

# FINC460: Homework 2

## 1 Implementing Mean-Variance Analysis

1. Open the file HW2Data.xls. It contains the risk free rate and monthly returns of three stocks, IBM, GM and GE.
  - a) Compute the average return for the 3 stocks.
  - b) Compute the standard deviation of each stock.
  - c) Compute the 95% confidence interval for the average return for each stock.
  - d) Compute the correlation matrix (tip: use the Data Analysis Toolpak in Excel to make your life easier, or even better use Stata)
  - e) Compute the Sharpe Ratio for each stock.
2. Now it is time to use some of these estimates to compute our optimal portfolio. Open the Markowitz spreadsheet and plug in the numbers that you found for the mean returns, standard deviation and correlations.
  - a) What are the weights on the optimal portfolio of these stocks? (Hint: use solver)
  - b) Draw the Capital Allocation Line.
  - c) Assuming a risk aversion coefficient of 4, what is the optimal mix of risky vs riskless assets?
3. Now suppose that we go back in time to May 1st 1998. You are contemplating the same decision, but you obviously do not have all the data available.
  - a) Using data available until May 1st 1998, repeat steps 1 and 2 above.

- b) Assuming you invested 100% in the optimal portfolio as of May 1st 1998 and you held on to this position until December 30 2006, compute the average realized return of this portfolio, its standard deviation and Sharpe ratio.
  - c) How well has your portfolio done? What happened?
4. (Extra credit) Now, with the benefit of hindsight let's return to May 1st 1998. Repeat the steps above, but impose a constraint on your portfolio that no position can be greater than 50%, in absolute value, of your wealth. How did this 'constrained' portfolio do in the second half of the sample?

## 2 Alex Sharpe's Portfolio

1. Estimate and compare the returns and variability (i.e. annual standard deviation over the past five years) of Reynolds and Hasbro with that of the S&P 500 Index. Which stock appears to be riskiest? (You can find the data in HW2Data.xls).
2. Suppose Sharpe's position had been 99 per cent of equity funds invested in the S&P 500 and either one per cent in Reynolds or one per cent in Hasbro. Estimate the resulting portfolio position. How does each stock affect the variability of the equity investment? How does this relate to your answer in question 1 above?
3. Perform a regression of each stock's monthly returns on the Index returns to compute a beta for each stock. How does this relate to your answer in question 2 above?
4. In what stock(s) (if any) should Sharpe invest?