

II UNIT

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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.

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".

Definition:

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"

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. Advertising elasticity of demand

Price elasticity of demand:

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

in the price, the relationship between the price and the demand is inverse.

Proportionate change in the quantity demand of commodity

Price elasticity = -----

Proportionate change in the price of commodity

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

Where:

Q₁ = quantity demand price before change

Q₂ = quantity demand price after change

P₁ = price before change

P₂ = price after change

Income elasticity of demand:

Income elasticity of demand refers to the quantity demand of a commodity in response to a given change in income of the consumer.

Proportionate change in the quantity demand of commodity

Income Elasticity = -----

Proportionate change in the income of the people

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

Where:

Q_1 = quantity demand ~~price~~ before change

Q_2 = quantity demand ~~price~~ after change

I_1 = income before change ~~income~~

I_2 = income after change

Income

Cross elasticity of demand:

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

Proportionate change in the quantity demand of commodity "X"

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

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

Where:

Q_1 = quantity demand price before change

Q_2 = quantity demand price after change

P_1 = price before change

P_2 = price after change

Advertising 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.

Proportionate change in the quantity demand of product "X"

$$\text{Advertising elasticity} = \frac{\text{Proportionate change in the quantity demand of product "X"}}{\text{Proportionate change in advertisement costs.}}$$

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

Where:

Q_1 = quantity demand price before change

Q_2 = quantity demand price after change

A_1 = advertising ~~V_{cost}~~ before change

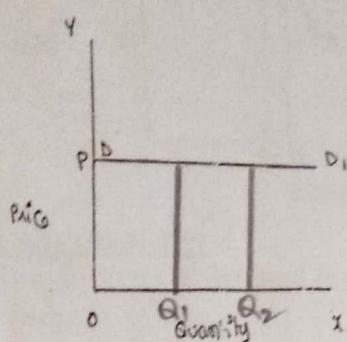
A_2 = advertising ~~V_{cost}~~ after change

Measures of Elasticity of Demand :

1. Perfectly elasticity of demand
2. Perfectly inelasticity of demand
3. Relatively elasticity of demand
4. Relatively inelasticity of demand
5. Unity elasticity of demand

Perfectly elasticity of demand:

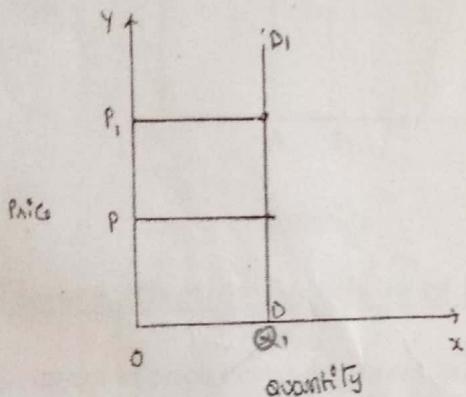
When any quantity can be sold at a given price, and when there is no need to reduce price, the demand is said to be perfectly elastic. In such cases, even a small increase in price will lead to complete fall in demand.



Eg: Festival season high demand
same price
→ Bikes, TV's

Perfectly inelasticity of demand:

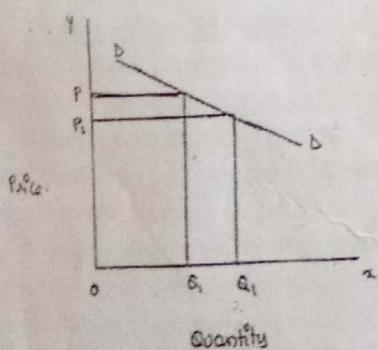
When a significant degree of change in price leads little or no change in the quantity demanded, then the elasticity is said to be perfectly inelasticity. In other words, the demand is said to be perfectly inelasticity when there is no change in the quantity demanded even though there is a big change in the price



Eg: Gold, Diamonds, Salt
Grown items

Relatively elasticity of demand:

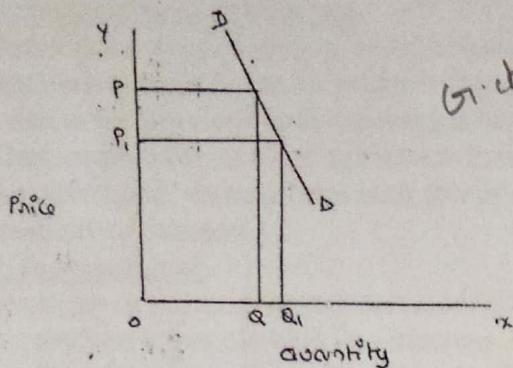
The demand is said to be relatively elasticity when the change in demand is more than the change in the price.



small change in P - greater change in D.

