Panel Discussion

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December 2010
European Central Bank Conference

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    7. DSGE modelers: add this & that and plow forward
- ► The vitriol, iconoclasm, and hubris are cyclical

Productive & Pragmatic Responses

- ▶ No policymaker uses models in the ways critics caricature
- ▶ Let's not rush to extend existing models to handle asset bubbles, large financial crises, sovereign debt problems, and so forth
- ▶ Let's first understand what we have
- ▶ Distinguish between central bank models for
    - ▶ routine analysis
    - ▶ unusual events
- ▶ Think carefully about what questions a given model should answer
- ▶ Recognize that no manageable model can answer all questions
- ▶ Economic analysis and modeling are inherently evolutionary processes

Understanding Our Models

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    1. Prior predictive analysis: can learn what a model is *able* to produce

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Understanding Our Models

- ▶ We have Bayesian tools... let's use them
    1. Prior predictive analysis: can learn what a model is *able* to produce
    2. Posterior predictive analysis: can learn how a model *interprets* data
- ▶ These analyses could be performed as a matter of course
- ▶ They are rarely applied to DSGE models, even when the models are estimated with Bayesian methods
- ▶ Understandings drawn from these analyses can be critical elements in the evolution of models
- ▶ Both tools require specifying the questions being asked of the model

Example 1: Prior Predictive

- How big is the government spending multiplier?

Example 1: Prior Predictive

- ▶ How big is the government spending multiplier?
- ▶ Draws on Leeper-Traum-Walker
- ▶ Recent "meta-studies"
  - ▶ IMF with 17 co-authors:
    - ▶ 7 structural models
    - ▶ "Robust finding across *all* models that fiscal policy can have sizeable output multipliers"
  - ▶ Cogan-Cwik-Taylor-Wieland & Cwik-Wieland:
    - ▶ 6 structural models
    - ▶ much smaller output multipliers and negative consumption & investment multipliers
- ▶ Models share many features
- ▶ Some estimated/calibrated with same U.S. data set
- ▶ To what extent does a DSGE model *force* a particular multiplier on the data?

Fiscal Multiplier Prior Predictive

Basic RBC: Lump Sum Financing

Multiplier	Impact	4 quarters	10 quarters	25 quarters	∞
$\text{Prob}\left(\frac{\text{PV}(\Delta Y)}{\text{PV}(\Delta G)} > 1\right)$	0.00	0.00	0.00	0.00	0.00
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$\text{Prob}\left(\frac{\text{PV}(\Delta Y)}{\text{PV}(\Delta G)} > 1\right)$	0.37	0.12	0.06	0.05	0.04
$\text{Prob}\left(\frac{\text{PV}(\Delta Y)}{\text{PV}(\Delta G)} > 1\right)$	0.67	0.35	0.17	0.10	0.08

Fiscal Multiplier Prior Predictive

Basic RBC: Distortionary Financing

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Fiscal Multiplier Prior Predictive

RBC with Real Frictions: Distortionary Financing

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Basic New Keynesian: Distortionary Financing

Multiplier	Impact	4 quarters	10 quarters	25 quarters	∞
$\text{Prob}\left(\frac{\text{PV}(\Delta Y)}{\text{PV}(\Delta G)} > 1\right)$	0.00	0.00	0.00	0.00	0.00
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Fiscal Multiplier Prior Predictive

NK with Sticky Wages: Distortionary Financing

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Fiscal Multiplier Prior Predictive

NK with Non-Savers: Distortionary Financing

Multiplier	Impact	4 quarters	10 quarters	25 quarters	∞
Prob$\left(\frac{\text{PV}(\Delta Y)}{\text{PV}(\Delta G)} > 1\right)$	0.00	0.00	0.00	0.00	0.00
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- Draws on Faust-Gupta
- Paper goes through several kinds of analyses
- Here I focus only on historical decomposition of GDP growth, summarized by structural feature $h(Y, \theta)$; Y: data; θ: parameter vector
- "Demand shocks" seem to drive business cycle

