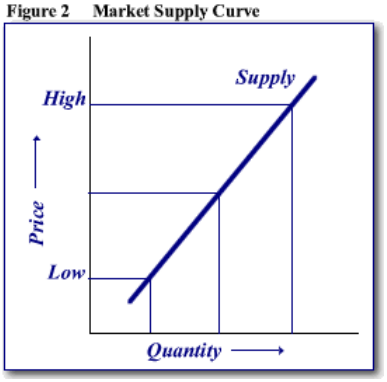
Meaning of Supply: Supply refers to the amount available at a specific price in a specific period. All else being equal, the supply provided by producers will rise if the price rises because all firms look to maximize profits.

Law of Supply: 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.

Figure 2 Market Supply Curve



Determinant of Supply: Determinants of supply (also known as factors affecting supply) are the factors which influence the quantity of a product or service supplied. These are as follows-

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. **Government policies:** If Government policies are liberal which could promote new industries, supply will increase and vice versa. For example liberal credit policies, licensing policy and other schemes like make in india.

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.

Meaning of Elasticity of Supply:

The law of supply indicates the direction of change—if price goes up, supply will increase. But how much supply will rise in response to an increase in price cannot be known from the law of supply. To quantify such change we require the concept of elasticity of supply that measures the extent of quantities supplied in response to a change in price.

Elasticity of supply measures the degree of responsiveness of quantity supplied to a change in own price of the commodity. It is also defined as the percentage change in quantity supplied divided by percentage change in price.

It can be calculated by using the following formula:

E_S = % change in quantity supplied/% change in price

Symbolically,

$E_S = \Delta Q/Q \div \Delta P/P = \Delta Q/\Delta P \times P/Q$

Since price and quantity supplied, in usual cases, move in the same direction, the coefficient of E_S is positive.

Types of Elasticity of Supply:

For all the commodities, the value of E_s cannot be uniform. For some commodities, the value may be greater than or less than one.

Like elasticity of demand, there are five cases of E_S:

(a) Elastic Supply (E_S>1):

Supply is said to be elastic when a given percentage change in price leads to a larger change in quantity supplied. Under this situation, the numerical value of E_s will be greater than one but less than infinity. SS_1 curve of Fig. 4.17 exhibits elastic supply. Here quantity supplied changes by a larger magnitude than does price.

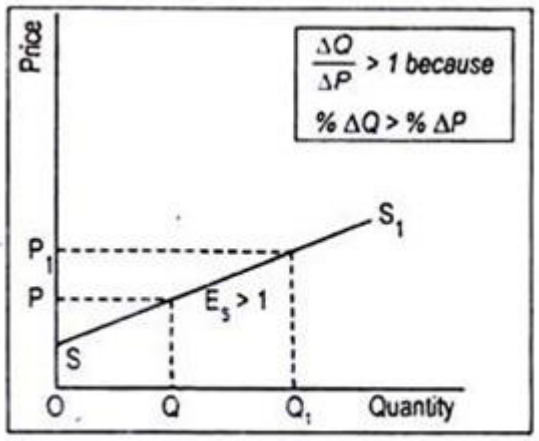


Fig. 4.17: $E_s > 1$

(b) Inelastic Supply ($E_s < 1$):

Supply is said to be inelastic when a given percentage change in price causes a smaller change in quantity supplied. Here the numerical value of elasticity of supply is greater than zero but less than one. Fig. 4.18 depicts inelastic supply curve where quantity supplied changes by a smaller percentage than does price.

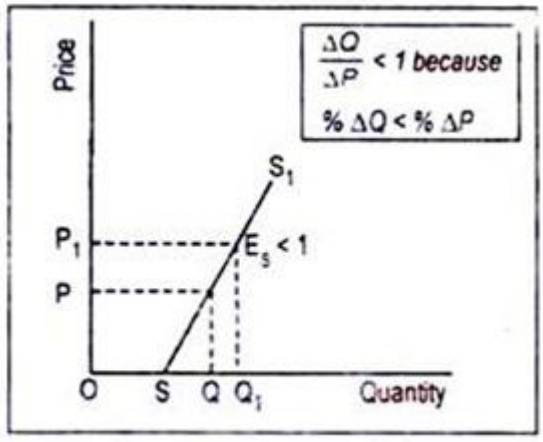


Fig. 4.18: $E_s < 1$

(c) Unit Elasticity of Supply ($E_S = 1$):

If price and quantity supplied change by the same magnitude, then we have unit elasticity of supply. Any straight line supply Curve passing through the origin, such as the one shown in Fig. 4.19, has an elasticity of supply equal to 1. This can be verified in this way.

