MONETARY ECONOMICS

Objective:

Overview of Theoretical, Empirical and Policy Issues in Modern Monetary Economics

Questions

- Why Did Inflation Take Off in Many Countries in the 1970s?
- What Should be Done To Reduce the Likelihood of It Happening Again?
  - Adopt Monetary Policy Institutions that Embody More 'Commitment'?
  - Will an Announced Commitment to a Rule Be Good Enough?
  - What Rule? (Inflation-targeting, interest rate-targeting, money targeting, etc.)
  - Should the Rule Respond Aggressively to Inflation, to Strong Output?
  - Is a Responsible Monetary Authority Sufficient?
- What are the Costs and Benefits of Adopting a Common Currency Area?
- Would Certain Regions of the World Benefit From 'Dollarization'?
- What Changes, if Any, Should be Made to International Financial Institutions in Response to the Asian Currency Crisis?
- Do Low Interest Rates Inhibit a Central Bank From Pursuing Its Job?
- What is the Appropriate Response of Monetary Policy to a Crisis?
- How Much Price Stability is Desirable?

- Ways to Answer Questions Like These:
  - Look at Historical Episodes (limited use)
  - Experiment (not an option!)
  - Experiment in Model Economies.

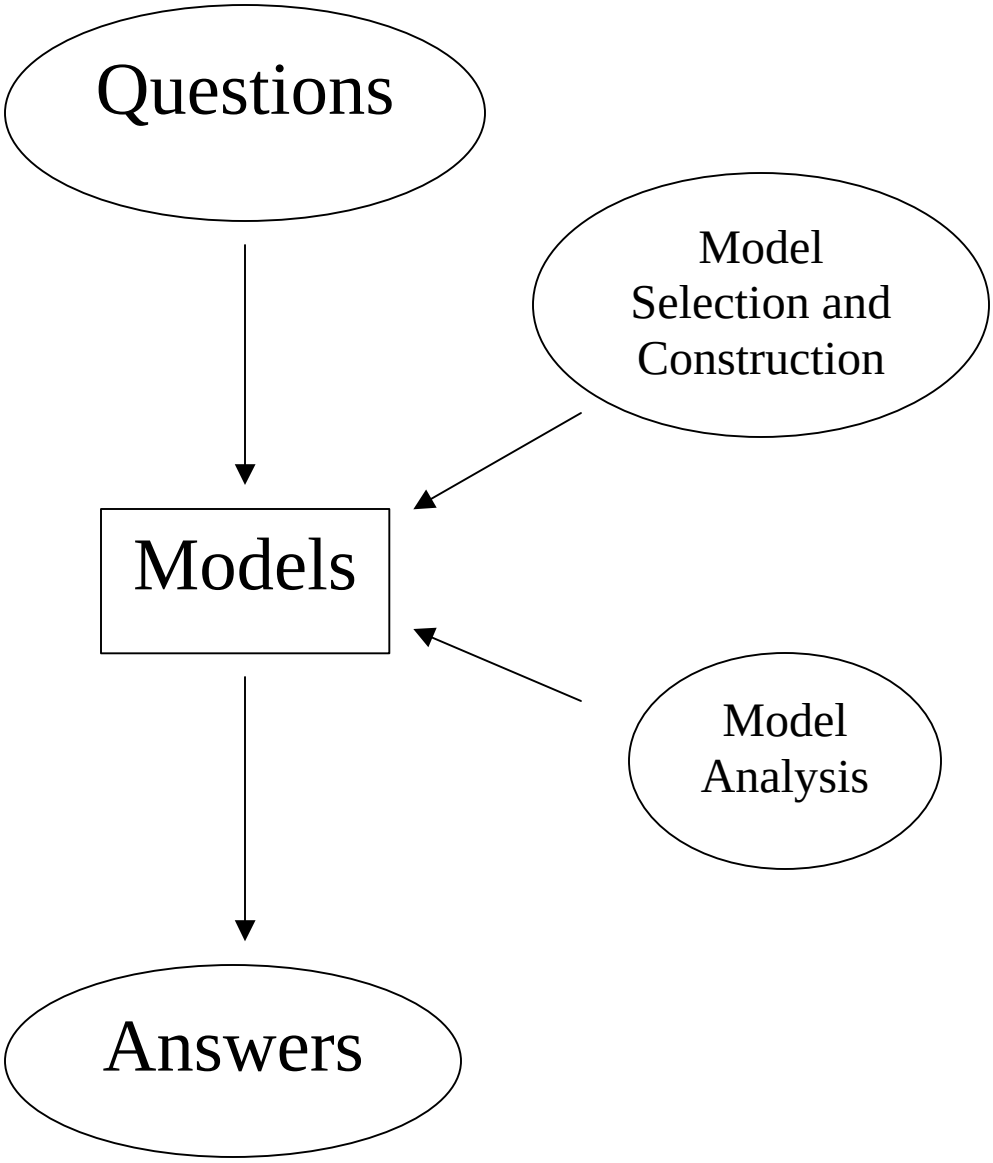
- Issues to Confront in Analysis of Model Economies

