

Problem Set #4
Spring 2017
Due Tuesday, Feb 14, 2:30pm

1.

(a) If

$$y_t = \beta_0 + \beta_1 Time_t + e_t$$

and $Time_n = 100$ for $n = 100$, which is 2016Q4 (quarterly data) . Suppose the estimated model is

$$\begin{aligned}\hat{\beta}_0 &= 0.51 \\ \hat{\beta}_1 &= 0.02 \\ \hat{\sigma}^2 &= 16\end{aligned}$$

Construct point and nominal 90% interval forecasts (use the normal interval method) for 2017Q1, 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 2017Q4.

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. Use the stata utility *freduse* to extract data on the aggregate level of U.S. quarterly imports, seasonally adjusted, in real \$2009 chained dollars, currently available for 1947Q1 through 2016Q4. The FRED label is IMPGSC1. Create a time index.

(a) For the period 1947-2000, plot the level of imports, and its natural log, against time.

(b) By inspection, determine if the series is better represented using a linear or exponential trend.

(c) Estimate an exponential trend model using the estimation period 1947-2000.

(d) Generate point and 90% interval forecasts for the log-level of imports for 2001-2016.

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

(f) Generate point and 90% interval forecasts for the level of imports for 2001-2016.

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

(h) Now re-estimate using the full sample 1947-2016. Generate point and 90% interval forecasts for the level of imports 2017-2021.

(i) Do the forecasts appear reliable or unreliable?