Seminar 5 – ECON 4325

Wednesday 27 April and Friday 29 April, 2016

Seminar presentations

- Ingvild (Wednesday) and Morten (Friday) present the Norges Bank decision from 17 March.
- Bernt (Wednesday) and Sigri (Friday) present the ECB decision from 21 April.

Seminar problem 1: Optimal monetary policy under commitment

(Exam exercise from 2011): It can be shown that the non-policy block of equilibrium behavior in the New Keynesian model can be explained by the following two equations:

$$\pi_t = \beta E_t\{\pi_{t+1}\} + \kappa\tilde{y}_t + u_t, \qquad 0 < \beta, \kappa < 1 \qquad (1)$$

$$\tilde{y}_t = E_t\{\tilde{y}_{t+1}\} - \frac{1}{\sigma}[i_t - E_t\{\pi_{t+1}\}], \qquad (2)$$

$$u_t = \rho u_{t-1} + \hat{u}_t, \quad 0 < \rho < 1$$

where $\tilde{y}_t = \left(y_t - y_t^{natural}\right)$ is the output gap in period t, i_t is the nominal interest rate, $\frac{1}{\sigma}$ is the intertemporal elasticity of substitution, u_t is the cost-push shock and $\hat{u}_t$ is white noise. u_t is known when monetary policy is determined. Introducing monetary policy, the central bank loss function is:

$$L_t = \frac{1}{2}E_t\left[\sum_{i=0}^{\infty}\beta^i\left\{(\pi_{t+i} - \pi^*)^2 + \lambda\tilde{y}_{t+i}^{\,2}\right\}\right], \qquad \pi^* = 0 \qquad (3)$$

where π^* is the zero inflation target. It can be shown that even when the central bank targets the natural level of output, as it does in this case, there can be gains from commitment. Hence, assume that the central bank commits to a policy rule for the target variable $\tilde{y}_t$ contingent on the cost push shock in the following way:

$$\tilde{y}_t = \gamma u_t, \qquad (4)$$

where each value of γ will relate to one particular rule.

a) Substitute the policy rule into the New Keynesian Phillips curve (i.e. in equation 1) and solve for the equilibrium inflation rate by the method of undetermined coefficients. Interpret the solution.

b) Express equilibrium inflation in terms of $\tilde{y}_t$ and the cost push shock, and show that the optimal value of γ within the simple family of policy rules (i.e. the constrained optimum), is:

$$\gamma^* = \frac{-\kappa}{\lambda(1-\beta\rho)^2 + \kappa^2} \tag{5}$$

Explain why γ^* is negative.

c) Find the expression for equilibrium output gap under this policy. What is equilibrium inflation? Interpret the solutions. (Hint: The more parameters interpreted, the higher is the score).

d) Explain briefly in words how one finds the equilibrium interest rate under this policy.

e) Describe the term "leaning against the wind" by the use of words and the equilibrium solutions for inflation and the output gap.

Seminar problem 2: The unconstrained optimum for optimal monetary policy under commitment

We go through slides 19-24 from lecture 9 so please bring your slides to the seminar.

(a) Solve the equation system for optimal policy under full state-contingent commitment, i.e. find the optimality conditions given in equations (12) and (13) on slide 19 from lecture 9 (recall the typo correction on slide 19, see slides on web).

(b) Interpret the solutions.