(a) Empirical: Which Model to Work With?

* Cash-in-Advance (Cooley-Hansen)
* Monetary Misperception (Lucas)
* Sticky Wage Model
* Sticky Price Model (Blanchard-Kiyotaki)
* Limited Participation (Lucas, Fuerst, Christiano-Eichenbaum)
* A Combination of the Above?

(b) Analytic

* Appropriate Equilibrium Concepts for the Issue Studied
* Revelant Computational Strategies
* Other Issues.


Questions
Model
Selection and
Construction
Models
Model
Analysis
Answers

Outline

1. Selection and Construction of a Monetary Model
   (a) Using Information from VAR's to Narrow the Field of Models (1 day)
   (b) Constructing a Particular Model With Various Frictions (1 day)
2. Analysis of Models
   (a) What Monetary Policy is Optimal? (1 day)
      * The Friedman-Phelps Debate Over the Appropriate Interest Rate Target
      * The Significance of the Income Elasticity of Money Demand
      * Ramsey Equilibrium
      * Lucas-Stokey Cash-Credit Good Model
   (b) Monetary Policy When The Monetary Authority Cannot Commit to Its Future Actions (1 day)
      * Kydland-Prescott/Barro-Gordon Time Consistency Problem.
      * Can Time-Consistency Problems Account for Episodes of High and Low Inflation?
      * Markov Equilibrium.

(c) Monetary Policy Rules (1/2 day)

(i) Taylor Rule in Sticky Price and Limited Participation Models.

(ii) Is the Surge of Inflation in the 1970s the Result of a Bad Taylor Rule?

(d) Other Topics (1/2 day)

(i) Fiscal Theory of the Price Level.

(ii) Monetary Policy in a Small Open Economy, in an 'International Credit Crunch'.

Today: Using Information from VAR's to Narrow the Field of Models

(Christiano-Eichenbaum-Evans Handbook of Macroeconomics Chapter)

- To Answer a Question, Need a Model.

- But, What Model Should We Use?
  - Cash-in-Advance (Cooley-Hansen)
  - Monetary Misperception (Lucas)
  - Sticky Wage Model
  - Sticky Price Model (Blanchard-Kiyotaki, Rotemberg, Woodford, Calvo, Taylor, Tak Yun, King-Wolman, Chari-Kehoe-McGrattan, Christiano-Eichenbaum-Evans)
  - Limited Participation (Lucas, Fuerst, Christiano-Eichenbaum)

- Lucas Program for Model Selection:

"...need to test them (models) as useful imitations of reality by subjecting them to shocks for which we are fairly certain how actual economies or parts of economies would react. The more dimensions on which the model mimics the answers actual economies give to simple questions, the more we trust its answers to harder questions."

