Homework 2

Eco 4306 Economic and Business Forecasting
Spring 2019
Due: Wednesday, February 13, before the class

Problem 1

Solve Exercise 3 from Chapter 3. In addition to the four time series listed there, also import into EViews and analyze in the same way the following data from www.quandl.com and fred.stlouisfed.org

(e) Index of Consumer Sentiment: UMICH/SOC1 from Quandl

(f) All Employees, Total Nonfarm Payrolls: PAYEMS from FRED, keep the monthly frequency, and consider the sample 1950M1-2018M12

(g) Average Weekly Hours of Production and Nonsupervisory Employees: Manufacturing: AWHMAN from FRED, keep the monthly frequency, and consider the sample 1950M1-2018M12

For the time series in (a)-(g) which are not stationary, generate either the difference Δy_t or log difference $\Delta \log y_t$ to obtain stationary time series. Create time series plots for original and transformed time series.

Problem 2

Download the quarterly data for U.S. Real Gross Domestic Product, code GDPC1, from FRED and import it into EViews. Let Y_t denote the GDP at time t and let $y_t = \log Y_t$.

(a) Generate time series for the quarter-over-quarter annualized growth rate (percentage change) of the real GDP

$$grGDPQ_t = 400 \times \frac{Y_t - Y_{t-1}}{Y_{t-1}}$$

and for the first log-differences of the real GDP

$$dlrGDPQ_t = 400 \times (y_t - y_{t-1}) = 400 \times (\log Y_t - \log Y_{t-1})$$

Plot $grGDPQ_t$ and $dlrGDPQ_t$ together in the same time series plot. Do you observe any significant differences?

(b) Generate time series for the year-over-year growth rate (percentage change) of the real GDP

$$grGDPA_t = 100 \times \frac{Y_t - Y_{t-4}}{Y_{t-4}}$$

and for the first log-differences at lag 4 of the real GDP

$$dlrGDPA_t = 100 \times (y_t - y_{t-4}) = 100 \times (\log Y_t - \log Y_{t-4})$$

Plot $grGDPA_t$ and $dlrGDPA_t$ together in the same time series plot. Do you observe any significant differences?

(c) Plot correlograms - the ACF and PACF functions - for $dlrGDPQ_t$ and for $dlrGDPA_t$.

(d) Comment on the ACF and PACF plots, are the autocorrelation coefficients statistically different from zero?

(e) Which growth rate shows more linear dependence (higher autocorrelation coefficients), $dlrGDPQ_t$ or $dlrGDPA_t$?