FIN7670 Exam 1

Start: Mar 22, 12:00am

Due: Apr 5th, 11:59pm

**Question A (5 points)**

Suppose that *r*t follows the model *r*t = *r*t−1 + *a*t −0.9*a*t−1, and we have *r*1001 = 1.2 and *r*1000 (1) = 1.0, where *r*t(1) denotes the 1 step ahead prediction of *r*t+1 at the forecast origin *t*. Compute *r*1001(1).

**Question B (10 points)**

Consider the daily log returns *r*t, in percentages, of the NASDAQ index for a certain period of time with 1841 observations. Answer the following questions, using the attached R output.

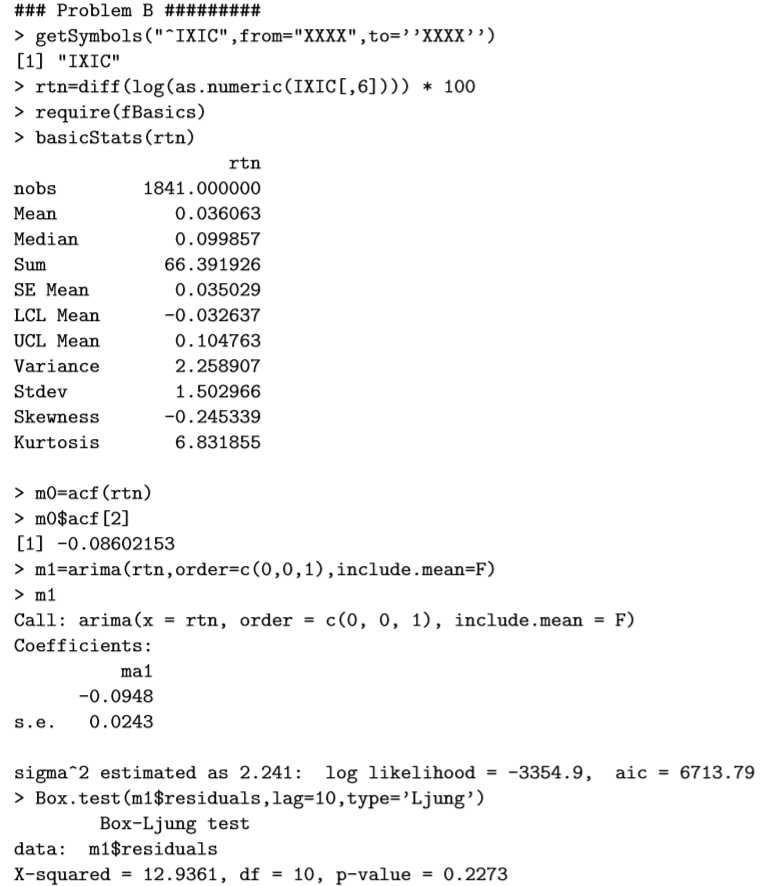
1. Let *µ* be the expected value of rt. Test H0 : µ = 0 versus Ha : µ ≠ 0. Obtain the test statistic and draw your conclusion.

2. Is the distribution of *r*t skew? Why?

3. Does the distribution of *r*t have heavy tails? Why?

4. Let *ρ*1 be the lag-1 ACF of rt. Test H0: ρ1 = 0 versus Ha : ρ ≠ 0. The sample lag-1 ACF is −0.086. Obtain the test statistic and draw your conclusion.

5. An MA(1) model is ﬁtted. Write down the ﬁtted model, including σ2 of the residuals.



**Question C (20 points)**

Consider the monthly yields of Moody’s Aaa & Baa seasoned bonds from January 1919 to November, 2011. The data are obtained from FRED of Federal Reserve Bank of St. Louis and in the file m-Aaa-1911.txt and m-Baa-1911.txt. What is the relationship between the two series? To answer this question, take the log transformation of the data to build a time series model for the Aaa yields using Baa yields as an explanatory variable. Write down the fitted model, including model checking. (**hint**: follow the procedure of the case study of 1- and 3- year Treasury rates that we discussed in the class)