- ## What Shocks?
  - Shocks to Monetary Policy Useful for Discriminating

- ## Why *Shocks*?
  - Need Impulse to be Exogenous

- ## Basic Strategy for Model Selection:
  - Isolate Shocks to Monetary Policy, Characterize the Nature of the Monetary Experiment
    - This is the Controversial Step
    - Requires Identifying Assumptions
  - Determine Economy's Actual Response to Shock
  - Do Same Experiment in Model Economy

- ## Then What?
  - Do the Analysis in the Chosen Model!

Outline

- Overview (done!).
- Strategies for Isolating Monetary Policy Shocks.
- Results Based on One Strategy.
- Robustness of Results.
- Implications of Results for Models.
- Caveat: Are We Sure It's *Money* Shocks We're Identifying?

Strategies for Isolating Monetary Policy Shocks.

- Based on Estimating the Monetary Authority's Feedback Rule (CEE, Sims-Zha)

- Narrative Approach (Romer and Romer)

- Long-Run Restrictions (Gali, Faust-Leeper)

Strategies Based on Estimating the Monetary Authority's Feedback Rule (CEE, Sims-Zha)

Policy Rule:

$$
\begin{aligned}
S_t &= f(\Omega_t) + \varepsilon_t \\
\varepsilon_t &\sim \text{Monetary Policy Shock} \\
\Omega_t &\sim \text{Information Set} \\
S_t &\sim \text{Policy Variable}
\end{aligned}
$$

Identification Problem:

Make Assumptions that Make it Possible to Compute ε_t Given Data on S_t, Ω_t.

Two Alternative Identification Strategies:

- Recursiveness Assumption: $\Omega_t \perp \varepsilon_t$
- Non-recursiveness Assumption: Ω_t and ε_t not orthogonal

Using the Shock to Characterize Fully the Nature of the Monetary Experiment, and the Economy's Response

- Characterizing the Nature of the Monetary Experiment
  - Run Regression:

$$M_t = \alpha_0\varepsilon_t + \alpha_1\varepsilon_{t-1} + \alpha_2\varepsilon_{t-2} + ...$$

The Monetary Experiment Associated With a Monetary Shock:

Move Money by $\alpha_0\varepsilon_t$ in t, $\alpha_1\varepsilon_t$ in $t+1$, $\alpha_2\varepsilon_t$ in $t+2$, $etc.$,

- Characterizing the Economy's Response to the Monetary Experiment
  - Run Regression:

$$X_t = \beta_0\varepsilon_t + \beta_1\varepsilon_{t-1} + \beta_2\varepsilon_{t-2} + ...$$

The Economy's Response:

Move X by $\alpha_0\varepsilon_t$ in t, $\alpha_1\varepsilon_t$ in $t+1$, $\alpha_2\varepsilon_t$ in $t+2$, $etc.$,

What Is A Monetary Policy Shock?

- Shocks to Preferences of Monetary Authority
- Expectation Trap (Chari-Christiano-Eichenbaum)
- Technical Factors Like Measurement Error (Bernanke-Mihov):

$$x_t(0) = x_t + v_t,\ x_t(1) = x_t + u_t$$
$$S_t = \beta_0 S_{t-1} + \beta_1 x_t(0) + \beta_2 x_{t-1}(1)$$

or

$$\begin{aligned} S_t &= \beta_0 S_{t-1} + \beta_1 x_t + \beta_2 x_{t-1} + \varepsilon_t \\ \varepsilon_t &= \beta_1 v_t + \beta_2 u_{t-1}. \end{aligned}$$

Recursiveness Assumption: $\beta_0 = 0$, or $\beta_0 \neq 0$, $u_t = 0$.

What Is a Monetary Policy Rule?

