Homework 3

Eco 5316 Time Series Econometrics
Spring 2019
Due: Saturday, February 9, 11.55pm

Problem 1

Take "Reporting with R Markdown" course on datacamp.com.

Problem 2

(a) Use `tq_get` to obtain the quarterly real private fixed investment (chain-type quantity index), available on FRED under code `B007RA3Q086SBEA`.

(b) Construct the log changes in the real private fixed investment $\Delta \log rPFI_t = \log rPFI_t - \log rPFI_{t-1}$ where $rPFI_t$ is the original quarterly real private fixed investment. Plot the time series for $rPFI_t$ and $\Delta \log rPFI_t$ using `ggplot`.

(c) Construct and plot the ACF and the PACF for $\Delta \log rPFI_t$ using `ggAcf` and `ggPacf`.

(d) Use the ACF and PACF to identify suitable AR and/or MA model(s) and estimate them using `Arima`.

(e) Perform diagnostics of model(s) from part (d) using `ggtsdiag`. Modify and reestimate the model if needed, if there are several competing specifications use AIC, BIC, Q statistics to compare their properties.

(f) Use the `auto.arima` function to find the model specification that minimizes AIC and the model specification that minimizes BIC. Again perform the model diagnostics for these two models.

(g) Summarize your findings.

Problem 3

(a) Use `tq_get` to obtain the monthly industrial production index, available on FRED under code `INDPRO`.

(b) Construct the log changes in the industrial production $\Delta \log IP_t = \log IP_t - \log IP_{t-1}$ where IP_t is the original industrial production index. Plot the time series for IP_t and $\Delta \log IP_t$ using `ggplot`.

(c) Follow the same steps as in Problem 2 parts (c)-(g) to find suitable AR/MA/ARMA model(s), this time for $\Delta \log IP_t$.