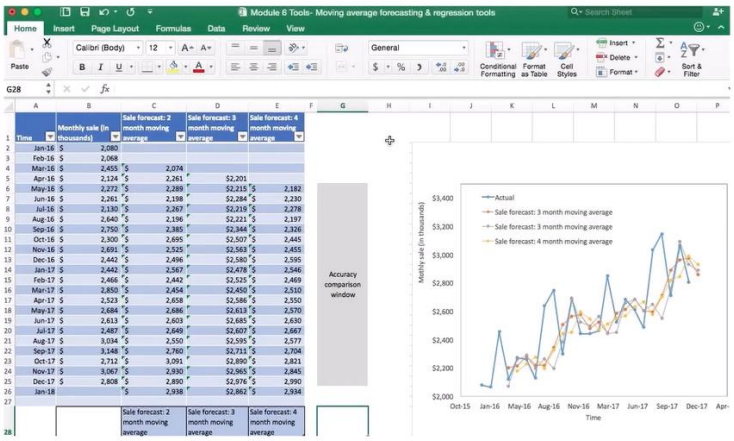
M6L4b. Moving Average Method

Slide #1

This video clip demonstrates how to build a moving average model with Microsoft Excel.

Slide #2



I am going to show you how to build and use the moving average forecasting model with Microsoft Excel.

This is the Excel moving average forecasting tool.

The raw sales data is in the first two columns between January 2016 and December 2017.

We're going to use two-month moving average, three-month moving average, and four-month moving average to forecast the next month of sale.

Let me use two-month moving average.

The formula is very simple.

For March 2016, the sale is the average of the past two months, January and February.

If we use three-month moving average, the sale in April is the average between January and March.

And if we use four-month average, we start with May and we use the average of the past four months to calculate the May performance.

So after we build the table, we can forecast the sale of next month, January, 2018, by using the moving average data.

This is two-month average data, this is three- month, and this is four-month.

We can also use the SUMXMY2 function to calculate the square difference between the forecasted number and the actual number to tell us the accuracy of each moving average method.

The accuracy check window is between May 2016 and December 2017.

We can tell the three-month moving average gives us the lowest difference.

The number is the smallest, and that means that the three- month moving average gives us the most accurate forecasting.

That is the result of the forecasting.

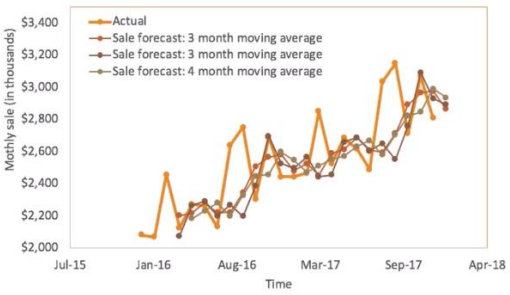
Here, you can see the different moving average windows: two-month, three-month, and four-month.

We can see the moving average smooths the monthly sale.

So that is why the moving average is also called the smoothing technique.

Slide #3

Forecasting: Moving Average Method



	Sale forecast: 2 month moving average	Sale forecast: 3 month moving average	Sale forecast: 4 month moving average
Accuracy comparison	$ 65,535	$ 53,878	$ 59,032

The actual OCT machine sales data is plotted in the figure along with the predicted values from the three moving average models.

This chart shows that the predicted values tend to be less volatile or smoother than the actual data.

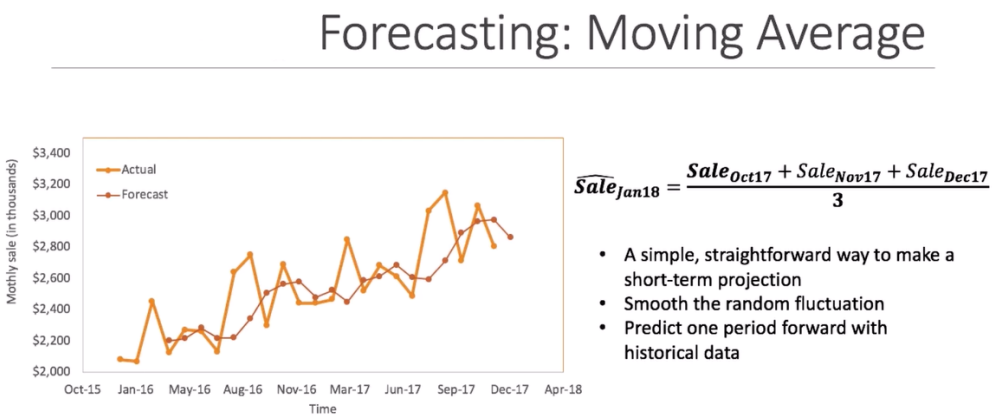
This should not be surprising, because the moving average technique tends to average out the peaks and valleys occurring in the original data.

