Erasmus School of Economics

Test Exercise 3

Notes:

- See website for how to submit your answers and how feedback is organized.

- This exercise uses the datafile TestExer3 and requires a computer.

Goals and skills being used:

- Experience the process of model selection.

- Apply methods to compare models.

- Apply tests to evaluate a model.

Questions

This test exercise is of an applied nature and uses data that are available in the data file TestExer3. We consider the so-called Taylor rule for setting the (nominal) interest rate. This model describes the level of the nominal interest rate that the central bank sets as a function of equilibrium real interest rate and inflation, and considers the current level of inflation and production. Taylor (1993)[1] considers the model:

$$i_t = r^* + \pi_t + 0.5(\pi_t - \pi^*) + 0.5g_t,$$

with i_t the Federal funds target interest rate at time t, r^* the equilibrium real federal funds rate, π_t a measure of inflation, π^* the target inflation rate and g_t the output gap (how much actual output deviates from potential output). We simplify the Taylor rule in two manners. First, we avoid determining r^* and π^* and simply add an intercept to the model to capture these two variables (and any other deviations in the means). Second, we consider production y_y rather than the output gap. In this form the Taylor rule is

$$i_t = \beta_1 + \beta_2\pi_t + \beta_3 y_t + \varepsilon_t. \tag{1}$$

Monthly data are available for the USA over the period 1960 through 2014 for the following variables:[2]

- INTRATE: Federal funds interest rate

- INFL: Inflation

- PROD: Production

- UNEMPL: Unemployment

- COMMPRI: Commodity prices

- PCE: Personal consumption expenditure

- PERSINC: Personal income

- HOUST: Housing starts

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[1]"Discretion Versus Policy Rules in Practice", Carnegie-Rochester Conference Series on Public Policy 39, pages 1455-1508.

[2]The data are from the St. Louis Federal Reserve Economic Dataset (FRED), with IDs FEDFUNDS, CPIAUCSL, INDPRO, PAYEMS, NAPMPRI, PCE, A229RX0 and HOUST respectively (all percent change from a year ago, except for the Federal funds rate).

(a) Use general-to-specific to come to a model. Start by regressing the federal funds rate on the other 7 variables and eliminate 1 variable at a time.

(b) Use specific-to-general to come to a model. Start by regressing the federal funds rate on only a constant and add 1 variable at a time. Is the model the same as in (a)?

(c) Compare your model from (a) and the Taylor rule of equation (1). Consider R^2, AIC and BIC. Which of the models do you prefer?

(d) Test the Taylor rule of equation (1) using the RESET test, Chow break and forecast test (with in both tests as break date January 1985) and a Jarque-Bera test. What do you conclude?