Relatively inelasticity of demand:

The demand is said to be relatively inelasticity when the change in demand is less than the change in the price



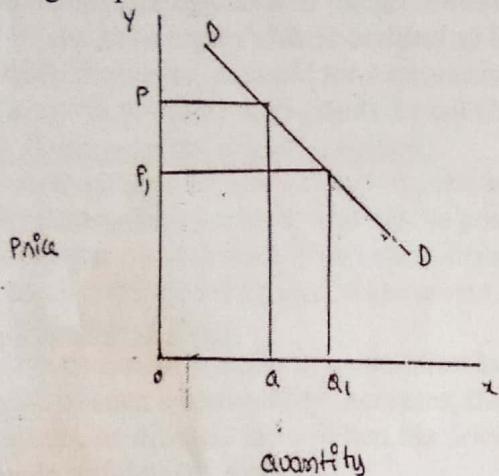
Gr. ch. price — small c. demand

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Unity elasticity:

The elasticity in demand is said to be unity when the change in demand is equal to the change in price.



Factors affecting Elasticity of Demand:

A change in price does not always lead to the same proportionate change in demand. For example, a small change in price of AC may affect its demand to a considerable extent/whereas, large change in price of salt may not affect its demand. So, elasticity of demand is different for different goods

1. Nature of commodity:

Elasticity of demand of a commodity is influenced by its nature. A commodity for a person may be a necessity, a comfort or a luxury.

- When a commodity is a necessity like food grains, vegetables, medicines, etc., its demand is generally inelastic as it is required for human survival and its demand does not fluctuate much with change in price.
- When a commodity is a comfort like fan, refrigerator, etc., its demand is generally elastic as consumer can postpone its consumption.
- When a commodity is a luxury like AC, DVD player, etc., its demand is generally more elastic as compared to demand for comforts.
- The term 'luxury' is a relative term as any item (like AC), may be a luxury for a poor person but a necessity for a rich person.

2. Availability of substitutes:

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PA - DI
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Demand for a commodity with large number of substitutes will be more elastic. The reason is that even a small rise in its prices will induce the buyers to go for its substitutes. For example, a rise in the price of Pepsi encourages buyers to buy Coke and vice-versa.

Thus, availability of close substitutes makes the demand sensitive to change in the prices. On the other hand, commodities with few or no substitutes like wheat and salt have less price elasticity of demand.

3. Income Level:

Elasticity of demand for any commodity is generally less for higher income level groups in comparison to people with low incomes. It happens because rich people are not influenced much by changes in the price of goods. But, poor people are highly affected by increase or decrease in the price of goods. As a result, demand for lower income group is highly elastic.

4. Level of price:

Level of price also affects the price elasticity of demand. Costly goods like laptop, Plasma TV, etc. have highly elastic demand as their demand is very sensitive to changes in their prices. However, demand for inexpensive goods like needle, match box, etc. is inelastic as change in prices of such goods do not change their demand by a considerable amount.

5. Postponement of Consumption:

Commodities like biscuits, soft drinks, etc. whose demand is not urgent, have highly elastic demand as their consumption can be postponed in case of an increase in their prices. However, commodities with urgent demand like life saving drugs, have inelastic demand because of their immediate requirement.

6. Number of Uses:

If the commodity under consideration has several uses, then its demand will be elastic. When price of such a commodity increases, then it is generally put to only more urgent uses and, as a result, its demand falls. When the prices fall, then it is used for satisfying even less urgent needs and demand rises.

For example, electricity is a multiple-use commodity. Fall in its price will result in substantial increase in its demand, particularly in those uses (like AC, Heat convector, etc.), where it was not employed formerly due to its high price. On the other hand, a commodity with no or few alternative uses has less elastic demand.

7. Share in Total Expenditure:

Proportion of consumer's income that is spent on a particular commodity also influences the elasticity of demand for it. Greater the proportion of income spent on the commodity, more is the elasticity of demand for it and vice-versa.

Demand for goods like salt, needle, soap, match box, etc. tends to be inelastic as consumers spend a small proportion of their income on such goods. When prices of such goods change, consumers continue to purchase almost the same quantity of these goods. However, if the proportion of income spent on a commodity is large, then demand for such a commodity will be elastic.

8. Time Period:

Price elasticity of demand is always related to a period of time. It can be a day, a week, a month, a year or a period of several years. Elasticity of demand varies directly with the time period. Demand is generally inelastic in the short period.

