FINANCIAL MODELING AND ECONOMETRICS
Refik Soyer, December 2016

Assignment 2: Due on Wednesday December 22, 2016
Each group will submit a single typed report of less than or equal to 6 pages. Please be sure that you include only the relevant SAS output and your interpretations in answering the each question. You can submit your assignment by email to soyer@gwu.edu

Regression Modeling of Changes in AAA Bond Rate

Consider the weekly data on interest rates: Federal funds rate (FF), 3 month t-bill rate (TB03), constant maturity 10-year Treasury bond rate (CM10), prime rate (PRIME) and corporate AAA bond rate (AAA). The data is in file "weekly_interest.txt" and in free format in the order of FF, TB03, CM10, PRIME and AAA.

We are interested in how weekly changes in AAA bond rate are related to the weekly changes in 10-year Treasury bond rate (CM10), Federal funds rate (FF) and 3 month t-bill rate (TB03).

(1) In order to see this relationship, create the weekly changes for these variables, that is, take the first differences of AAA, CM10, FF and TB03. Then obtain the scatter plots of DIF(AAA) versus DIF(CM10), DIF(FF) and DIF(TB03). Based on these plots, what type of a relationship you see between DIF(AAA) and each of these two variables ?

(2) Estimate the multiple regression model for DIF(AAA) using DIF(CM10), DIF(FF) and DIF(TB03) as the independent variables. Write down the estimated regression equation and interpret the meaning of coefficient for DIF(CM10) in this model.

(3) Discuss the significance of the individual coefficients of the model in (2), that is, discuss whether the individual coefficients are different than 0. Please use $\alpha = 0.05$ level of significance and state your conclusion and reasoning using the SAS output.

What is the coefficient of multiple correlation of the model ? What does it mean ?

(4) Investigate whether there is any evidence of multicollinearity in the model. Please justify your answer using the SAS output.

(5) To investigate presence of heteroskedasticity (non-constant variance), save the model residuals, and use the White's test as we discussed in the class, that is, use PROC MODEL in SAS (See Lecture Set 4). Please use $\alpha = 0.05$ level of significance in stating your conclusion.

(6) Obtain the autocorrelation function of the residuals. Can you conclude that residuals are uncorrelated at all lags (say upto lag 24) ? Please use $\alpha = 0.05$ level of significance and state your conclusion and reasoning using the SAS output.