# Assignment 13

## Risk-Return Trade-Off

The purpose of this assignment is practice gathering stock price data, calculate returns from price data, and estimate averages and standard deviations of stock returns. You'll need to do this for all four firms that you chose (one) from at the beginning of the course.

**Group:**

**Section:**

**Ticker:**

1. Follow the steps provided on the next page in order to gather returns in a spreadsheet, and then do the calculations to fill in the table below.

| Ticker | Average ($\mu$) | Standard Deviation ($\sigma$) | Ratio ($\mu/\sigma$) |
|---|---|---|---|
| PFE | | | |
| PG | | | |
| IBM | | | |
| KO | | | |
| Portolio Average | | | |
| S&P 500 | | | |

# Estimating Mean & Standard Deviation

To estimate the mean and standard deviation of a firm's stock:

1. Go to Yahoo! Finance
2. Type the stock's ticker symbol in the search box.
3. Select "Historical Prices".
4. Select "Monthly".
5. Change the dates so that you have the latest 61 months of data, and then click "Get Prices".
6. At the bottom of the table, select "Download to Spreadsheet" to save the file to your computer.
7. The "Adjusted Close" heading is the closing price for the stock adjusted for dividends and splits so you can calculate accurate monthly returns. The formula for the return from month *t*-1 to *t* is

$$r_t = \frac{P_t^{Adj.} - P_{t-1}^{Adj.}}{P_{t-1}^{Adj.}}$$

8. After calculating monthly returns, use the AVERAGE function to calculate the average return over 60 months (notice that there is no return for the first month). Inside the parentheses, put the data range. If your returns are in column C, then type "=AVERAGE(C2:C61)" to get the average monthly return over the last five years.
9. Next, use the STDEV function to get the sample standard deviation of returns. Use the same range inside the parentheses as you did when you calculated the average return.
10. The ratio of average return to standard deviation of returns, is the return per unit of risk.
11. Repeat the above (Steps 2-10) for each of the other three firms.
12. Now you are ready to combine the four firms' data (i.e. returns) into a portfolio return for each month. First, you need to put all four firms' returns into a single spreadsheet. From your firm's spreadsheet, highlight the column of returns and copy it. Next, open a new spreadsheet and put your firm's ticker as the column heading (cell A1). Go to cell A2 and "right click" the mouse. You will see a bunch of choices emerge. Select the choice under "paste options" that shows a clipboard with 123 on it ("paste values").
13. Repeat step 12 for each of the other 3 firms, but paste into the *same* spreadsheet (using columns B, C, and D) as the one with your firm's returns.
14. In the column to the right of the last of the 4 firms (which should be column E), calculate the average return in that month *across* the four stocks. This is the average portfolio return in that month.
15. You can now calculate the mean and standard deviation (*over time*) of the portfolio returns you see in each month following Steps 8 and 9 once again.