It happens because consumers find it difficult to change their habits, in the short period, in order to respond to a change in the price of the given commodity. However, demand is more elastic in long run as it is comparatively easier to shift to other substitutes, if the price of the given commodity rises.

9. Habits:

Commodities, which have become habitual necessities for the consumers, have less elastic demand. It happens because such a commodity becomes a necessity for the consumer and he continues to purchase it even if its price rises. Alcohol, tobacco, cigarettes, etc. are some examples of habit forming commodities.

Finally it can be concluded that elasticity of demand for a commodity is affected by number of factors. However, it is difficult to say, which particular factor or combination of factors determines the elasticity. It all depends upon circumstances of each case.

Significance/Importance of Elasticity of Demand (or) Elasticity of Demand in decision making :

The following points highlight the ten main areas of importance of elasticity of demand in management. Some of the areas are:

Area # 1. In the Determination of Output Level:

For making production profitable, it is essential that the quantity of goods and services should be produced corresponding to the demand for that product. Since the changes in demand is due to the change in price, the knowledge of elasticity of demand is necessary for determining the output level.

Area # 2. In the Determination of Price:

The elasticity of demand for a product is the basis of its price determination. The ratio in which the demand for a product will fall with the rise in its price and vice versa can be known with the knowledge of elasticity of demand.

If the demand for a product is inelastic, the producer can charge high price for it, whereas for an elastic demand product he will charge low price. Thus, the knowledge of elasticity of demand is essential for management in order to earn maximum profit.

Area # 3. In Price Discrimination by Monopolist:

Under monopoly discrimination the problem of pricing the same commodity in two different markets also depends on the elasticity of demand in each market. In the market with elastic demand for his commodity, the discriminating monopolist fixes a low price and in the market with less elastic demand, he charges a high price.

Area # 4. In Price Determination of Factors of Production:

The concept of elasticity for demand is of great importance for determining prices of various factors of production. Factors of production are paid according to their elasticity of demand. In other words, if the demand of a factor is inelastic, its price will be high and if it is elastic, its price will be low.

Area # 5. In Demand Forecasting:

The elasticity of demand is the basis of demand forecasting. The knowledge of income elasticity is essential for demand forecasting of producible goods in future. Long- term production planning and management depend more on the income elasticity because management can know the effect of changing income levels on the demand for his product.

Area # 6. In Dumping:

A firm enters foreign markets for dumping his product on the basis of elasticity of demand to face foreign competition.

Area # 7. In the Determination of Prices of Joint Products:

The concept of the elasticity of demand is of much use in the pricing of joint products, like wool and mutton, wheat and straw, cotton and cotton seeds, etc. In such cases, separate cost of production of each product is not known.

Therefore, the price of each is fixed on the basis of its elasticity of demand. That is why products like wool, wheat and cotton having an inelastic demand are priced very high as compared to their by products like mutton, straw and cotton seeds which have an elastic demand.

Area # 8. In the Determination of Government Policies:

The knowledge of elasticity of demand is also helpful for the government in determining its policies. Before imposing statutory price control on a product, the government must consider the elasticity of demand for that product.

The government decision to declare public utilities those industries whose products have inelastic demand and are in danger of being controlled by monopolist interests depends upon the elasticity of demand for their products.

Area # 9. Helpful in Adopting the Policy of Protection:

The government considers the elasticity of demand of the products of those industries which apply for the grant of a subsidy or protection. Subsidy or protection is given to only those industries whose products have an elastic demand. As a consequence, they are unable to face foreign competition unless their prices are lowered through subsidy or by raising the prices of imported goods by imposing heavy duties on them.

Area # 10. In the Determination of Gains from International Trade:

The gains from international trade depend, among others, on the elasticity of demand. A country will gain from international trade if it exports goods with less elasticity of demand and import those goods for which its demand is elastic.

In the first case, it will be in a position to charge a high price for its products and in the latter case it will be paying less for the goods obtained from the other country. Thus, it gains both ways and shall be able to increase the volume of its exports and imports.

Law of demand

There is an inverse relationship between quantity demanded and its price. The people know that when price of a commodity goes up its demand comes down. When there is decrease in price the demand for a commodity goes up. There is inverse relation between price and demand. The law refers to the direction in which quantity demanded changes due to change in price.

For example: A consumer may demand one dozen oranges at \$5 per dozen. He may demand two dozens when the price is \$4 per dozen. A person generally buys more at a lower price. He buys less at higher price. It is not the case with one person but all people like to buy more due to fall in price and vice versa. This is true for all commodities and under all conditions. The economists call it as **law of demand**.

