

Method of Moving Average

The method of moving average is used for smoothing out fluctuations in time series, that is, it is used for determination of trend. Here a number of moving averages of overlapping periods of the time series are calculated. Each moving average is plotted against the middle of the time interval it covers.

For example, in case of a five yearly moving average, the first average which is obtained by adding up the values of the 1st, 2nd, 3rd, 4th and 5th years and dividing by 5 is placed against the middle of the 5 years, i.e. 3rd year.

The second average which is obtained by dividing by 5 the total of the values of the 2nd, 3rd, 4th and 5th years is placed against the 4th year and so on. The graph obtained by plotting the moving average gives the trend line.

↑ A moving average with a properly selected period will smooth out cyclical fluctuations from the series and give an estimate of the trend. The central problem in this method is the selection of an appropriate period which will eliminate all fluctuations that draw the series away from the trend.

Cyclical fluctuations with uniform period and amplitude (height) can be completely eliminated by taking a period of the moving average which is equal to (or a multiple of) the period of the cycles, provided the trend is linear and the additive model is appropriate. However, cycles in economic time series are not strictly periodic. The period and the amplitude generally vary from cycle to cycle. In such cases, the best result may be obtained by using a moving average whose period is equal to the average period of the cycles. This, however, will not completely eliminate the cycles.

There will be further complications in case the trend is non-linear. If the trend is concave upwards, the moving averages will always overestimate the trend values. If the trend is convex upwards, the moving averages will underestimate the trend values.

Like the graphical method, the method of moving averages is flexible : the moving averages can adapt themselves to changing circumstances ; that is, any change in the trend will be faithfully reflected by them. But unlike the graphical method, this method has the merit of objectivity since the period of the moving average can be more or less objectively determined. It should be noted, however, that since this method assumes no law of change, it cannot be used for forecasting purposes. Besides, in this process a number of trend values at each end of the series remain unestimated.)

Example 15.1 In Table 15.1 data relating to the annual production of wheat in India during 1947-68 are shown. The data indicate an increasing trend, with a marked cyclical effect superimposed on it. In order to eliminate the cyclical fluctuations, and thereby determine the underlying trend, we may use the method of moving averages.

Moving average method is considered to be the best method. It is very easy to obtain the moving averages and also the idea behind it is very clear. But the difficulty of this method is that it cannot be used for forecasting purpose. Also simple moving average method is suitable when the trend is linear. More over in this method we donot get some moving averages at the begining and at the end. If the series is very short such missing is not permitted. Therefore for short series, moving average method is not suitable. But for a large series this method of determination of trend is very suitable. As trend is estimated generally for large series so this method is considered to be the best one.

Uses of time series : Time series analysis is very useful in forecasting future business conditions and in planning sales and production of consumer articles. The knowledge of the growth rate of population of a city or an area would be very necessary in laying out water supply project, town planning and establishing stores, banks and other amenities to meet future needs. This can be done by measuring increasing trend of population. Each of the components of the time-series has its own utility. The long term trend depicts the steady growth or decline of industries. Cyclic variations indicate steps to be taken to avoid slump or to meet rising demand. Seasonal variations are useful in a similar way. Business houses can plan their affairs taking advantage of seasonal variations. The head of a departmental store would be interested to study the variations in the demands of different articles for different months in order to plan his future stocks to meet the public demands which arise due to seasonal swings.)