Assignment 6 Spring 2020

DUE DATE: Wednesday 19^{th}, May 2021.

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

Full name _____ **Student ID.** _____

There are two 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.