

THE UNIVERSITY OF CHICAGO
Graduate School of Business
Business 41202, Spring Quarter 2006, Mr. Ruey S. Tsay

Homework Assignment #1

Due Date: before class

- Campus class: April 7, 2006
- Evening class: April 6, 2006

Data files: Datasets may be downloaded from the course web site.

Assignment:

1. Consider the daily stock return of Boeing Company (tick symbol BA) and the S&P 500 index from January 1995 to December 2005. The data are simple returns and in the file d-basp9505.txt (date, BA, SP).
 - Express the simple returns in percentages. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of the percentage simple returns.
 - Transform the simple returns to log returns and express the log returns in percentages. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of the percentage log returns.
 - Are the sample means of log returns statistically different from zero? Use 5% significance level to draw your conclusion. Is there any difference in returns between an individual company such as Boeing and the market index?
2. Consider the monthly simple returns for Procter & Gamble stock(tick symbol PG), the CRSP value-weighted index (vw), CRSP equal-weighted index (ew) and S&P composite index from January 1975 to December 2005. The returns include dividend distributions, and the data file is m-pg3dx7505.txt. Transform the simple returns to log returns and express the log returns in percentages. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of each percentage log-return series.
3. Consider the weekly 3-month Treasury bill rates on the secondary market from January 8, 1954 to March 17, 2006. Answer the following questions:
 - Compute the mean, standard deviation, skewness, and kurtosis of the interest rate series.
 - Compute the change series of interest rate, i.e. $x_t = y_t - y_{t-1}$ with y_t being the t th observation of the interest rate. Compute the mean, standard deviation, skewness, and kurtosis of the change series.

4. Consider the daily log returns of Boeing stock from January 1995 to December 2005 as in Problem 1. Use 5% significance level to 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; (c) Test the null hypothesis that the log returns is normally distributed. You may use the Jarque-Bera test.
5. Daily foreign exchange rates (noon buying spot rates) are obtained from the Federal Reserve Bank at St. Louis. Consider the exchange rates of US Dollar-Euro and US Dollar-JP Yen from January 4, 1999 to March 17, 2006. (a) Compute the daily log return of each exchange rate, (b) Compute the sample mean, variance, skewness, excess kurtosis, minimum, and maximum of each log return series. For Japan, the exchange rate is yens per U.S. dollar. For Euro, the exchange rate is U.S. dollars per Euro. (c) What is the correlation between the two log return series of exchange rate?

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

Self study: The next question is for your own study. Do not hand in the solution.

Consider the daily prices of Electronic Arts stock from 1995 to 2004. The data file “d-ertsphlv.txt” contains date, closing price, high and low price, and volume (5 columns). Perform the following analyses.

- Plot the daily closing stock price. What characteristics are in the data?
- Daily price range is defined as $\text{range} = \text{high} - \text{low}$. Construct the daily range series for the stock. Compute the sample mean, standard error, skewness, excess kurtosis, minimum, and maximum of daily range.
- Take log transformation of the daily range. Compute the sample mean, standard error, skewness, excess kurtosis, minimum, and maximum of the log range.
- Plot the daily volume. What characteristics are in the data?
- Daily price volume, denoted by pvol , can be defined as $\text{pvol} = \text{closing price} \times \text{volume}$. Construct the price volume series and take log transformation. Plot the $\log(\text{pvol})$ series. Comment on the plot.
- Compute the sample mean, standard error, skewness, excess kurtosis, minimum, and maximum of $\log(\text{pvol})$.