

# Bayesian Methods for Macroeconometrics

**Frank Schorfheide**

Department of Economics, University of Pennsylvania

## **DSGE and VAR IRFs**

- Long tradition of assessing DSGE models by comparing their IRFs to VAR responses.
- Question: can DSGE model reproduce dynamics that we “observe in the data?”

## DSGE and VAR IRFs

- DSGE models generate VARMA representations in terms of structural shocks.
- Are MA polynomials invertible, that is, can we write DSGE as infinite-order VAR?
- Example,  $0 \leq \theta < 1$ :
  - Invertible:  $y_t = \epsilon_t + \theta\epsilon_{t-1}$
  - Non-invertible:  $y_t = \theta\epsilon_t + \epsilon_{t-1}$
- How well is infinite-order VAR approximated by a finite-order VAR?
- Reference: Fernandez-Villaverde, Rubio-Ramirez, and Sargent (2004).
- How can we construct an identification scheme that is consistent with DSGE? Modify DSGE versus DSGE-model-based identification schemes as in Del Negro and Schorfheide (2004).

## DSGE and VAR IRFs

- Rotemberg and Woodford (1998), Christiano, Eichenbaum, and Evans (2005):
  - Assume that we know how to identify a monetary policy shock with a structural VAR.
  - Design DSGE models that are “consistent” with VAR identification scheme.
  - Estimate DSGE model parameters by minimizing discrepancy between DSGE model and VAR responses.
  - Idea: don’t use likelihood because we don’t know much about additional shocks.
  - Assess internal propagation of DSGE model based on its ability to replicate the response to a monetary policy shock.

## DSGE and VAR IRFs

- Rotemberg and Woodford (1998), Christiano, Eichenbaum, and Evans (2001):
  - Do we really know the effects of a monetary policy shock?
  - Monetary policy shocks explain only 5-10 percent of the variation in output. Other shocks might be much more informative about propagation mechanism.
  - Identification of parameters? Weighting of impulse responses? No measure of time series fit for the DSGE model.