Overview of the Moving Average

The moving average is a statistical technique used to smooth out short-term fluctuations in a series of data in order to more easily recognize longer-term trends or cycles.

A moving average is a series of numbers, each of which represents the average of an interval of specified number of previous periods (3 or 5 or 7..).

The larger the interval, the more smoothing occurs. The smaller the interval, the more that the moving average resembles the actual data series.

Moving averages perform the following three functions:

1. Smoothing the data, which means to improve the fit of the data to a line.
2. Reducing the effect of temporary variation and random noise.
3. Highlighting outliers above or below the trend.

The moving average is one of the most widely used statistical techniques in industry to identify data trends.

For example, sales managers commonly view three-month moving averages of sales data. The article will compare a two-month, three-month, and six-month simple moving averages of the same sale data.

The moving average is used quite often in technical analysis of financial data such as stock returns and in

economics to locate trends in macroeconomic time series such as employment.

There are a number of variations of the moving average. The most-commonly employed are

1. the simple moving average,
2. the weighted moving average,
3. and the exponential moving average.

Simple Moving Average

Every point in a simple moving average is the average of a specified number of previous periods

Weighted Moving Average

Points in the weighted moving average also represent an average of a specified number of previous periods. The weighted moving average applies different weighting to certain previous periods; quite often the more recent periods are given greater weight.

Exponential Smoothing

Points in the exponential moving average also represent an average of a specified number of previous periods. Exponential smoothing applies weighting factors to previous periods that decrease exponentially, never reaching zero. As a result exponential smoothing takes into account all previous periods instead of a designated number of previous periods that the weighted moving average does.

Exponential smoothing is sometimes referred to as an EMA (Exponential Moving Average) or an EWMA (Exponential Weighted Moving Average).

The Exponential Smoothing analysis tool predicts a value based on the forecast for the prior period, adjusted for the error in that prior forecast.

The tool uses the smoothing constant a, the magnitude of which determines how strongly forecasts respond to errors in the prior forecast.

Note Values of 0.2 to 0.3 are reasonable smoothing constants. These values indicate that the current forecast should be adjusted 20 to 30 percent for error in the prior forecast. Larger constants yield a faster response but can produce erratic projections. Smaller constants can result in long lags for forecast values.

Input Range **- Enter the cell reference for the range of data you want to analyze. The range must contain a single column or row with four or more cells of data.**

Damping factor **- Enter the damping factor you want to use as the exponential smoothing constant. The damping factor is a corrective factor that minimizes the instability of data collected across a population. The default damping factor is 0.3.**

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Labels **- Select if the first row and column of your input range contain labels. Clear this check box if your input range has no labels; Microsoft Excel generates appropriate data labels for the output table.**

Output Range **- Enter the reference for the upper-left cell of the output table. If you select the Standard Errors check box, Excel generates a two-column output table with standard error values in the right column. If there are insufficient historical values to project a forecast or calculate a standard error, Excel returns the #N/A error value. Note The output range must be on the same worksheet as the data used in the input range. For this reason, the New Worksheet Ply and New Workbook options are unavailable.**

Chart Output **- Select to generate an embedded chart for the actual and forecast values in the output table.**

Standard Errors **- Select if you want to include a column that contains standard error values in the output table. Clear if you want a single-column output table without standard error values.**