- Literal Interpretation: Structural Policy Rule of Central Bank.
- Combination of Structural Policy Rule and Other Stuff

– Example 1:

$$\text{`True' Policy Rule: } S_t = \alpha e_t + \varepsilon_t,$$

where

$$e_t \sim \text{`innovation' in some variable}$$
$$= \sum_{i=0}^{\infty} \beta_i x_{t-i}.$$

Then

$$\text{Estimated Policy Rule: } S_t = \alpha \sum_{i=0}^{\infty} \beta_i x_{t-i} + \varepsilon_t$$

Here, α's are not structural.

– Example 2 (Clarida-Gertler):

$$\text{`True' Policy Rule: } S_t = \alpha E_t x_{t+1} + \varepsilon_t$$

Results Based on One Approach.

- Policy Rule:

$$\begin{aligned} S_t &= f(\Omega_t) + \varepsilon_t \\ \varepsilon_t &\sim \text{Monetary Policy Shock} \\ \Omega_t &\sim \text{Information Set} \\ S_t &\sim \text{Federal Funds Rate} \\ \varepsilon_t &\perp \Omega_t \text{ 'Recursiveness'} \\ \Omega_t &\sim \text{includes current } P_t, Y_t, PCOM_t \end{aligned}$$

- Nature of Policy Experiment: 'Delayed Action'

$$\Delta \log(M1_t) = const - 0.08\varepsilon_t - 0.26\varepsilon_{t-1} - 0.11\varepsilon_{t-2}$$

- Economic Response to Experiment:
  - Short Term Interest Rates Rise
  - Output, Employment, Profits, Fall
  - Price Level Responds Slowly, then Falls
  - Real Wages Fall, by a Modest Amount
  - Unemployment Rises, Retail Sales Fall,
  - Manufacturing Inventories Rise
  - Residential Investment Declines Immediately, and Structures are Delayed (Jonas Fisher)

Results Based on Another Approach.

- $S_t \sim$'nonborrowed reserves of banks'
- Results: Similar, Except No Delayed Action.

Robustness to Alternative Identifying Assumptions

- Principle: If Shocks Produce Results Inconsistent With All the Monetary Models Available, Must Not be Monetary Policy Shocks.
- Monthly Results Similar.
- Drop Current Y_t from Ω_t : (Slightly) Nonsense Results.
- Drop Current P_t from Ω_t : No Change in Results.
- Drop Current $PCOM_t$ from Ω_t : Little Change in Results
- Set $S_t \sim MB_t$: some evidence of nonrobustness
- Set $S_t \sim M1_t$: confidence intervals wide, point estimates hard to square with any theory.
- Set $S_t \sim M2_t$: consistent with benchmark results.
- Subsample Stability: Shocks Smaller in Early 1980s, But Responses Similar.

Contribution to Variance of the Various Shock Measures

- Disagreement on Contribution to Variance of Output.
- Policy Shocks Not Important for Aggregate Price Index.
- Policy shocks contribute relatively little to own variance.

- What Model Should We Use?
  - Cash-in-Advance (Cooley-Hansen): A Thin Thread $\sim$ MB Results
  - Monetary Misperception (Lucas): No
  - Sticky Wage Model: No
  - Sticky Price Model (Blanchard-Kiyotaki): A Good Starting Point, But, Problems
  - Limited Participation (Lucas, Fuerst, Christiano-Eichenbaum): A Good Starting Point, But, Problems

Note of Caution: Are We Sure It's Money Shocks We're Identifying?

- Sims (1980b) Conjectures That Non-Monetary Policy Shocks May be Important in Interest Rate Shocks Attributed to Monetary Policy.
- Christiano and Fisher (1998) Display a Real Economy With Complete Money Neutrality Where:
  - Bad Technology Shock Signals Bad Times Ahead
  - Interest Rate 'Spikes' As Households Borrow To Smooth Consumption.
  - Bad Times Brings High Price Level As Money Demand Falls ('Price Puzzle')
  - Bad Times Brings Low Money Because of Endogeneity of Money.
- Is This An Embarrassment to Monetary Shocks Literature?
  - Maybe
  - Maybe not.