**Tutorial 2**

**Week 3**

1. Consider the Microsoft stock prices (MSFT), NASDAQ composite index (^IXIC), Dow Jones Industrial Average (^DJI) index from January 3, 2005 to August 04, 2017. The data can be downloaded using the command “**getSymbols**” in “**quantmod**” package in R.
2. Compute the simple return series.
3. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of each simple return series.
4. Obtain the empirical density function of the simple returns of Microsft stock. Are the daily simple returns normally distributed? Why? Perform a normality test to justify your answer.
5. Transform the simple returns to log returns. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of each log return series.
6. Test the null hypothesis that the mean of the log returns of Microsoft stock is zero.
7. Obtain the empirical density plot of the daily log returns of Microsoft stock and the Dow Jones Industrial Average (^DJI) index.
8. Consider the monthly log returns of PG stock in Problem 2. Perform the tests and draw conclusions using the 5% significance level.

(a) Construct a 95% confidence interval for the monthly log returns of PG stock.

(b) Test : versus : , where denotes the skewness of the return.

(c) Test : versus : , where denotes the kurtosis.

**Additional excersises (If time allows)**

1. Answer the questions from (a) to (d) as Problem 1 but using monthly returns for Proctor and Gamble (PG) stock, CRSP value-weighted index (VW), CRSP equal-weighted index (EW), and S&P composite index (SP) from January 1961 to December 2014. The returns include dividend distributions. Data file is **m-pg3indexes.txt** with column names PERMNO of PG, date, ge, vwretd, ewretd, and sprtrn, respectively.
2. Monthly foreign exchange rates (spot rates) can be obtained from the Federal Reserve Bank in St Louis (FRED). Consider the exchange rates between the U.S. dollar and the Malaysian Ringgit from January, 1971 to August, 2015. See the file **m-exusmal.txt**. The file has two columns, namely DATE, and DEXMAUS, respectively. Answer the following questions:

(a) Compute the daily log return of the exchange rate.

(b) Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of the log returns of the exchange rate.

(c) Plot the monthly exchange rate values and log returns.

(d) Obtain a density plot of the daily long returns of Dollar-Pound exchange rate.

(e) Test : versus : , where denotes the mean of the daily log return of Ringgit-Dollar exchange rate.