EE435 Introductory Financial Econometrics, Semester 2/2019

Faculty of Economics, Thammast University

Due Date: Thursday 30, 2020 before 4.00 pm

Assignment 6

I pledge to the Honor Code and to obey all rules for taking and performing homework assignments as specified by the course instructor.

Your name: _____

There are four questions.

Question1.

Consider the monthly unemployment rates of Michigan, Illinois, and Indiana from 1976.1 to 2017.2. Build a VAR model for this 3-dimensional time series. Simplify (or refine) the model by removing insignificant parameters with threshold of t-ratio 1.645, and perform model checking.The data are in m-unrate-MIILIN.txt

1.1 Write down the final fitted model.

1.2 Obtain the plots of impulse response function of the fitted model and explain the relationship among the monthly unemployment rates of Michigan, Illinois, and Indiana from 1976.1 to 2017.2.

Question2.

Consider the monthly growth rate of M1 money supply of China and the growth rate of monthly crude oil price. The original data are from FRED. The crude oil prices are MCOILWTICO, Western Texas Intermediate. The data are in m-m1cnwti.txt with first column containing M1 series.

2.1 Obtain the time series plots of the bivariate time series, say z_t.

2.2 Build a VAR model for z_t, including simplification and model checking. Write down the fitted model.

2.3 Obtain the impulse response functions of the fitted model. What is the relationship between the M1 money supply of China and crude oil price, which represents commodity prices.

2.4 Obtain 1-step to 6-step ahead predictions of z_t at the forecast origin 2015.2.

2.5 Obtain the forecast error variance decomposition and explain it.

Question3.

Consider the monthly returns of McDonalds stock from August 1966 to December 2014. The data are available from CRSP and in the file m-mcd3dx6614.txt. Obtain the log return series of MCD stock.

3.1 Is the expected MCD log return zero? Why? Is there any serial correlation in the log returns? Why? Is there any ARCH effect in the log returns? Why?

3.2 Build a GARCH model with Gaussian innovations for the log return series. Per- form model checking and write down the fitted model.

3.3 Fit an IGARCH(1,1) model for the MCD log returns. Write down the fitted model.

3.4 Fit a GARCH model with skew-Student-t innovations to the log return series. Perform model checking and write down the fitted model.

3.5 Based on the fitted model, is the monthly log returns of MCD stock skewed? Why?

3.6 Fit a GARCM-M model to the monthly log returns. Write down the model? Is the risk premium statistically significant? Why?

3.7 Fit a TGARCH(1,1) model to the monthly log returns. Write down the fitted model. Is the leverage effect statistically significant? Why?

Question4.

Consider the monthly returns of the value-weighted index, including dividends from 1966 to 20014. The simple returns are in the file m-mcd3dx6614.txt (column with heading vwretd). Transform the simple returns to log returns.

4.1 Find an adequate model for the monthly log return series. Perform model checking to justify your model.

4.2 Obtain 1-step to 5-step ahead predictions of the log return and its volatility at the forecast origin December 2014.

4.3 Fit a GJR model (may use the APARCH command) to the monthly log return series. Write down the model. Is the leverage effect statistically significant? Why?