In simple words the law of demand states that other things being equal more will be demanded at lower price and lower will be demanded at higher price.)

Definition

1. Alfred Marshal says that the amount demanded increase with a fall in price, diminishes with a rise in price.
2. C.E. Ferguson says that according to law of demand, the quantity demanded varies inversely with price.
3. Paul A. Samuelson says that law of demand states that people will buy more at a lower prices and buy less at higher prices, other things remaining the same.

Assumptions of the law

1. There is no change in income of consumers.
2. There is no change in the price of product.
3. There is no change in quality of product.
4. There is no substitute of the commodity.
5. The prices of related commodities remain the same.
6. There is no change in customs.
7. There is no change in taste and preference of consumers.
8. The size of population remains the same.
9. The climate and weather conditions are same.
10. The tax rates and other fiscal measures remain the same.

Explanation of the law

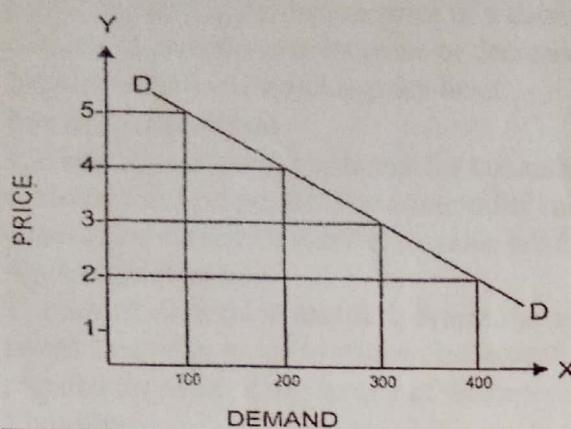
The relationship between price of a commodity and its demand depends upon many factors. The most important factor is nature of commodity. The demand schedule shows response of quantity demanded to change in price of that commodity. This is the table that shows prices per unit of commodity and amount demanded per period of time. The demand of one person is called individual demand. The demand of many persons is known as market demand. The experts are concerned with market demand schedule. The market demand schedule means 'quantities of given commodity which all consumers want to buy at all possible prices at a given moment of time'. The demand schedules of all individuals can be added up to find out market demand schedule.

Demand schedule

| Price in dollars. | Demand in Kg. |
|-------------------|---------------|
| 5 | 100 |
| 4 | 200 |
| 3 | 300 |
| 2 | 400 |

The table shows the demand of all the consumers in a market. When the price decreases there is increase in demand for goods and vice versa. When price is \$5 demand is 100 kilograms. When the price is \$4 demand is 200 kilograms. Thus the table shows the total amount demanded by all consumers various price levels.

Demand curve



There is same price in the market. All consumers purchase commodity according to their needs. The market demand curve is the total amount demanded by all consumers at different prices. The market demand curve slopes from left down to the right.

Exceptions to the law

Inferior goods

The law of demand does not apply in case of inferior goods. When price of inferior commodity decreases and its demand also decrease and amount so saved in spent on superior commodity. The wheat and rice are superior food grains while maize is inferior food grain.

Demonstration effect

The law of demand does not apply in case of diamond and jewelry. There is more demand when prices are high. There is less demand due to low prices. The rich people like to demonstrate such items that only they have such commodities.

Ignorance of consumers

The consumer usually judge the quality of a commodity from its price. A low priced commodity is considered as inferior and less quantity is purchased. A high priced commodity is treated as superior and more quantity is purchased. The law of demand does not apply in this case.

Less supply

The law of demand does not work when there is less supply of commodity. The people buy more for stock purpose even at high price. They think that commodity will become short.

Depression

The law of demand does not work during period of depression. The prices of commodities are low but there is increase in demand. it is due to low purchasing power of people,

Speculation

The law does not apply in case of speculation. The speculators start buying share just to raise the price. Then they start selling large quantity of shares to avoid losses.

Out of fashion

The law of demand is not applicable in case of goods out of fashion. The decrease in prices cannot raise the demand of such goods. The quantity purchased is less even though there is falls in prices.

Importance of the law

Price determination

A monopolist can determine price of a commodity on the basis of such law. He can know the effect on demand due to increase or decrease in price. The demand schedule can help him to determine the most suitable price level.

Tax on commodities

The law of demand is important for tax authorities. The effect of tax on different commodities is checked. The commodity must be taxed if its demand is relatively inelastic. A commodity cannot be taxed if its sales fall to great extent.