The moving average technique is sometimes referred to as a smoothing method.

The larger the value of k, the smoother the moving average prediction will be. But the smoother curve does not mean the forecast is more accurate.

So there is a difference between the smoothness of the data and the accuracy of our forecast. The squared difference value describes the overall fit of the forecasting technique to the historical data. The comparison of the different values for the three moving averages, we might conclude that the three-month moving average with a difference value of 54,000 provides more accurate forecasts than the two month or a four month moving averages.

Slide #4



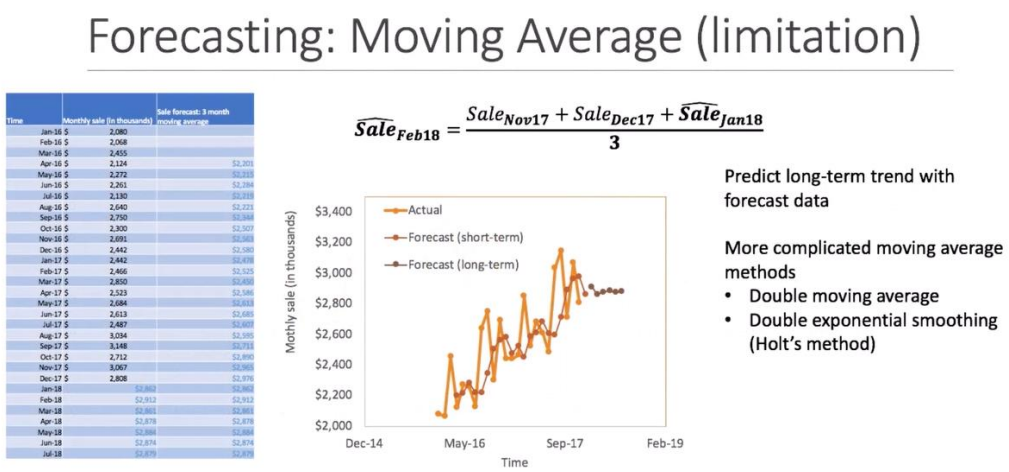
Assuming that the product manager of OCT machine is satisfied with the accuracy of the three-month moving average forecasting model, the prediction of OCT machines to be sold in the next month, in January 2018, can be calculated with this formula.

Forecasted sales in January 2018 equals to the average of actual sale in October, November, and December 2017.

From this calculation, we can tell that moving average is a very simple, straightforward way to make a short-term projection.

The method not only predicts the future performance, but also smooths the random fluctuation and can predict one period forward with historical data.

Slide #5



To forecast more than one period into the future, using the moving average technique, we must substitute actual sales data with forecasted data.

For example, if we want to forecast the number of OCT machines to be sold in February, using a three-month moving average window, the forecast for February 2018's sale is represented by this.

February sale 2018 forecast, equal to the actual sale in November 2017, plus the actual sale in December 2017, plus the forecasted sale in January 2018, divided by 3, where the sale data in January is the forecasted data, while November and December data is the actual sales data.

From the chart, we can see that the moving average method is not suitable for the long-term forecasting of fast growing or declining businesses, but the simple method works well for short-term forecasts or medium terms for stable businesses.

More complicated moving average methods, such as double moving average or double exponential smoothing technique, might be more suitable for a longer term forecasting.

But in practice, regression type of forecasting method might be more suitable for a long-term trend analysis.