

# 16. Wrap-Up

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## From course syllabus: the goal is to learn how to

- Document the facts that monetary theory must explain using empirical impulse response functions and their associated vector auto-regressions.
- Solve forward looking monetary models and thereby calculate the quantitative impact of monetary shocks on output, the inflation rate, the interest rate, the exchange rate.
- Draw key monetary policy implications of the Lucas critique and time inconsistency.
- Work with and understand the dynamic macro implications of staggered price setting models.
- Determine the impact of monetary policy on the term structure of interest rates.
- Evaluate alternative monetary policy rules in new Keynesian models.
- Make assessments about the practical relevance of these ideas for monetary policy today.

Document the facts that monetary theory must explain using empirical impulse response functions and their associated vector auto-regressions.

- Variables: inflation, interest rates, exchange rates, reserve balances, money supply, output, unemployment
- Stationarity and detrending
  - primarily about fluctuations rather than growth
  - output gap and Okun's law
- Define and estimate VARs
- Calculate and interpret impulse response functions
- Define, test for, and interpret Granger causality

Solve forward looking monetary models and thereby calculate the quantitative impact of monetary shocks on output, the inflation rate, the interest rate, the exchange rate.

$$y_t = \alpha E_t y_{t+1} + \delta u_t \quad u_t = \sum_{i=0}^{\infty} \theta_i \varepsilon_{t-i}$$

Find and interpret solution: 
$$y_t = \sum_{i=0}^{\infty} \gamma_i \varepsilon_{t-i}$$

as a stochastic process and as a thought experiment (Unanticipated, anticipated, permanent, temporary) with economic explanations. Uniqueness, determinacy.

Multivariate generalizations (eigenvalues, jump variables, ...)

$$E_t \mathbf{z}_{t+1} = \mathbf{A} \mathbf{z}_t + \mathbf{d} m_t$$

# Draw key monetary policy implications of the Lucas critique and time inconsistency

- Micro founded version of the Phillips curve as an example of how estimated coefficients of reduced forms (including VARs) change with policy
  - Also micro-founded consumption (permanent income)
    - Many other examples during the course
- Solutions?
  - “Good economics” (micro principles, forward looking, RE)
  - Focus on monetary policy rules
- Time inconsistency illustrated with inflation-output tradeoff and social welfare function (three solution concepts: rule, cheating, discretionary)
- Solutions?
  - Appoint “conservative” central bankers (Rogoff)
  - Focus on monetary policy rules

# Work with and understand the dynamic macro implications of staggered price setting models.

- Basic 2- or n-period model with overlapping
  - Expectations of future inflation matter for pricing decisions today.
  - There is inertia in the inflation process
  - The inertia is longer than the length of the period during which prices are fixed. (contract multiplier)
  - The degree of inertia or persistence depends on monetary policy.
  - The theory implies a tradeoff curve between price stability and output stability.
- Calvo version
- Derivation from model of firms' market power

## Determine the impact of monetary policy on the term structure of interest rates.

- Pure expectations model
- No-arbitrage affine model with risk
- Preferred habitat models
- Imbed term structure into a macro model
  - Get term structure of policy rules
- Used to find augmented rule to deal with zero lower bound
- Illustration of benefits from policy inertia
- Quantitative easing

# Evaluate alternative monetary policy rules in new Keynesian models

- Example of 3-equation NK model (Woodford)
  - Staggered price setting, Euler equation, policy rule
  - “Greater than one” principle needed for uniqueness
  - Maybe need lagged interest rate in policy rule
- Similar findings with “backward-looking” model
  - “Greater than one principle” needed for stability
  - Coefficient on output is positive
    - even if output not in loss function
- International coordination (2-country model)
- Robustness issues



# Make assessments about the practical relevance of these ideas for monetary policy today.

- Most important goal of all: to use economics to better understand the world and help improve it
- Causes of the financial crisis
  - Monetary model ok, policy screwed up?
- International monetary issues
  - Current Eurozone problems
  - Fed impact on emerging markets
- Central bank decisions today
  - Focus on policy rules
  - But which rule?