UNIVERSITY OF TORONTO SCARBOROUGH
DEPARTMENT OF MANAGEMENT

FINANCIAL ECONOMICS

About the Assignments

Assignments are an important part of this course. It is a kind of learning by doing that helps you understand the course more profoundly. In addition, the tools developed with these assignments should help further your future work on similar issues. The assignments are dated so make sure you hand them by the deadline. **You need to post your report (word document) along with the Excel worksheet on Blackboard digital Drop-box before the end of the stated day**. **Your word document should be an elaborate explanation of the issues discovered in your empirical work so you should not view it as merely a reply to the posted questions.** There will be one point penalty per late day.

In general, while the assignments are not designed to be very long those that might not have had a lot of experience working with Excel may have to incur set-up costs especially on the first assignment. Having said that, since you are working in groups of 5, those costs should be manageable. **In any case, if you need help with Excel, please let me know and I will be happy to assist.**

Important notes:

1. **The assignment is a group work. Any use of work done by other groups, either from this term or the previous terms will be considered as plagiarism and will be dealt with accordingly.**
2. **3-4 marks out of a total 5 marks for each assignment is allocated to your explanation of the Excel work. Please make sure the explanations are thorough and clear.**

Good luck,

Assignment-1
Deadline (February 23)

Rate of Return Distributions

Download the monthly data for the 4 stocks all listed on S&P-500 for at least 10 years, 2 of the stock have to be (MSFT, JPM). For the purpose of this and the next two assignments ignore the exchange rate issue.

- From January 2006, till January 2016 (should give you roughly 120 observations for each stock)
- Calculate the monthly returns (Should be left with 119 observations for each stock, remember that the return is $r_t = \dfrac{P_t - P_{t-1}}{P_{t-1}}$, where P stands for the Adjusted (for Dividend & Split) Close.

Hint: Historical data are available on Yahoo-Finance.

(i) Use the monthly returns of your stocks to:

a) Construct frequency diagrams for the returns using historical data.

Hint: Use the FREQUENCY function.

b) Calculate the average returns (both arithmetic and geometric) of each stock as well as their standard deviations.

Hint: For the arithmetic and geometric average, and the standard deviation you can use the GEOMEAN, AVERAGE and STDEV functions.
Note: The GEOMETRIC mean function in Excel simply provides the squared root of the multiplied numbers. Therefore, to calculate the geometric averages you need to add 1 to the return [e.g, $1 + r_t$] then use the GEOMEAN function and then the Geometric mean will be: GEOMEAN-1.

c) Use (a) & (b) to briefly assess each stock risk and return.

(ii) Use the monthly returns of your portfolio to:

Hint: To calculate the monthly returns of your portfolio multiply the monthly returns of each stock by their weight and add up. (**Important Note**: the weight is relative to the total fund invested in these 6 stocks. Throughout these assignments we are completely ignoring your other investments.)

a) Construct frequency diagrams for the returns of your portfolio.
b) Calculate the average returns (both arithmetic and geometric) of the portfolio as well as their standard deviations.
c) Based on your frequency diagram. What is the probability that you lose money next month?

   Hint: Calculate the relative frequency that the monthly return is negative.

d) Answer (c) assuming that the monthly returns were normally distributed with the same average and standard deviation as in the sample. Compare you answer to this and the previous question. What does the comparison tell you about the distribution of returns of your portfolio?

   Hint: Use the NORMDIST function to calculate the probability.

e) Calculated the diversifiable and the non-diversifiable part of your portfolio.

   Hint: The diversifiable part of your portfolio is the first components of the right-side of the following equation:
   Since you have already calculated variances of all four stocks, you simply need to

   $$\sigma_p^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2 + 2 \sum_{\substack{j,k=1 \\ j \neq k}}^{n} w_j w_k Cov\ (r_j, r_k)$$

   multiply each by its squared weight and add up. The difference between this and the total variance of your portfolio is the market risk.

f) Discuss how much diversification you have achieved by combining these four stocks in your portfolio.

Good luck!