Discussion of

“The joint dynamics of US and euro area inflation: Expectations and time-varying uncertainty”

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Objective: model jointly $\pi$ and all available $\pi$ surveys. Surveys are sampled irregularly/infrequently $\rightarrow$ state-space model

$$
\pi_t = \bar{\pi} + \delta' X_t \\
X_t = \Phi_X X_{t-1} + \Gamma \epsilon_{X,t}
$$

Note: $E_t X_{t+h}$ and $E_t \pi_{t+h}$ (surveys) easy to compute for any $h$

Desire to match also $\text{Var}_t \pi_{t+h} \rightarrow$ stoch vol factors $z_t$ in $\Gamma(z_t)$

- Problem: may require a simulation step for $E_t \pi_{t+h}$ and/or $\text{Var}_t \pi_{t+h}$. Computationally demanding for large $h$.

- Solution: Autoregressive Gamma Process (ARG)
ARG what?
ARG what?

- ARG processes (Gouriéroux and Jasiak, 2006) has exponentially affine conditional Laplace transform, hence affine conditional moments.
- Discrete-time version of CIR process. Scalar case:

\[ z_t = \nu + \phi z_{t-1} + \sqrt{\nu + 2\phi z_{t-1}} \epsilon_{z,t} \]

with unconditional mean \( \bar{z} = \frac{\nu}{1-\phi} \) for \( \nu > 0 \).
ARG paths

\[ \Pr(z_t \mid z_{t-1}) \sim \gamma_{\nu}(\phi z_{t-1}, \mu) \]

\(\nu = 0.1, \ \phi = 0.992\)
Multivariate ARG process for the "volatility factors" $z_t$; stoch vol for level factors (plus variance-in-mean)

$$Y_t = \Phi_Y Y_{t-1} + \text{diag} \left( \sqrt{\Gamma_{z,0} + \Gamma_{z,1} z_{t-1}} \right) \varepsilon_{Y,t} + \Theta (z_t - \bar{z})$$

Loads of observation equations (for $X_t = (Y_t', z_t')'$)

$$\pi_t^{(i)} = \overline{\pi}^{(i)} + \delta^{(i)'} X_t$$

$$E_t \pi_{t+h}^{(i)} = a_h^{(i)} + b_h^{(i)} X_t$$

$$\text{Var}_t \pi_{t+h}^{(i)} = \alpha_h^{(i)} + \beta_h^{(i)} X_t$$
Results

- Eminently plausible (surveys are a standard plausibility test)
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  - forecasting inflation at various horizons
  - focus on density forecasts
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- forecasting inflation at various horizons
- focus on density forecasts
- cross-country dimension
(1) Focus on inflation forecasts using survey information

- Show the benefits of including survey information in a forecasting model (a’ la Ang, Bekaert and Wei, 2007)
  - can do it for different forecast horizons, not just 1y ahead
- Results are not obvious. Inflation developments in the past few years were hard to predict also for professional forecasters
- Possibly throw in more information— inflation surveys already used in term structure models, but focus is not on inflation forecasting
- Focus on the US would provide longer sample:
  - is the joint EA-US dimension crucial from a forecasting perspective?
HICP inflation and SPF forecasts
(2) Focus on density forecasts

- A clear plus of the framework
- The Great Recession presumably represents an ideal period to highlight importance of allowing for stochastic volatility to track variations in the shape of forecast densities
- Especially interesting if there were any evidence of strong non-normality (bimodality, asymmetry) of the survey distributions
- Is the joint EA-US dimension crucial from a density forecasting perspective?
Figure 4: Fit of survey distributions

Euro area (1-year horizon)
(3) International dimension

- Why?
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- Why?
  - Why not!
Consumer Price Index for All Urban Consumers: All Items Less Food and Energy
Harmonized Index of Consumer Prices: Overall Index Excluding Energy and Seasonal Food for Euro area (19 countries)©
Why?
  Why not!

The benefit of focusing on a single country could be a more parsimonious model (fewer factors)
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What would be the cost? What would one loose in looking independently at each monetary area?
Concluding remarks

- Take-away: it is relatively straightforward to obtain a full term structure of inflation forecast densities using survey information
- By-product: very sensible results
- More model validation would be desirable to underline the key contribution to the literature