Problem Set #4
Spring 2014

1.

    (a) If
$$y_t = \beta_0 + \beta_1 Time_t + e_t$$

    and $Time_n = 100$ for $n = 100$, which is 2013Q4 (quarterly data) . Suppose the estimated model is
$$\hat{\beta}_0 = 0.51$$
$$\hat{\beta}_1 = 0.02$$
$$\hat{\sigma}^2 = 16$$

    Construct point and nominal 90% interval forecasts (use the normal interval method) for 2014Q1, Q2, Q3 and Q4

    (b) Suppose for the y_t of the previous part, $y_t = \ln(Y_t)$. Construct point and 90% interval forecasts for Y_t in 2014Q4.

2. Let $[L, U]$ be a reported 95% forecast interval for Y_{n+h}. What does this mean?

3. In the trend model
$$T_t = \beta_0 + \beta_1 Time_t$$

suppose $\beta_1 > 0$.

    (a) Does this mean that the series is expected to grow or decline in subsequent periods?

    (b) Does this mean that the series will grow with certainty in every period?

4. The STATA file "realgdp2013.dta" is on the course webpage. This contains quarterly observations on the major components of U.S. real GDP

    • gdp = real gdp

    • consumption = personal consumption expenditures

    • investment = gross private domestic investment

    • exports = exports of goods and services

    • imports = imports of goods and services

    • government = government consumption expenditures and gross investment

all variables are real reported in $2009 chained dollars, for 1947Q1 through 2013Q4.

Take the *imports* series

    (a) Plot the data and determine if the series is better represented using a linear or exponential trend. If exponential, take natural logs of the series.

    (b) Fit your trend model to the time period 1947-2000.

    (c) Generate point and 90% interval forecasts for the level of imports for 2001-2013

    (d) Plot your forecasts against the actual. How did the forecast perform?

    (e) Now re-estimate using the full sample 1947-2009. Generate point and 90% interval forecasts for the level of imports 2014-2019