Lecture 4 in Monetary Economics

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The flexible price equilibrium is not efficient outside the steady state
($Y_t^N \neq Y_t^e$) but $Y^N = Y^e$.
Case of exogenous markup fluctuations + employment subsidy
Rewrite the IS and Phillips curves in terms of the appropriate output gap, $\widehat{y_t^e} = log(Y_t) - log(Y_t^e)$.

$$PC: \ \pi_t = \beta E_t \pi_{t+1} + \kappa \widehat{y}_t^N = \beta E_t \pi_{t+1} + \kappa \widehat{y}_t^e + v_t \qquad (1)$$

$v_t = \kappa(logY_t^e - logY_t^N)$, independent of policy.

- Perfect price stabilization does not eliminate the welfare relevant output gap. Hence, there may be a trade off between price and output stability (the discrepancy between the current output and the efficient level of output).
- What is the practical relevance of this trade off?
- With a trade off between the two objectives of price and output stability, the distinction between *discretionary* and *rule* based policy becomes important. Given expectations, the policymaker may be tempted to deviate from previously announced plans.

A. Optimal policy under discretion

The CB cannot credibly commit to any future policy. Its current actions cannot influence expectations about future inflation and output. In selecting the current action it takes $E_t\pi_{t+1}$ as given. It minimizes

$$L_t = \kappa(\widehat{y}_t^e)^2 + \theta\pi_t^2 \tag{2}$$

subject to

$$\pi_t = \kappa\widehat{y}_t^e + N_t \tag{3}$$

where $\widehat{y}_t$ is the relevant welfare gap and $N_t = \beta E_t\pi_{t+1} + v_t$.

When v_t is iid the optimal solution satisfies

$$\begin{aligned} \pi_t &= \left(\frac{1}{1+\kappa\theta}\right) v_t \\ \widehat{y}_t^e &= -\left(\frac{\theta}{1+\kappa\theta}\right) v_t \\ \Rightarrow \widehat{y}_t^e &= -\theta\pi_t \end{aligned} \tag{4}$$

Key property: Let output decline following an adverse v shock. *Split* the effects of the shock between output and inflation.

Implementation of policy via an interest rate rule

$$\widehat{R}_t = \widehat{r}_t^e + \left(\frac{\gamma\theta - k_\pi}{1 + \kappa\theta} v_t + k_\pi \pi_t \right) \tag{5}$$

$k_\pi > 1$ guarantees uniqueness.

Practical difficulty of implementing such a procedure.

One could think in terms of targeting rules: Use the CB instruments to induce $\widehat{y}_t^e = -\theta\pi_t$ rather than try to follow equation (5). But this still requires knowledge of the efficient level of output.

B. Optimal policy under commitment (a rule)
Monetary policy is credible and the CB can commit to a future course of actions.

The CB chooses a state contingent path of inflation and output gaps in order to minimize

$$\Omega = 0.5E_0 \sum_{t=0}^{\infty} \beta^t L_t = 0.5E_0 \sum_{t=0}^{\infty} \beta^t \left(\kappa (\widehat{y}_t^e)^2 + \theta \pi_t^2 \right) \tag{6}$$

subject to the Phillips curve constraint

$$\pi_t = \beta E_t \pi_{t+1} + \kappa \widehat{y}_t^e + v_t \tag{7}$$

The choice of π_t and $\widehat{y}_t^e$ satisfy

$$\widehat{y}_t^e = \lambda_t \tag{8}$$
$$\theta\pi_t = \lambda_{t-1} - \lambda_t \tag{9}$$

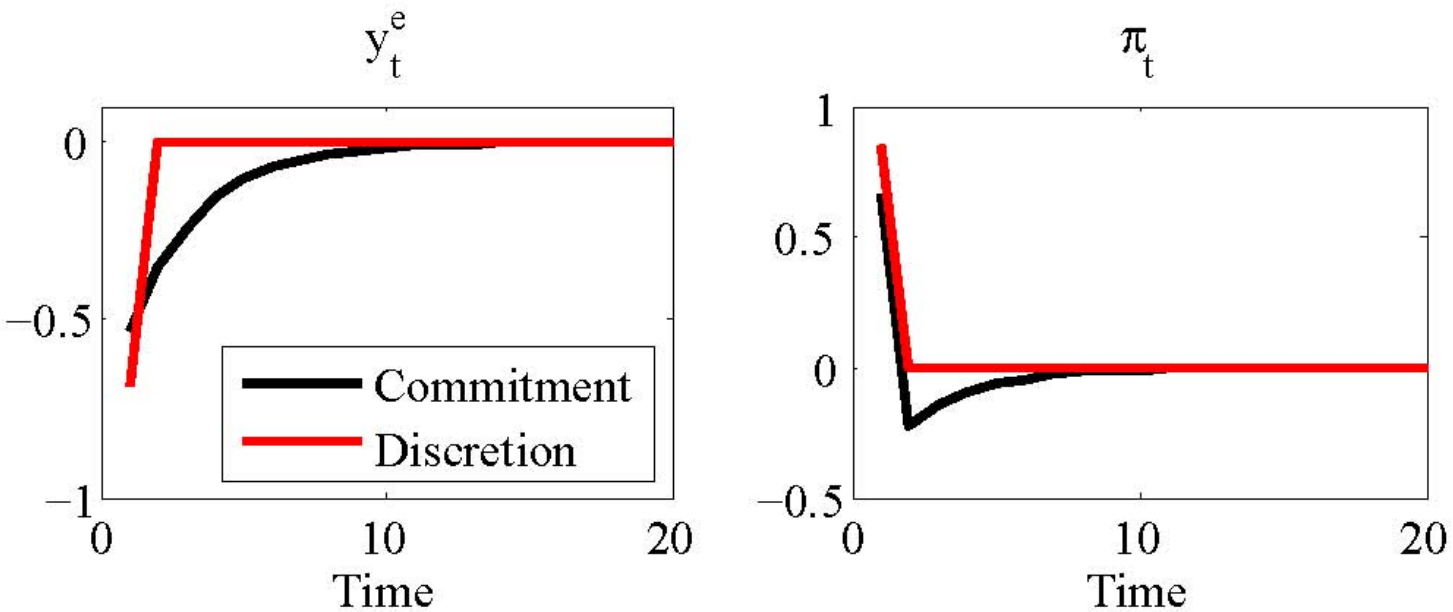
The importance of the presence of the Lagrange multiplier of period $t-1$ in the optimal choice of policy in period t. Past commitments are honored!

$$\widehat{y}_t^e = -\theta(logP_t - logP_{-1}) \equiv -\theta\hat{p}_t \tag{10}$$

The optimal path of the price level

$$(1 + \beta + \kappa\theta)\hat{p}_t = \hat{p}_{t-1} + \beta E_t\hat{p}_{t+1} + v_t \tag{11}$$

Figure: Discretion vs Commitment



Main observation: The CB gets a better trade off between inflation and output at the time of the shock under commitment. This is valuable because of the convexity of the objective function.

C. The management of expectations

Comparison of the analysis to the traditional literature on credibility (Barro and Gordon)