Homework

An important relationship in macroeconomics is the consumption function. The file *consumptn.dta* contains quarterly data from 1960Q1 to 2009Q4 on the percentage changes in disposable personal income and personal consumption expenditures. We describe these variables as income growth (*INCGWTH*) and consumption growth (*CONGWTH*). To ensure the same number of observations (197) are used for estimation in each of the models that we consider, use as your sample period 1960Q4 to 2009Q4. Where relevant, lagged variables on the right-hand side of equations can use values prior to 1960Q4.

(a) Graph the time series for *CONGWTH* and *INCGWTH*. Include a horizontal line at the mean of each series. Do the series appear to fluctuate around a constant mean?

(b) Estimate the model $CONGWTH_t = \delta + \delta_0 INCGWTH + v_t$. Interpret the estimate for δ_0. Check for serially correlated errors using the residual correlogram, and an *LM* test with 2 lagged errors. What do you conclude?

(c) Estimate the model $CONGWTH_t = \delta + \theta_1 CONGWTH_{t-1} + \delta_0 INCGWTH_t + v_t$. Is this model an improvement over that in part (b)? Is the estimate for θ_1 significantly different from zero? Have the values for the AIC and the SC gone down? Has serial correlation in the errors been eliminated?

(d) Add the variable $CONGWTH_{t-2}$ to the model in part (c) and re-estimate. Is this model an improvement over that in part (c)? Is the estimate for θ_2 (the coefficient of $CONGWTH_{t-2}$) significantly different from zero? Have the values for the AIC and the SC gone down? Has serial correlation in the errors been eliminated?

(e) Add the variable $INCGWTH_{t-1}$ to the model in part (d) and re-estimate. Is this model an improvement over that in part (d)? Is the estimate for δ_1 (the coefficient of $INCGWTH_{t-1}$)

significantly different from zero? Have the values for the AIC and the SC gone down? Has serial correlation in the errors been eliminated?

(f) Does the addition of $CONGWTH_{t-3}$ or $INCGWTH_{t-2}$ improve the model in part(e)?

(g) Drop the variable $CONGWTH_{t-1}$ from the model in part (e) and re-estimate. Why might you consider dropping this variable? The model you should be estimating is

$$CONGWTH_t = \delta + \theta_2 CONGWTH_{t-2} + \delta_0 INCGWTH_t + \delta_1 INCGWTH_{t-1} + v_t \qquad (9.94)$$

Does this model have lower AIC and SC values than any of the other models? Is there any evidence of serially correlated errors?