Agricultural prices

The law of demand is useful to determine agricultural prices. When there are good crops, the prices come down due to change in demand. In case of bad crops, the prices go up if demand remains the same. The poverty of farmers can be determined.

Planning

Individual demand schedule is used in planning for individual goods and industries. There is need to know the effect of change in price on the demand of commodity at national and world level. The nature of demand schedule helps to know such effect.

DEMAND FORECASTING:

Introduction:

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. The survival and prosperity of a business firm depend on its ability to meet the consumer's needs efficiently and adequately. 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 also essential to distinguish between forecasting of demand and forecast of sales, sales forecasts are important for estimating revenue, cash requirements and expenses whereas,

demand forecasting relate to production, inventory control, timing, reliability of forecast etc. however, there is not much difference between these terms.

Definition:

According to Evan J. Douglas, "Demand estimation (forecasting) may be defined as a process of finding values for demand in future time periods

Steps of Demand Forecasting:

The Demand forecasting process of an organization can be effective only when it is conducted systematically and scientifically.

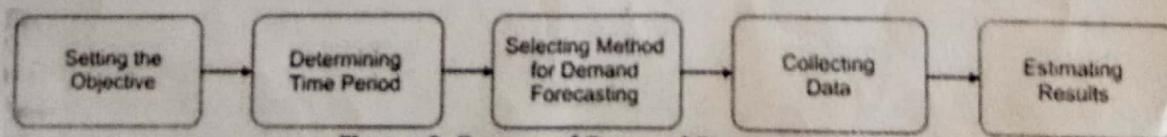


Figure-3: Process of Demand Forecasting

The steps involved in demand forecasting (as shown in Figure-3) are explained as follows:

1. Setting the Objective:

Refers to first and foremost step of the demand forecasting process. An organization needs to clearly state the purpose of demand forecasting before initiating it.

Setting objective of demand forecasting involves the following:

- a. Deciding the time period of forecasting whether an organization should opt for short-term forecasting or long-term forecasting
- b. Deciding whether to forecast the overall demand for a product in the market or only- for the organizations own products
- c. Deciding whether to forecast the demand for the whole market or for the segment of the market
- d. Deciding whether to forecast the market share of the organization

2. Determining Time Period:

Involves deciding the time perspective for demand forecasting. Demand can be forecasted for a long period or short period. In the short run, determinants of demand may not change significantly or may remain constant, whereas in the long run, there is a significant change in the determinants of demand. Therefore, an organization determines the time period on the basis of its set objectives.

3. Selecting a Method for Demand Forecasting:

Constitutes one of the most important steps of the demand forecasting process. Demand can be forecasted by using various methods. The method of demand forecasting differs from organization to organization depending on the purpose of forecasting, time frame, and data requirement and its availability. Selecting the suitable method is necessary for saving time and cost and ensuring the reliability of the data.

4. Collecting Data:

Requires gathering primary or secondary data. Primary' data refers to the data that is collected by researchers through observation, interviews, and questionnaires for a particular research. On the other hand, secondary data refers to the data that is collected in the past; but can be utilized in the present scenario/research work.

5. Estimating Results:

Involves making an estimate of the forecasted demand for predetermined years. The results should be easily interpreted and presented in a usable form. The results should be easy to understand by the readers or management of the organization.

METHODS OF DEMAND FORECASTING

1. Survey methods
2. Statistical methods
3. Expert opinion methods
4. Test marketing
5. Controlled experiments
6. Judgmental approach

1. Survey Method:

Survey method is one of the most common and direct methods of forecasting demand in the short term. This method encompasses the future purchase plans of consumers and their intentions. In this method, an organization conducts surveys with consumers to determine the demand for their existing products and services and anticipate the future demand accordingly.

2. Statistical Methods: The statistical methods are often used when the forecasting of demand is to be done for a longer period. The statistical methods utilize the time-series

(historical) and cross-sectional data to estimate the long-term demand for a product. The statistical methods are used more often and are considered superior than the other techniques of demand forecasting due to the following reasons:

- There is a minimum element of subjectivity in the statistical methods.
- The estimation method is scientific and depends on the relationship between the dependent and independent variables.
- The estimates are more reliable
- Also, the cost involved in the estimation of demand is the minimum.

3. Expert opinion methods:

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 interest in the results of a particular survey. As expert is good at forecasting and analysis the future trend in a give product or service at a given level of technology. The service of an expert

could be advantageously used when a firm uses general economic forecasting or special industry fore casting prepared outside the firm.

