Discussion of Juillard and Maih
"Estimating DSGE Models with Observed Real-Time Expectation Data"

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Summary of paper

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- Builds on Maih (2010) “Conditional Forecasts in DSGE Models”, who shows how to compute forecasts in DSGE models conditional on a multivariate density for a subset of observables
  - Key contribution is to show how to condition on a density and not just the mean in a DSGE framework. Andersson, Palmqvist and Waggoner (2008) show how to do this in a VAR framework
Uses these techniques to exploit real-time expectations (SPF) when estimating a DSGE model.
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  - SW (2007) model and their vintage of actual data
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  - SW (2007) model and their vintage of actual data
  - While JM could in principle could condition on whole density of SPF, they use mean from SPF and add model implied densities
  - Assess to what extent the fit (LML, RMSFEs) of the SW model is improved by taking SPF into account
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- While JM could in principle could condition on whole density of SPF, they use mean from SPF and add model implied densities
- Assess to what extent the fit (LML, RMSFEs) of the SW model is improved by taking SPF into account
- Estimate how far into the future agents would like to make use of SPF forecasts for current decisions
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Why this is important...

- Conditioning on real time information could potentially be very useful from several perspectives
  - By conditioning on more observables, parameter uncertainty reduced
  - SPF forecasts provide additional information on actual and expected shocks $\Rightarrow$ improvement in forecast performance
  - Provide hints if model misspecification likely to be important
Summary of paper

Key findings in paper

- Correlations between actual outcomes and SPF expectations high for inflation, low for output and consumption growth
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Key findings in paper

- Correlations between actual outcomes and SPF expectations high for inflation, low for output and consumption growth
  - But surprisingly little discussion about precision of SPF relative to commonly used timeseries models
- Conditioning on inflation (?) therefore appear to add most to improvement in fit (LML/RMSFE)
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Improvement in RMSFEs remarkable for hours worked per capita, inflation and FFR. Given my work with Adolfson and Villani (Econometric Reviews, 2007) on the forecasting performance of DSGE models, I found the combination of sharp reductions in RMSFEs and modest increases in LML surprising
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Posterior mode of parameters substantially affected when conditioning information is used
Discussion outline

- Data issue
- The predictive content of SPF forecasts
- Role of conditioning information in model
- Expected shocks (news) in NK DSGE models
- Concluding remarks
Data issue

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- When each SPF forecaster constructed their forecast, they only had access to the first vintage of the data.

Is there a quick fix? Use difference between real-time and last vintage of the data to adjust the SPF forecasts in a systematic fashion, e.g. via estimated AR(p) or a VAR(p) models on real-time vintage of the data. An alternative is to allow the SPF forecasts in model to be based on observables measured with errors.
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  - Alternative: Allow the SPF forecasts in model to be based on observables measured with errors.
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The predictive content of SPF forecasts

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- Specifically, you could use two-sided filtered shocks \( \hat{\epsilon} \) to run regressions

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\hat{\epsilon}_{t,t} = \alpha + \beta \hat{\epsilon}_{t,t-j} + u_t
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- Can you reject the joint null hypothesis that $\alpha = 0$ and $\beta = 1$?
- How large share of the variance in $\varepsilon_{t,t}$ are the $u_t$ accounting for. This is hard to figure out from Figure 9 in the paper.
- I would be concerned if the $R^2$ is low for $\alpha = 0$ and $\beta = 1$. 

Lindé (Federal Reserve Board) 
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- Moreover, full use of condition densities would be very useful to pin down uncertainty bands for shock process parameters.
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Second, you explain part of the movements in actual data with non-zero expectations about future shocks, is that implying that your model underpredicts the volatility in the data?
Role of conditioning information in model

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- Second, you explain part of the movements in actual data with non-zero expectations about future shocks, is that implying that your model underpredicts the volatility in the data?
  - Would your model match unconditional moments in the data if you simulated it under the assumption that agents in the model did not take SPF expectations into account, i.e. should we think about the news that gets added by the real-time data as a source of fluctuations or as genuine useful conditioning information
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- Simple rules based on current variables are not well suited to deal with expected shocks, need to respond to expected paths.

Parameterization adopted from Lindé (2005, JME)

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Expected shocks (news) in NK DSGE models

Role of policy rule

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- Exemplify this in the simple trinity New Keynesian model:

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\begin{align*}
\pi_t &= \omega_f E_t \pi_{t+1} + (1 - \omega_f) \pi_{t-1} + \omega x_t \\
R_t &= (1 - \gamma_r) \left( \gamma_\pi \pi_t + \gamma_x x_t \right) + \gamma_r R_{t-1}
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\begin{align*}
x_t &= \beta_f E_t x_{t+1} + (1 - \beta_f) x_{t-1} - \beta_r (R_t - E_t \pi_{t+1}) + \epsilon_{x,t} \\
\pi_t &= \omega_f E_t \pi_{t+1} + (1 - \omega_f) \pi_{t-1} + \omega_x x_t \\
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Impact of negative demand shocks in baseline Trinity NK Model

Simulating the effects of -2.3 shock in period 0 and expected shock in period 8

Responses to Actual (left panels) and Expected (right panels) Demand Shocks in NK Model
Redoing exercise in completely forward-looking Trinity NK Model
Simulating the effects of -2.3 shock in period 0 and expected shock in period 8
JM offer a very nice way to incorporate expected real-time data into the estimation of DSGE models.

Results seem very encouraging (almost to good to be true for RMSFEs), but some additional experiments and robust analysis seem warranted.

Potentially very useful method for central banks in the business of inflation forecast targeting.
Concluding remarks

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