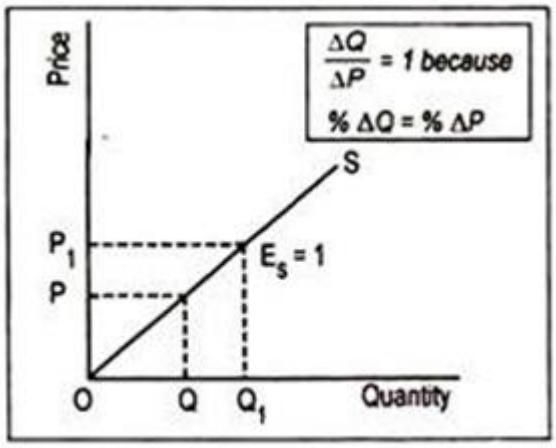


Fig. 4.19: $E_S = 1$

For any straight line positively-sloped supply curve drawn through the origin, the ratio of P/Q at any point on the supply curve is equal to the ratio Δ P/Δ Q. Note that Δ P/Δ Q is the slope of the supply curve while elasticity is (1/ΔP/ΔQ = ΔQ/ΔP).Thus, in the formula (ΔQ/ΔP. P/Q), the two ratios cancel out each other.

(d) Perfectly Elastic Supply (Es = ∞):

The numerical value of elasticity of supply, in exceptional cases, may reach up to infinity. The supply curve PS_1 drawn in Fig. 4.20 has an elasticity of supply equal to infinity. Here the supply curve has been drawn parallel to the horizontal axis. The economic interpretation of this supply curve is that an unlimited quantity will be offered for sale at the price OS. If price slightly drops down below OS, nothing will be supplied.

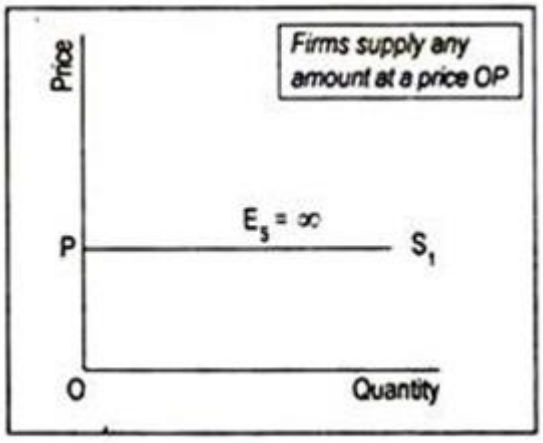


Fig. 4.20: $E_s = \infty$

(e) Perfectly Inelastic Supply (Es = 0):

Another extreme is the completely or perfectly inelastic supply or zero elasticity. SS_1curve drawn in Fig. 4.21 illustrates the case of zero elasticity. This curve describes that whatever the price of the commodity, it may even be zero, quantity supplied remains unchanged at OQ. This sort of supply curve is conceived when we consider the supply curve of land from the viewpoint of a country, or the world as a whole.

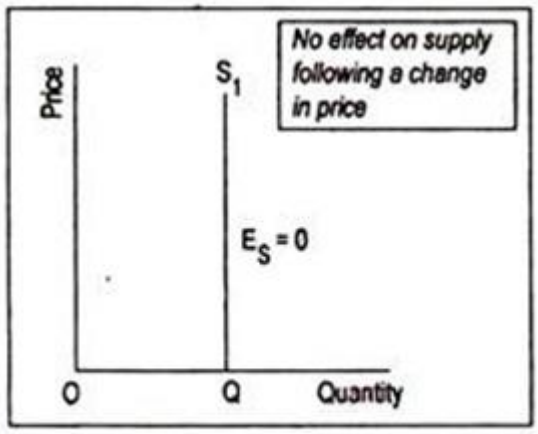


Fig. 4.21: $E_S = 0$

Demand Forecasting

Meaning of Demand Forecasting:

Demand forecast means estimation of the demand for the product in question for the forecast period. Demand forecasting is the activity of estimating the quantity of a product or service on the basis of past data that consumers will purchase. **Demand forecasting** involves techniques including both informal methods, such as educated guesses, and quantitative methods, such as the use of historical sales data or current data from test markets.

