Monetary Policy, Inflation and the Business Cycle: Introduction

Background: the RBC Revolution

- methodological aspects:

  - DSGE models, optimizing agents, rational expectations
  - quantitative analysis: calibration, simulation, evaluation

- conceptual aspects:

  - central role for technology (end of dichotomy)
  - business cycles as optimal responses to shocks
  - abstraction from monetary aspects

Modern Monetary Theory: the New Keynesian Perspective

Course Outline

Some Empirical Evidence

- The Long Run

- The Short Run

  - cyclical behavior of nominal variables
  - identified effects of monetary policy shocks

- Micro evidence on patterns of price-setting

Long Run Evidence

McCandless and Weber (1995)

- sample of 110 countries
- average CPI inflation, GDP growth, money supply growth over 1960-90 period
- main findings

Barro (1998)

- 80 countries, three observations per country (65-75,75-85,85-95)
- average inflation and standard deviation of inflation added to a conventional growth regression
- main findings. convergence interpretation and non-linearities.

Bruno and Easterly (1998)

- episodes of high inflation crisis $\pi \geq 40\%$ over the period 1961-94
- pattern of output growth around crisis

Estimated Effects of Monetary Policy Shocks

Romer and Romer (1989)

- narrative approach
- six dates marking the beginning of a stronger anti-inflation stance
- empirical equation

$$y_t = a + \sum_{k=1}^{24} b_k \, y_{t-k} + \sum_{k=0}^{36} c_k \, D_{t-k} + \varepsilon_t$$

- impulse responses
- shortcomings

Specification and Estimation of Monetary Policy Rules

- explicit feedback rule for instrument s_t

$$s_t = \sum_{j\geq 1} \alpha_j \; s_{t-j} + \sum_{j\geq 0} \boldsymbol{\beta}_j \; \mathbf{x}_{1,t-j} + \sum_{j\geq 1} \gamma_j \; \mathbf{x}_{2,t-j} + \varepsilon_t^m$$

- recursivity assumption:

$E\{\mathbf{x}_{1t-j},\; \varepsilon_t^m\} = 0$ for $j = 0, 1, 2, \ldots$; $E\{\mathbf{x}_{2t-j},\; \varepsilon_t^m\} = 0$ for $j = 1, 2, 3\ldots$

- impulse responses $\{\phi_j\}$

$$z_t = \sum_{j\geq 0} \phi_j \; \varepsilon_{t-j}^m + \xi_t$$

- Application: Christiano, Eichenbaum, and Evans (1998)

  - FF model: $\mathbf{x}_{1t} = [y_t, p_t, pcom_t]'$, $s_t = ff_t$, $\mathbf{x}_{2t} = [tr_t, nbr_t, m_t]'$
  - NBR model: $\mathbf{x}_{1t} = [y_t, p_t, pcom_t]'$, $s_t = nbr_t$, $\mathbf{x}_{2t} = [tr_t, ff_t, m_t]'$
  - NBR/TR model: $\mathbf{x}_{1t} = [y_t, p_t, pcom_t, tr_t]'$, $s_t = nbr_t$, $\mathbf{x}_{2t} = [ff_t, m_t]'$

- main findings

Fully-identified VARs

- structural model

$$A(L)\ \mathbf{x}_t = \varepsilon_t \qquad ; \qquad \mathbf{x}_t = C(L)\ \varepsilon_t$$

  where $A(L) \equiv A_0 - A_1 L - \ldots - A_p L^p$ and ε_t is an $(n \times 1)$ vector of structural shocks, and $E\varepsilon_t\varepsilon_t' = I$.

- reduced form:

$$B(L)\ \mathbf{x}_t = \mathbf{u}_t \qquad ; \qquad \mathbf{x}_t = E(L)\ \mathbf{u}_t$$

  where $B(0) \equiv I$, $E\{\mathbf{u}_t\mathbf{u}_t'\} = \Sigma$ and $E\{\mathbf{u}_t\mathbf{x}_{t-k}'\} = 0$, $k = 1, 2, 3, \ldots$

- assumption: $\mathbf{u}_t = S\ \varepsilon_t$ (implying $SS' = \Sigma$)

- given S, we have $C(L) = E(L)\ S$

- *Application (hybrid restrictions): Galí (1992).*

  $\mathbf{x}_t = [\Delta y_t, \Delta r_t, r_t - \Delta p_t, \Delta m_t - \Delta p_t]'$
  $\varepsilon_t = [\varepsilon_t^s, \varepsilon_t^{ms}, \varepsilon_t^{md}, \varepsilon_t^{is}]'$
  $C^{12}(1) = C^{13}(1) = C^{14}(1) = 0$ ("long run neutrality")
  $S_{12} = S_{13} = 0$ ("transmission lags")
  $A^{23}(0) + A^{24}(0) = 0$ ("information lags")

Micro Evidence on Nominal Rigidities and Patterns of Price Setting

The Benchmark Perfectly Competitive Model

$$\begin{aligned} p_t(j) &= mc_t^n(i) \\ &= p_t + (w_t - p_t) - mpn_t(i) \\ &= p_t + b_0\ y_t + b_1\ y_t(i) - b_2\ a_t(i) \end{aligned}$$

Bils and Klenow (2004)

- monthly frequency of price changes for 350 cagegories of goods and services underlying CPI

The Eurosystem IPN Project

- evidence for 12 euro area countries
- price trajectories of individual goods prices underlying CPI and PPI
- qualitative evidence based on surveys