Homework 6

Eco 5316 Time Series Econometrics
Spring 2019
Due: Sunday, April 21, 11.55pm

Problem 1

(a) Use `tq_get` with `get = "economic.data"` option to obtain the following time series for the period 1950Q1-2017Q4 from FRED: U.S. real GDP GDPC1, and GDP deflator GDPDEF. Then, use `tq_get` with `get = "stock.prices"` to obtain the data for the adjusted closing value of S&P 500 Index ^GSPC for the period 1950-01-01 to 2017-12-31 from Yahoo Finance. Construct the quarterly average values of the closing price of S&P 500 Index. Hint: one way how to do it is as follows

```
tq_get("^GSPC", from = "1950-01-01", to = "2017-12-31") %>%
        select(date, adjusted) %>%
        mutate(qtryear = as.yearqtr(date)) %>%
        group_by(qtryear) %>%
        summarise(SP500 = mean(adjusted)) %>%
        ungroup()
```

(b) Use the data from (a) to construct the following two time series:

$$dlrGDP_t = 400\Delta \log GDP_t$$

which approximates the annualized growth rate of the U.S. real GDP and

$$dlrSP500_t = 100(\Delta \log SP500_t - \Delta \log GDPDEF_t)$$

which approximates the inflation adjusted annual return of S&P 500.

(c) Estimate a bivariate reduced form VAR for $\mathbf{y}_t = (dlrSP500_t, dlrGDP_t)'$ for the period 1990Q1-2018Q4, use information criteria to select number of lags.

(d) Run the Granger causality tests for both variables. What do the results suggest about the predictive power of the two variables? Discuss the economic intution behind your results of Granger causality test.

(e) Estimate a restricted VAR model in which you remove lags based on Granger causality test from (d).

(f) Use the VAR model to create a multistep forecast for 2019Q1-2019Q4. Compare your forecast for real GDP growth rate in 2019Q1 with (1) the Federal Bank of New York Nowcast, (2) the GDPNow Federal Bank of Atlanta forecast, and (3) the minimum, the average, and the maximum forecasts in the Wall Street Journal Economic Forecasting Survey.