Characteristics of Forecasting-

1. Forecasting is concerned with future events. Forecasting means to estimate future with the help of past data. As such they may or may not be correct.
2. As the time period of forecasts increases, the accuracy of forecast decreases. This is because the increase in time horizon increases the uncertainty in demand pattern.
3. A good forecast is more than a single number. It includes a mean value and standard deviation. Also it has an accuracy range.
4. Aggregated forecasts are usually more accurate because the aggregate forecast can adjust the variation in actual demand of individual projects.

Significance of Demand Forecasting

Distribution of resources: The business firm also has to take decisions regarding capital arrangement, manpower planning and so on. These all could be done with a bit of ease if the firm has idea about the demand for its product. In short the estimation of demand enables the firm to undertake critical business decisions.

Helps in avoiding wastages of resources: Imagine a firm that does not undertake demand forecasting. As a result it will have no clue as to where its product stands in the market and how is the future demand for the same. This may result in wastage of resources. So in order to avoid wastages it is always beneficial to have a sense of future demand for the products and services.

Serves as a direction to production: The production process is not confirmed to producing goods

and services. Producers need to ensure that there is continuous supply of goods and services in the market. If there is proper prediction of the demand, then it serves as a handy tool for the businesses to undertake future production activities.

Pricing: The decision regarding pricing of the goods and services is perhaps one of the most critical business decisions. Demand forecasting is useful in this area too.

Helps in devising sales policy: Production is followed by sales. Demand forecasting is nothing but estimating the sales of the product. The business firms can plan its sales policy effectively on the backdrop of demand forecasting

Decrease of business risk: Where there is business there is risk. Demand forecasting though does not completely remove the business uncertainties, helps in reducing the risks and uncertainties to a certain extent.

Techniques of demand forecasting

There are two approaches to determine demand forecast – (1) the qualitative approach, (2) the quantitative approach.

Qualitative Method	**Description**
Consumer survey	The customers are asked about their purchasing plans and their projected buying behaviour. A large number of respondents are needed here to be able to generalize certain results. This Techniques can be divided under two heads: **Complete Enumeration-** under this method, each and every unit of universe is enumerated. But this method is more expensive and time consuming. Sample survey:- under this method, few units from universe are taken to enumerate. Generally this method is used by the organization because this method is less expensive and less time consuming.
Sales force composite/ market experiment method	Each salesperson (for example for a territorial coverage) is asked to project their sales. Since the salesperson is the one closest to the marketplace, he has the capacity to know what the customer wants. These projections are then combined at the municipal, provincial and regional levels.
Delphi method	A panel of experts is identified where an expert could be a decision maker, an ordinary employee, or an industry expert. Each of them will be asked individually for their estimate of the demand. An iterative process is conducted until the experts have reached a consensus. The main advantage of this method is that it is time and cost effective as a number of experts are approached in a short time without spending on other resources. However, this method may lead to

	subjective decision making.

Quantitative Forecasting Methods:

Graphical Method
Linear Regression
Simple Moving Average
Weighted Moving Average
Exponential Smoothing Method

1. **Graphical Method:** Helps in forecasting the future sales of an organization with the help of a graph. The sales data is plotted on a graph and a line is drawn on plotted points.
2. **Barometric Method:** In barometric method, demand is predicted on the basis of past events or key variables occurring in the present. This method is also used to predict various economic indicators, such as saving, investment, and income. This technique helps in determining the general trend of business activities. For example, suppose government allots land to the XYZ society for constructing buildings. This indicates that there would be high demand for cement, bricks, and steel. The main advantage of this method is that it is applicable even in the absence of past data. However, this method is not applicable in case of new products.

3. **Simple Linear Regression**: Linear regression analysis establishes a relationship between a dependent variable and one or more independent variables. In simple linear regression analysis there is only one independent variable.

