

Lab Assignment - 7

Instructor : Dr. Arabin Kumar Dey

1 Due date:

- 22/9/2015 midnight.

2 Notes:

- Submit the codes in all R / S-plus corresponding to the questions.
- Make a proper documentation preferably in latex or using some other software and submit the printout of the report in .pdf form.
- Each student needs to write his/ her own solutions, even though discussions of the assignments between students are encouraged.

3 Assignments:

(1) Consider the daily gold price, London Bullion Market, price per Troy Ounce in U.S. Dollars at 10:30 AM local time, from January 2, 1992 to March 31, 2015.

- (a) Obtain the time plot of the gold price.
- (b) Let r_t be the log return of the daily gold price. Obtain the time plot of r_t .

(c) Are there serial correlations in the r_t series? You may use $Q(10)$ to draw the conclusion.

(d) Build an AR model for r_t . Do you think that this is the correct model for the data set ?

(f) Use the final model to compute 1-step to 3-step ahead forecasts of r_t at the forecast origin March 31, 2015.

(2) Assume the distribution of a_t as $N(0, \sigma_a^2)$ in the MA(1) model : $R_t = a_t + 0.2a_{t-1}$, $\sigma_a = 0.025$

(a) Generate 100 random returns (R_t) based on the above model.

(b) Plot the sample auto-correlation in different lags.

(c) Plot the actual autocorrelation with respect to different lags.

(3) Consider the monthly simple returns of CRSP Decile 1, 2, 5, 9 and 10 portfolios based on the market capitalization of NYSE/AMEX/NASDAQ. The data span is from January 1961 to September 2011.

(a) For the return series of Decile 2 and Decile 10, test the null hypothesis that the first 12 lags of autocorrelations are zero at the 5% level. Draw your conclusion.

(b) Build an ARMA model for the return series of Decile 2. Perform model checking and write down the fitted model.

(c) Use the fitted ARMA model to produce 1 to 12-step ahead forecasts of the series and the associated standard errors of forecasts.