Macro II Problem of the week: Identification of Taylor Rules

Erik Öberg

A big literature has, in various ways, estimated time-series regressions of nominal interest rates on inflation (and other variables), with the purpose of retrieving the coefficients of the Taylor rule, i.e., regressions of the form:

$$i_t = \alpha + \beta \pi_t + \zeta_t \tag{1}$$

The perhaps most famous example is Clarida-Gali-Gertler (QJE 2000). Let's explore how we can interpret such regressions, focusing on the case with flexible price setting.

The flexible-price model studied in the class is summarized by

$$\begin{aligned} \text{DIS curve:} \quad & i_t = r + E_t \pi_{t+1} \\ \text{Policy rule:} \quad & i_t = r + \phi \pi_t + \nu_t \end{aligned}$$

where r is the log of the steady state real interest rate and the monetary policy shock is assumed to follow $\nu_t = \rho \nu_{t-1} + \epsilon_t$, where ϵ_t is an i.i.d. disturbance.

1. Assume that $\phi > 1$. Show that the unique bounded solution is given by

$$\pi_t = -\frac{\nu_t}{\phi - \rho}$$

2. Show that, in equilibrium, inflation and interest rates are related according to

$$i_t = r + \rho \pi_t. \tag{2}$$

3. Why does this equilibrium condition (2) not contradict the assumed policy rule $i_t = r + \phi \pi_t + \nu_t$?

4. Would you interpret the time-series estimate of β in Equation (1) as the structural Taylor rule coefficient ϕ? Explain in the words what the identification problem is.

5. Bonus question (not graded): Show that the same identification problem arises also with sticky price setting.