

Summary

- The term 'secular trend' or simply "trend" is very popularly used in day-to-day conversation. For e.g.: we often talk that the population, prices, production, etc. are showing an upward trend. What we really mean thereby is that when we observe such variables over a long period of time we find an increasing tendency. The general tendency of the data to grow or decline over a long period of time is called 'Secular Trend'.
- Trends are classified into 2 main categories mainly:
 1. Linear / Straight Line methods
 2. Non-Linear trends
- The methods of measurement for the straight line trends are the following:
 1. The free hand or graphic method
 2. The semi average method
 3. The method of least squares
- The methods of measurement for the Non-linear trends are the following:
 1. Freehand or Graphic method
 2. Moving average method
 3. A parabolic trend by a second degree polynomial equation obtained by the method of least squares

Graphic or Freehand Method:

It is the simplest method of studying trend. In this method, the given data are plotted on a graph paper and trend line is fitted to the data just by inspecting the graph of the series. As a rough guide, the line should be drawn in such a way that it passes between the plotted points in such a manner that the fluctuations in one direction are approximately equal to those in the other directions and that it shows a general movement.

Method of Semi-Average:

In this method the trend is calculated by dividing the given data into 2 parts. In case of even numbers, the data is divided into 2 equal parts. In case of odd numbers, middle point will be eliminated and the remaining data will be divided into 2 equal parts. Once the data is divided into 2 parts, an arithmetic mean of each part is obtained. Thus we get 2 points. Each point is plotted at the mid-point of the class interval covered by the respective part. The two points are joined by a straight line which gives the required trend. The line can be extended downwards or upwards to get the intermediate values or to predict the future values.

Method of Least Squares:

This method is most widely used in practice. A trend line is fitted to the data in such a manner that the following 2 conditions are satisfied.

1. $\sum(Y - Y_c) = 0$

The sum of deviations of the actual values of the Y and the computed values of Y is Zero

2. $\sum(Y - Y_c)^2$ is least

The sum of the squares of the deviations of the actual and computed values is least from this line. That is why this method is called the method of least squares. The line obtained by this method is known as the "Line of best fit".

Measurements of Non Linear Trend:

The straight line trends indicate the increase and decrease of a time series at a constant amount. It is the simplest form of describing the secular trend movement and the trend is

frequently accurate. However there are situations where the straight line trend cannot fit the data adequately. In such cases better description of the time series is given by a nonlinear curve.

Second degree parabola is the simplest example of the non-linear trends. In the second degree parabola, the equation of which is written in the form of

Trend $Y = a + bx + cx^2$ where a, b and c have been derived, the trend value for any year may be computed by substituting in the equation the value of X for that year.

Method of Moving Average – In this method the average value for a number of years (months or weeks) is secured and this average is taken as the normal or trend value for the unit of time falling at the middle of the period covered in the calculation of the average. The effect of averaging is to give a smoother curve reducing the influence of the fluctuation that pulls the annual figures away from the general trend. While applying this method, it is necessary to select a period for moving average such as – 3 yearly average, 5-yearly average, 8-yearly average etc. the period of the average is generally decided keeping in mind the length of the cycle.