Discussion of “Monetary Policy Forecasting in a DSGE Model with Data that is Uncertain, Unbalanced, and About the Future” by Gonzales, Mahadeva, Rodriguez, and Rohas

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Federal Reserve Bank of New York

FRB Atlanta, May 15, 2009

Disclaimer: The views expressed are the author’s and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System
Outline

• About the Future

• Unbalanced

• Uncertain
About the Future I: Anticipated Shocks

- “News shocks” (Schmidt-Grohe and Uribe 2008)

- Technology, taxes, government spending . . .
About the Future I: Anticipated Shocks

- “News shocks” (Schmidt-Grohe and Uribe 2008)

- Technology, taxes, government spending . . .

- Standard law of motion for exogenous process (say, government spending):

\[ g_t = \rho g_{t-1} + \epsilon_t^g \]
About the Future I: Anticipated Shocks

• “News shocks” (Schmidt-Grohe and Uribe 2008)

• Technology, taxes, government spending . . .

• Standard law of motion for exogenous process (say, government spending):

\[ g_t = \rho g_{t-1} + \epsilon_t \]

• Schmidt-Grohe and Uribe’s anticipated shocks:

\[ g_t = \rho g_{t-1} + \epsilon_t + \epsilon_{t-1} + \epsilon_{t-2} + \ldots \]
Anticipated Shocks

Incorporate into the canonical form for linear RE models (Sims 2001):

$$\Gamma_0 s_t = \Gamma_1 s_{t-1} + \Psi \epsilon_t + \Pi \eta_t \quad (1)$$

- Extend the vector of shocks known to agents in period $t$ from $\epsilon^g_t$ to $\epsilon^g_t, \epsilon^{g,1}_t, \epsilon^{g,2}_t, ..$
- and augment the vector of states with placeholders $v^{g,1}_t, v^{g,2}_t, ..$ such that:

$$v^{g,1}_t = \epsilon^{g,1}_t$$
$$v^{g,2}_t = v^{g,1}_{t-1}$$
$$\vdots$$

so that:

$$g_t = \rho g_{t-1} + \epsilon^g_t + v^{g,1}_{t-1} + v^{g,2}_{t-1} + \ldots$$
Anticipated Policy Shocks (Láséen and Svensson 2009)

A sequence of deviations from the policy rule:

\[ R_{t+1} = \rho R_t + (1-\rho) \left( \psi_1 (\pi_{t+1} - \pi^*) + \psi_2 y_{t+1} \right) + \epsilon_{R_t+1} \]

\[ R_{t+2} = \rho R_{t+1} + \rho^2 R_t + (1-\rho^2) \left( \psi_1 (\pi_{t+2} - \pi^*) + \psi_2 y_{t+2} \right) + \epsilon_{R_t+2} \]

...,

where \( \epsilon_{R_t}, \epsilon_{R_{t+2}}, \ldots \) are "surprises."
Anticipated Policy Shocks (Laséen and Svensson 2009)

- Unanticipated policy shocks (Leeper and Zha “Modest Policy Interventions”)

- A sequence of deviations from the policy rule:

\[
R_{t+1} = \rho^R R_t + (1 - \rho^R)(\psi_1 (\pi_{t+1} - \pi^*) + \psi_2 y_{t+1}) + \epsilon^R_{t+1} \\
R_{t+2} = \rho^R R_{t+1} + \epsilon^R_{t+2} + \epsilon^R_{t+2} \\
\ldots,
\]

where $\epsilon^R_t, \epsilon^R_{t+2}, \ldots$ are “surprises”.
Anticipated Policy Shocks

• Anticipated policy shocks ($T$ periods):

\[ R_{t+1} = \rho^R R_t + (1 - \rho^R)(...) + \epsilon^R_{t+1} + \epsilon^R_{t} + \epsilon^R_{t-1} + \cdots + \epsilon^R_{t-T+1} \]

\[ R_{t+2} = \rho^R R_{t+1} + \cdots + \epsilon^R_{t+2} + \epsilon^R_{t+1} + \epsilon^R_{t} + \cdots + \epsilon^R_{t-T+2} \]

\[
\cdots ,
\]

where $\epsilon^R_t, \epsilon^R_{t,1}, \ldots, \epsilon^R_{t,T}$ is the menu of shocks available to the policymaker (and known to the public).
Anticipated Policy Shocks

- Anticipated policy shocks ($T$ periods):

  \[ R_{t+1} = \rho^R R_t + (1 - \rho^R)(...) + \epsilon^R_{t+1} + \epsilon^R_{t} + \epsilon^R_{t-1} + \cdots + \epsilon^R_{t-T+1} \]

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  \[ \cdots, \]

  where $\epsilon^R_t, \epsilon^R_{t-1}, \ldots, \epsilon^R_{t-T}$ is the menu of shocks available to the policymaker (and known to the public).

- Setup is same as before

- After solving the linear RE model, the sequence $\epsilon^R_t, \epsilon^R_{t-1}, \ldots, \epsilon^R_{t-T}$ that implements a given path can be found recursively.
Unanticipated Shocks vs Unanticipated Regime Change

• No anticipated policy deviations in the estimated model?

• How credible is the regime change?
About the Future II: Using Measured Expectations as Observables

Measured expectations (say, SPF output/inflation expectations) can be helpful in:

- **Model comparison**: Expectations help discriminate across models.
About the Future II: Using Measured Expectations as Observables

Model Comparison:

The Information from Measured Inflation Expectations

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<th>Dataset w/o Expectations</th>
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Model Comparison: The Information from Measured Inflation Expectations

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About the Future II: Using Measured Expectations as Observables

Measured expectations (say, SPF output/inflation expectations) can be helpful in:

- **Model comparison**: Expectations help discriminate across models.

- **Signal extraction**: Agents in the economy have more information than the econometrician, which can be exploited for forecasting (Monti 2008).
Unbalanced Data

- There are attempts to combine factor and DSGE models with the goal of incorporating as much of the available data as possible:
  - Boivin and Giannoni 2008
  - Giannone, Monti and Reichlin 2008
Unbalanced Data

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  - Boivin and Giannoni 2008
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Issues:

- Unbalanced data

- Lack of correspondence between measurement and theory → Bridge equations (Schorfheide, Sill, and Kryshko 2009).
Uncertain Data

- Sargent’s “Two models of measurement” 1989.
Uncertain States

- Sims and Zha’s “Does Monetary Policy Generate Recessions” 2006.