4. Test marketing:

It is likely that opinions given by buyers, salesman or other experts may be, at times, misleading. This is the reason why most of the manufactures favour to test their product or service in a limited market as test – run before they launch their product nationwide.

5. Controlled experiments:

Controlled experiment refer to such exercise 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.

6. Judgmental approach:

When none of the above methods are directly related to the given product or service, the management has no alternative other than using its own judgment. Even when the above methods are used, the forecasting process is supplemented with the factor of judgment for the following reasons

- Historical data for significantly long period is not available
- Turning point in terms of policies or procedures or causal factors cannot be precisely determined
- Sale fluctuation are wide and significant
- The sophisticated statistical techniques such as regression and so on, may not cover all the Signing

Supply

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Supply refers to the quantities of a good or service that the seller is willing and able to provide at a price, at a given point of time.

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 reduces 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 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.

Supply function:

1. Individual supply function
2. market supply function

The supply of a commodity also depends on a number of factors. When all the determinants of supply are put together in the form of a functional relationship, it is termed as 'Supply Function'.

Supply function shows the functional relationship between quantity supplied for a particular commodity and the factors influencing it. It can be either with respect to one producer (individual supply function) or to all the producers in the market (market supply function).

1. Individual Supply Function:

Individual supply function refers to the functional relationship between supply and price factors affecting the supply of a commodity. A firms supply function (S_x) for a good X can be simplified by holding constant the values of all variables other than the price of the good.

It is expressed as:

$$S_x = f(P_x,)$$

S_x = Supply of the given commodity x;

P_x = Price of given commodity x;

2. Market Supply Function:

Market supply function refers to the functional relationship between market supply and factors affecting the market supply of a commodity. A firms supply function (S_x) for a good X can be simplified by holding the values of all variables.

Market supply function is expressed as:

$$S_x = f(P_x, P_o, P_f, S_t, T, G, T, G, N, F, M)$$

Where,

S_x = Market supply of given commodity x;

P_x = Price of the given commodity x;

P_o = Price of other goods;

P_f = Prices of factors of production;

S_t = State of technology;

T = Taxation policy;

G = Goals of the market;

N = Number of firms;

F = Future expectation regarding

M = Means of transportation and communication.

Law of supply :

It is observed in markets that when more price of commodities are offered to sellers. They increase the quantity supplied of these commodities and when the level of prices decreases, the sellers decrease the quantity supplied. This behavior of seller is called law of supply.

$P \uparrow - \text{Supply} \uparrow$
 $P \downarrow - S \downarrow$

Definition

"Other things remaining the same, if the price of a commodity increases its quantity supplied increases and if the price of a commodity decreases, quantity supplied also decreases".

There exists a direct and positive relationship between price and quantity supplied of a commodity. The functional relationship between quantity supplied and the price of a commodity can be expressed as:

$$Q_s = f(P)$$

Where Q_s = quantity supplied

P = price of commodity

Assumptions :

The assumptions of the law of supply are as under:

No change in cost of production

It is assumed that there is no change in cost of production because of the profit decreases with the increase in cost of production and it causes the decrease in supply. If price of a commodity decreases and cost of production also decreases, at the same time, the quantity supplied does not decrease and profit remains constant.

No change in technology

It is also assumed that technique of production does not change. If better methods of production are invented, profit increases at the previous price. The sellers increase supply and law of supply does not operate.

No change in climate

It is also assumed that there is no change in climatic situation. For example, at any place flood or earth quake occurred. The supply of goods decreases at that place at previously prevailing price.

No change in prices of substitutes

If the prices of substitutes of a commodity fall then the tendency of consumers diverts to substitutes therefore, the supply of a commodity falls without any change in price.

No change in natural resources $\uparrow - P \downarrow - S \uparrow$

If the quantity of natural resources (minerals, gas, coal, oil etc) increases, the cost of production decreases. It causes to increase in quantity supplied.

No change in price of capital goods $\leftarrow C \uparrow - S \downarrow$

The capital goods are raw material, machinery, tools etc. The cost of production increases due to increase in prices of capital goods. It can lead to decrease in quantity supplied.

No change in political situation

The amount of investment is affected by the change in political situation of a country. The production of goods decreases due to decrease in investment.

No change in tax policy

It is also assumed that the taxation policy of government does not change. The increase in taxes effects the investment and production and supply of goods decreases.

