Homework Assignment #1

Due Date: before class on April 6 (Campus class) & April 7 (Weekend class)

Data files: Datasets are available from the course web at

Notes:
- All tests are based on the 5% significance level.
- Do not hand in computer output. Use cut-and-paste to summarize the output. There is no need to keep many digits in an answer.
- Each student needs to write his/her own solutions, even though discussions of the assignments between students are encouraged.

Assignment: fBasics of R is helpful in doing this assignment.

1. Consider the daily simple returns of American Express (AXP), CRSP value-weighted index (VW), CRSP equal-weighted index (EW), and the S&P composite index (SP) from September 01, 2001 to September 30, 2011. Returns of indices include dividends. The data are in the file d-axp3dx-0111.txt (date, axp, vw, ew, sp).
   (a) Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of each simple return series.
   (b) Transform the simple returns to log returns. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of each log return series.
   (c) Test the null hypothesis that the mean of the log returns of AXP stock is zero.

2. Answer the same questions as Problem 1 but using monthly returns for General Electric (GE), CRSP value-weighted index (VW), CRSP equal-weighted index (EW), and S&P composite index from January 1940 to September 2011. The returns include dividend distributions. Data file is m-ge3dx-4011.txt (date, ge, vw, ew, sp).

3. Consider the monthly stock returns of S&P composite index from January 1940 to September 2011 in Problem 2. Perform the tests and draw conclusions using the 5% significance level.
   (a) Test $H_0 : \mu = 0$ versus $H_a : \mu \neq 0$, where $\mu$ denotes the mean return.
   (b) Test $H_0 : m_3 = 0$ versus $H_a : m_3 \neq 0$, where $m_3$ denotes the skewness.
   (c) Test $H_0 : K = 3$ versus $H_a : K \neq 3$, where $K$ denotes the kurtosis.
4. Consider the daily log returns of American Express stock from September 1, 2001 to September 30, 2011 as in Problem 1. Perform the following tests: (a) Test the null hypothesis that the skewness measure of the returns is zero; (b) Test the null hypothesis that the excess kurtosis of the returns is zero.

5. Daily foreign exchange rates (spot rates) can be obtained from the Federal Reserve Bank in Chicago. The data are the noon buying rates in New York City certified by the Federal Reserve Bank of New York. Consider the exchange rates between the U.S. dollar and the British pound and Japanese yen from January 2, 2007 to November 30, 2011. The data are also available on the web. (a) Compute the daily log return of each exchange rate. (b) Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of the log returns of each exchange rate. (c) Obtain a density plot of the daily long returns of Dollar-Yen exchange rate. (d) Test \( H_0 : \mu = 0 \) versus \( H_a : \mu \neq 0 \), where \( \mu \) denotes the mean of the daily log return of Dollar-Yen exchange rate. Use the 5% significance level to draw the conclusion.

**Reading assignment**: Chapter 1 and Chapter 2 (Sections 1 to 5) of the text.