Calculating a Beta

In this tutorial you will learn to create a historic beta. In finance, we use the word beta to represent risk, defined as the relative volatility of a stock's returns to those of the market. We use a simple line to represent this relationship. You might remember from your high-school geometry that the formula is y equals a plus bx. In this case, we will replace the b with the Greek beta.
In this exercise, we will be using a stock's returns as the dependent variable or Y and the returns from the S&P 500 as the independent variable or X. The beta we will calculate is historical, though we often use it to estimate the required return for the stock into the future. Beta, and using it to estimate the required return, is discussed in the chapter you read for this session.

On the spreadsheet, you can see three columns of data. In column 1, you will see the date for each pair of data points. In column 2 and column 3, you will see the closing prices for the Standard and Poors 500 index and the stock for that date.

Now let's calculate the S&P 500's returns. Since returns are calculated from one period to the next, we will have no data in Cell E5. Go to cell E6. To calculate the return from January to February 2002 subtract B5 from B6 and divide by B5, the index level on Jnauary 2002. The result, as you can see, is a loss of 17.0925 percent over the month. Next, we will repeat this process using the copy function until all the returns are calculated. Now, we repeat this same process for the stock.

Now that we have created the return's series we need to estimate the beta. Our next step is to plot the data in a chart. If you are unsure of your charting skills, you may go to the Element K tutorial.

Now to chart the data. First, select the data you want to chart. In this case, it will be E6 through F39. Now, select the chart icon on the bar. Once you have selected the chart icon, you will see a drop-down box where you have a number of choices, select the **XY (Scatter)** and press **Next**. In the small box, you will see a miniature of your chart. Click **Next**. Add titles for the X axis and Y axis. Click on **Legend** and remove the legend since we don't need it. Continue to click **Next**. Finally, you get a chance to place your chart on the same sheet or as a separate sheet in your workbook. We are going to put it as a separate sheet in our workbook.

Now to calculate the beta: with the chart open, go to the toolbar and click **Chart**. In the drop down menu, choose **Add a Trendline**. From the menu box, choose **Linear**, and then go to the **Options** menu. Click on the box to display the equation on the chart, and the one to display R-squared value on the chart. Click **OK**. As you can now see, the beta for this stock is .8593 in the regression. This beta represents a stock that moves in a way similar to the market, but is less volatile, and the R-squared, is 0.8627, indicates that the variance of the stock returns are highly related to the variance of the S&P 500 returns.