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- ▶ "Demand shocks" seem to drive business cycle
- ▶ $h(Y^r, \theta)$; Y^r: realized sample
- ▶ $h(Y^{rep}, \theta)$; Y^{rep}: predictive sample
- ▶ If typical draw from model+posterior is like realized sample, $(h(Y^r, \theta), h(Y^{rep}, \theta))$ pairs lie along $45°$ line
- ▶ Focus on "risk-premium" shock in Euler equation
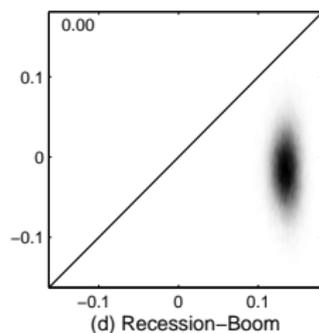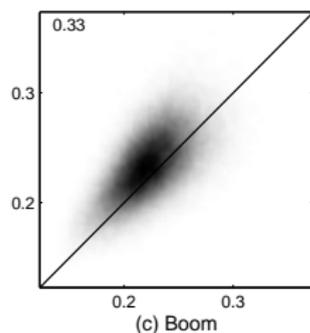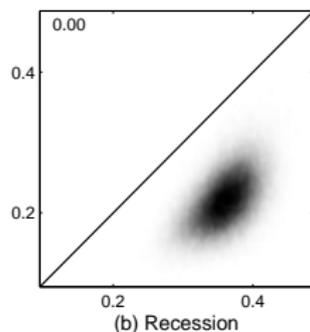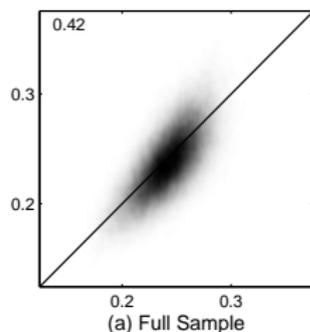
Shock Structure Posterior Predictive
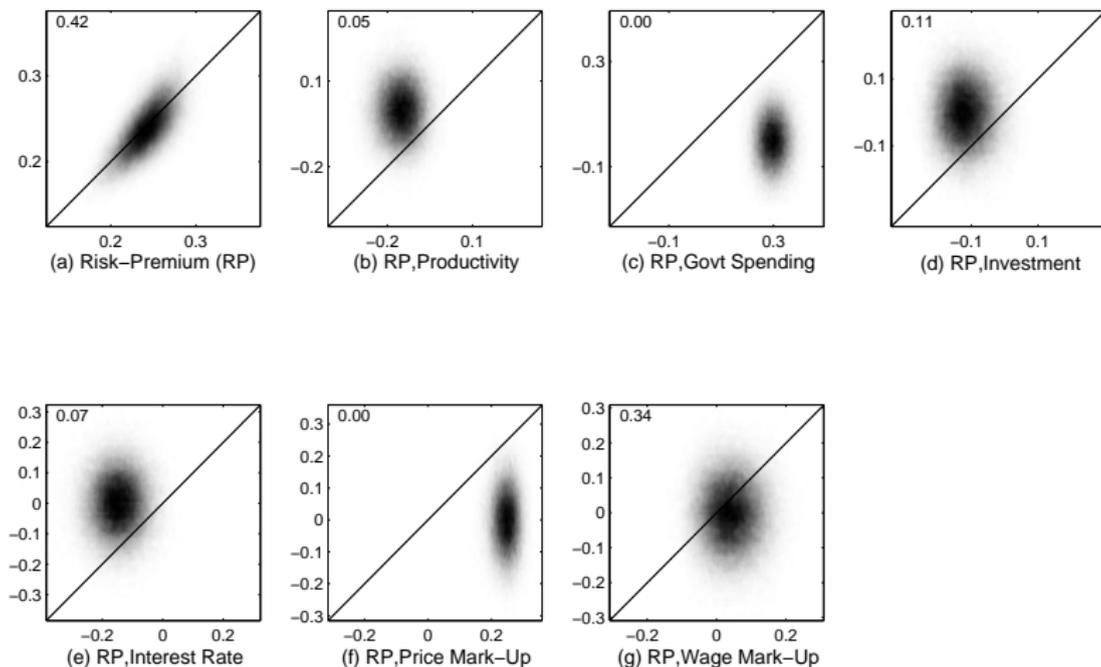
Risk-premium shock properties.
$h(Y^r, \theta)$ (horizontal axis); $h(Y^{rep}, \theta)$ (vertical axis)

Shock Structure Posterior Predictive

Risk-premium shock standard deviation.
$h(Y^r, \theta)$ (horizontal axis); $h(Y^{rep}, \theta)$ (vertical axis)

Shock Structure Posterior Predictive

- Conclusions

    - To match time series, model needs sample shocks to be correlated in particular ways

    - Model systematically links causal mechanisms associated with behaviorally distinct sectors

    - Recessions were freakish events produced by abnormally large risk-premium shocks that occurred systematically at business cycle frequencies

    - This is *not* a criticism of Smets-Wouters

    - It is a diagnostic tool that tells you when a model's interpretation of data is stretched

Lessons for Euro Fiscal Institutions

- Hard to say, since "lessons" changing each week
  1. ECB seems to have taken on the task of preventing sovereign debt default
     - Is this task compatible with inflation targeting?
     - Is sovereign debt default incompatible with monetary union?
  2. Difficult to have stable monetary union without *explicit* system-wide fiscal scheme
     - need fiscal transfers to respond in just the right way to various shocks
  3. It is unhelpful for policymakers to deny the obvious
     - a week ago, Irish were denying any need for EU help
     - Portuguese Social Democrat attacked for breaking taboo by suggesting Portugal may need bail-out

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    4. Encourage research that confronts fiscal and political realities about fiscal limits
        - need to understand them and quantify them
    5. Policymakers need to consider a larger set of contingencies
        - they seem to be winging it much of the time
        - creates unnecessary uncertainty