Explanation :

The slope of the supply function i.e. $\Delta Q/\Delta P$ is positive. Regarding the assumptions, the standard supply function is written as $Q_s = -c + dP$

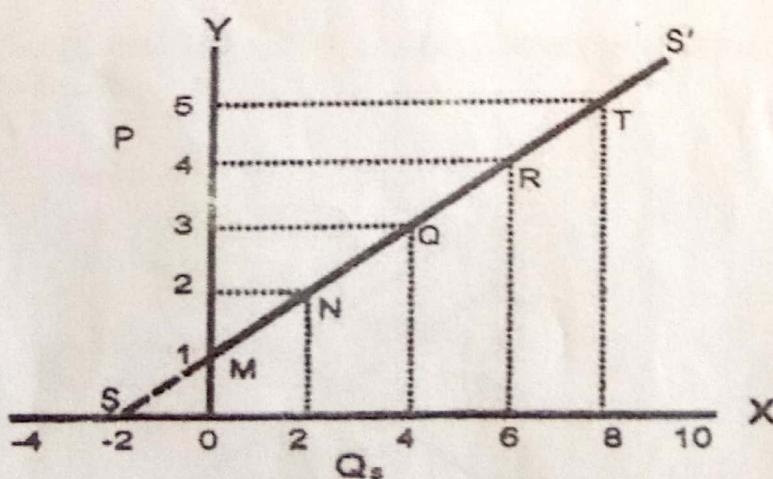
Where c and d are parameters while P and Q_s are independent and dependent variables, respectively. The positive sign represents direct relationship between P and Q_s .

The supply function is expressed with the help of following example: $Q_s = -2 + 2P$

By assuming different values of P , we can calculate the different values of Q_s as shown below.

| Price (P) | Quantity supplied Q_s |
|-----------|-------------------------|
| 0 | -2 |
| 1 | -0 |
| 2 | 2 |
| 3 | 4 |
| 4 | 6 |
| 5 | 8 |

As we assumed the different values of 'P' from zero to 5, then the calculated values of Q_s increases from -2 to 8.



The quantity supplied is expressed on X-axis while price is measured on Y-axis. The law of supply can be illustrated through the supply schedule as shown in the above supply curve SS'. By plotting the various combinations of price and quantity supplied,

we get different points S, M, N, Q, R and T. by joining these points, we get our desired supply curve SS', having positive slope as shown in the above figure.

Causes of positive slope of supply curve

Following are the causes of positive slope of supply curve.

Profit

When the price of a commodity increases, the seller increases the quantity supplied. The profit of seller increases and the aim of seller is to profit maximization.

Cost of production

The cost of production increases due to increase in quantity supplied. It is necessary to increase price to maintain or increase the level of profit. Therefore, there is a direct relationship between price and quantity supplied.

Future Expectations

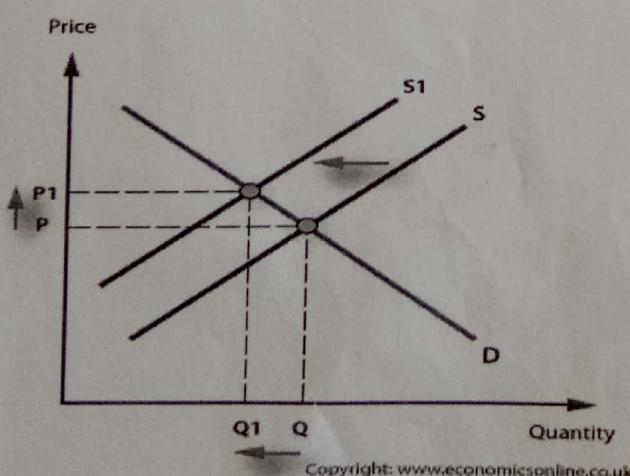
If there is a tendency of increasing prices at present period, the sellers increase quantity supplied for the lust of profit. It may be expectations in future to decrease prices. Now they want to maximize their profit due to good present circumstances.

Shifts in supply

The position of a supply curve will change following a change in one or more of the *underlying determinants* of supply. For example, a change in costs, such as a change in labour or raw material costs, will shift the position of the supply curve.