- If the data is a time series, the independent variable is the time period.
- The dependent variable is whatever we wish to forecast.
- Regression Equation: Y = a + bX
- Y = dependent variable
- X = independent variable
- a = y-axis intercept
- b = slope of regression line

4. **Simple Moving Average**

- It is called “moving” because as new demand data becomes available, the oldest data is not used. By increasing the AP, the forecast is less responsive to fluctuations in demand
- By decreasing the AP, the forecast is more responsive to fluctuations in demand.

5. **Weighted Moving Average**: This is a variation on the simple moving average where the weights used to compute the average are not equal. This allows more recent demand data to have a greater effect on the moving average. The weights must add to 1.0 and generally decrease in value with the age of the data. The distribution of the weights determine the impulse response of the forecast.

6. **Exponential Smoothing**

- The weights used to compute the forecast (moving average) are exponentially distributed.
- The forecast is the sum of the old forecast and a portion (α) of the forecast error (**$A_{t-1} - F_{t-1}$).**
- **$Ft = F_{t-1} + \alpha(A_{t-1} - F_{t-1})$**
- The smoothing constant, α, must be between 0.0 and 1.0.
- A large α provides a high impulse response forecast.
- A small α provides a low impulse response forecast

Errors in forecasting

Forecasting errors are the difference between actual demand for time period (**At)** and forecasted demand (**Ft)**.

Two types of forecasting errors can occur.

Positive Error: When actual demand is more than forecasted demand, this is known as Positive error.

Negative Error: When actual demand is less than forecasted demand, this is known as Negative error.

CRITERIA FOR A GOOD DEMAND FORECASTING

The following are the main criteria for demand forecasting.

1. Accuracy: Accuracy is the most important criterion of a demand forecast, even though cent percent accuracy about the future demand cannot be assured. It is generally measured in terms of the past forecasts on the present sales and by the number of times it is correct.

2. Plausibility: The techniques used and the assumptions made should be intelligible to the management. It is essential for a correct interpretation of the results.

3. Simplicity: It should be simple, reasonable and consistent with the existing knowledge. A simple method is always more comprehensive than the complicated one.

4. Durability: Durability of demand forecast depends on the relationships of the variables considered and the stability underlying such relationships, as for instance, the relation between price and demand, between advertisement and sales, between the level of income and the volume of sales, and so on.

5. Flexibility: There should be scope for adjustments to meet the changing conditions. This imparts durability to the technique.

6. Availability of data: Immediate availability of required data is of vital importance to business. It should be made available on an up to date basis. There should be scope for making changes in the demand relationships as they occur.

7. Economy: It should involve lesser costs as far as possible. Its costs must be compared against the benefits of forecasts

8. Quickness: It should be capable of yielding quick and useful results. This helps the management to take quick and effective decisions.

FORECASTING FOR NEW PRODUCTS

Forecasting for new products is difficult enough since there are no past trends to reassuringly extrapolate into the future, just a ton of uncertainty about 80% of new products fail. But a better alternative is to take control of the situation and adopt some of the forecasting best practices approaches that have found to work. The demand of new product can be forecasted by anyone of the following techniques:

Substitute Approach: It is based on the assumption that a new product will be analyzed as a substitute of an existing product. In this method, the demand of substitute product is analyzed and on the basis of such analysis (or survey) forecasts are made for the new product to be introduced in

the market.

Evolutionary Approach: This method of sales forecasting is based on the assumption that the new product will be considered an improvement over existing products. It is further assumed that the new product can follow some life-cycles as of existing products. The sales of existing product are analyzed and efforts are made to forecast the sales of the new product of the enterprise on this basis.

Buyers or consumers view: In this method, the potential buyers of the product are contacted and efforts are made to know their opinions regarding new product. Efforts are also made to guess the quantity to be purchased by these consumers. Sales forecasts of the new product are based on these opinions and estimates.

Vicarious approach (or Experts' opinion): This approach of sales forecasting of new product is based on the opinion of experts in the field of marketing, who know the needs, desires, tastes and preferences of customers. Experts are contacted and their opinions are collected regarding the utilities and possible demand of the product. Sales forecasts are prepared on the basis of opinion of these experts.

Sales experience approach (or Market test method): In this method, the new product is offered for sale in a sample market for a fixed period. The results of the sales of the product are considered to be the base of forecasting the demand for the new product. The results of sales of the product in these segments are collected and deeply analyzed.