will release less from their current stock.

They will withhold supplies for future sales at a higher price. If, on the other hand, techno-logical progress is likely to make a product (like a computer) obsolete in near future, the existing producers would decide to reduce the price of their products and clear the stocks as soon as they can.

### **6. Random Variables:**

There are certain variables which are unsystematic or random in nature. But they do no doubt affect the quantity supplied of a commodity. Examples of such variables are – weather, plant disease, accident in a major industrial plant, or labour trouble in a major industry (such as India's jute industry).

These are called external factors because they are outside the control of man. But they are very important from the point of view of supply of a commodity. For example, ceteris paribus, there may be a bumper crop of wheat in India due to good weather. On the other hand, frosts may destroy a portion of Brazil's coffee crop.

### 7. Government Policy:

Various actions of the State such as taxes and subsidies, etc. may affect the aggregate supply of a commodity by influencing cost of production (i.e., marginal cost). Moreover, labour laws may affect productivity of labour and rules relating to smoke pollution may affect the types of boilers that may be used as also the location of the plant. The supply of a commodity like sugar or tea may be affected if there is fear of nationalisation or State take-over of the industry in not-too-distant future.

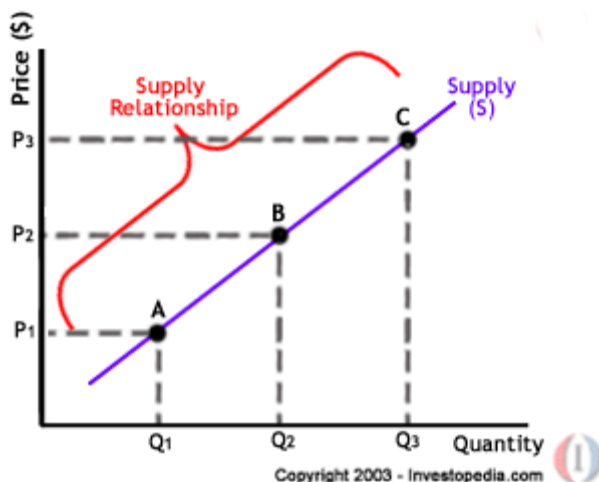
### 8. Non-Economic Factors:

Certain non- economic factors may also affect the supply of a commodity. These are of two broad categories, viz., social factors and psychological factors. Such factors include all those that have not been included in our list so far. These factors may include the state of business confidence, political considerations, etc.

## Law Of Supply

The law of supply is the microeconomic law that states that, all other factors being equal, as the price of a good or service increases, the quantity of goods or services that suppliers offer will increase, and vice versa. The law of supply says that as the price of an item goes up, suppliers will attempt to maximize their profits by increasing the quantity offered for sale.

The chart below depicts the law of supply using a supply curve, which is always upward sloping. A, B and C are points on the supply curve. Each point on the curve reflects a direct correlation between quantity supplied (Q) and price (P). So, at point A, the quantity supplied will be  $Q_1$  and the price will be  $P_1$ , and so on.



The law of supply is so intuitive that you may not even be aware of all the examples around you.

-When college students learn computer engineering jobs pay more than English professor jobs, the supply of students with majors in computer engineering will increase.

-When consumers start paying more for cupcakes than for donuts, bakeries will increase their output of cupcakes and reduce their output of donuts in order to increase their profits.

-When your employer pays time and a half for overtime, the number of hours you are willing to supply for work increases.

The law of supply summarizes the effect price changes have on producer behavior. For example, a business will make more video game systems if the price of those systems increases. The opposite is true if the price of video game systems decreases. The company might supply 1,000,000 systems if the price is \$200 each, but if the price increases to \$300, they might supply 1,500,000 systems.

The law of supply is one of the most fundamental concepts in economics. It works with the law of demand to explain how market economies allocate resources and determine the prices of goods and services.