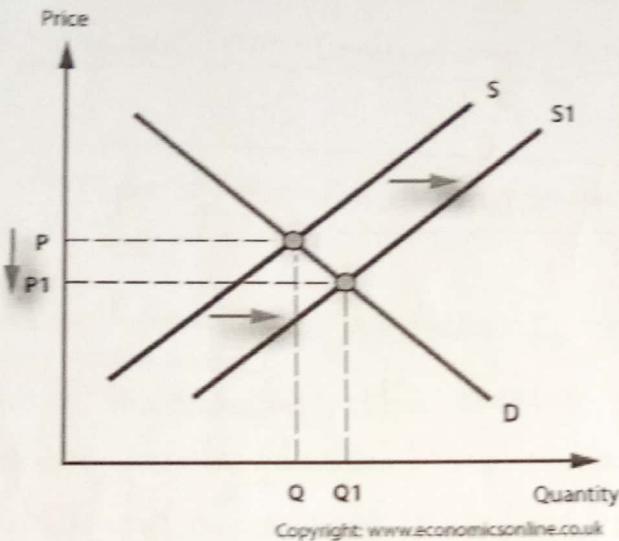
Rising costs:

If costs rise, less can be produced at any given price, and the supply curve will shift to the left.



Falling costs:

If costs fall, more can be produced, and the supply curve will shift to the right.



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Any change in an underlying determinant of supply, such as a change in the availability of factors, or changes in weather, taxes, and subsidies, will shift the supply curve to the left or right.

Elasticity1) price elasticity of demand:

⇒ problem: Determine the price elasticity of demand given that, the quantity demanded for product M is 1000 units at a price of Rs. 100. The price declines to Rs. 90 and the quantity demanded increases to 1500 units.

solution:

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

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

⇒ Let us define these variables here.

Q_1 = 1000 units (quantity before change)

Q_2 = 1500 units (quantity after change).

P_1 = Rs. 100 (price before change).

P_2 = Rs. 90 (price after change).

$$EdP = \frac{(1500 - 1000) / 1000}{(90 - 100) / 100} = -5$$

→ The demand is elastic. The percentage of increase in quantity demanded is more than the percentage of decrease in price.

2) Income elasticity of Demand:

⇒ problem: Determine the Income elasticity of demand given that, the quantity demanded for product M is 1000 units at a daily income of Rs. 100. The daily income declines to Rs. 80

and the quantity demanded decreases to 700 units.

$$\Rightarrow \text{Solution: } EDI = \frac{(Q_2 - Q_1) / Q_1}{(I_2 - I_1) / I_1}$$

(or)

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

\rightarrow let us define these variables here.

$Q_1 = 1000$ units (quantity before change)

$Q_2 = 700$ units (quantity after change)

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

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

$$EDI = \frac{(700 - 1000) / 1000}{(80 - 100) / 100}$$

= 1.5

\rightarrow which means that for a 10% fall in income, there is decrease in demand by 15 percent.

3) Cross Elasticity of demand:

\Rightarrow Problem: Consider two goods x and y. There was no change in price of x, but its demand was seen to fall from 6000 units to 5500 units. On analysis it was found that price of another commodity y has decreased from 250 to 225. find out the cross elasticity between x and y and the relationship between the two goods.

- solution:

Cross elasticity of demand = $\frac{\text{Proportionate change in quantity demanded for product } x}{\text{proportionate change in price of product } y}$

$$Edc = \frac{(Q_2 - Q_1) / Q_1}{(P_{2y} - P_{1y}) / P_{1y}}$$

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Let us define these variables here:-

$Q_2 = 6000$ units (quantity after change of product X)

$Q_1 = 5500$ units (quantity before change of product X)

$P_{1y} = 225$ (price before change of product Y)

$P_{2y} = 250$ (price after change of product Y)

$$Edc = \frac{(5500 - 6000) / 6000}{(250 - 225) / 225}$$

$$= -0.15 \quad 0.83$$

→ Since elasticity is negative (-0.83), it can be concluded that X and Y are ~~complements~~ ^{substitutes}.

* When elasticity is positive, it can be ~~substitutes~~ ^{complements} / ~~complements~~.

4. Advertising elasticity of demand :-

→ Problem: Determine the advertising elasticity of demand given that, the quantity demanded for product M is 100,000 units per day at a monthly advertising budget of Rs. 10,000. The monthly advertising budget is slashed to Rs. 5000; the quantity demanded will fall down to 30,000 units per day.

→ Solution:

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

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

→ Let us define these variables here:

$Q_1 = 100000$ units (quantity demanded before change)

$Q_2 = 30000$ units (quantity demanded after change)

$A_1 = \text{Rs. } 10000$ (Advertising budget before change)

$A_2 = \text{Rs. } 5000$ (Advertising budget after change)

$$E_{da} = \frac{(30000 - 10000) / 100000}{(5000 - 10000) / 10000}$$

→ The advertising elastic demand^{1.4} is elastic. The percentage of decrease in advertising budget is less than the percentage of decrease in the quantity demanded.