Discussion of

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

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The model

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

$$\begin{aligned} \pi_t &= \overline{\pi} + \delta' X_t \\ X_t &= \Phi_X X_{t-1} + \Gamma \varepsilon_{X,t} \end{aligned}$$

- Note: $\mathrm{E}_t X_{t+h}$ and $\mathrm{E}_t \pi_{t+h}$ (surveys) easy to compute for any h
- Desire to match also $\mathrm{Var}_t \pi_{t+h} \longrightarrow$ stoch vol factors z_t in $\Gamma(z_t)$
  - Problem: may require a simulation step for $\mathrm{E}_t \pi_{t+h}$ and/or $\mathrm{Var}_t \pi_{t+h}$. Computationally demanding for large h.
  - Solution: Autoregressive Gamma Process (ARG)

ARG *what*?

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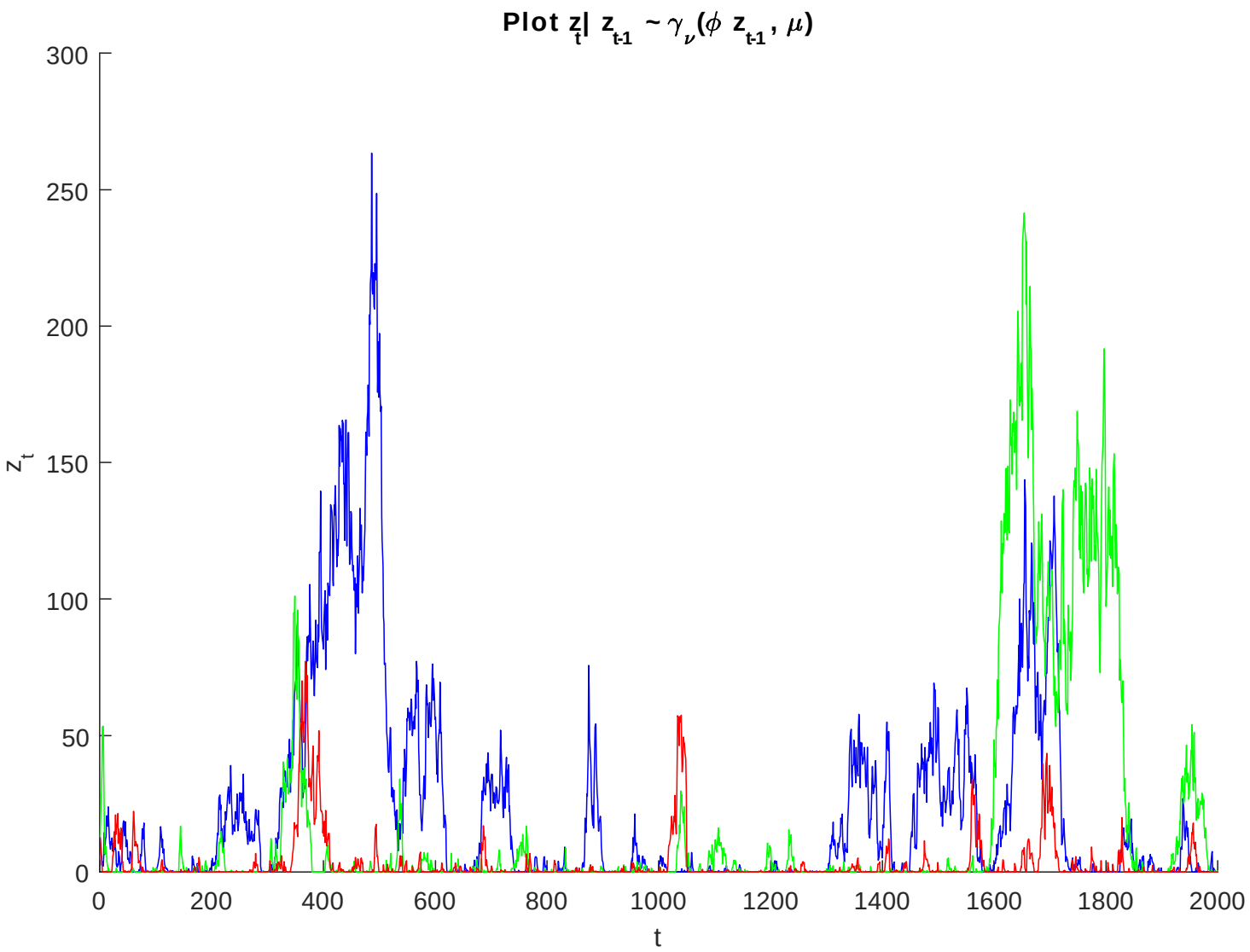
- ARG processes (Gouriéroux and Jasiak, 2006) has exponentially affine conditional Laplace transform, hence affine conditional moments
- Discrete-time version of CIR process. Scalar case:

$$z_t = \nu + \phi z_{t-1} + \sqrt{\nu + 2\phi z_{t-1}}\varepsilon_{z,t}$$

with unconditional mean $\overline{z} = \frac{\nu}{1-\phi}$ for $\nu > 0$

ARG paths



$\nu = 0.1,\ \phi = 0.992$

Full model

- Multivariate ARG process for the "volatility factors" z_t; stoch vol for level factors (plus variance-in-mean)

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

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

$$\begin{aligned} \pi_t^{(i)} &= \overline{\pi}^{(i)} + \delta^{(i)\prime} X_t \\ \mathrm{E}_t \pi_{t+h}^{(i)} &= a_h^{(i)} + b_h^{(i)} X_t \\ \mathrm{Var}_t \pi_{t+h}^{(i)} &= \alpha_h^{(i)} + \beta_h^{(i)} X_t \end{aligned}$$

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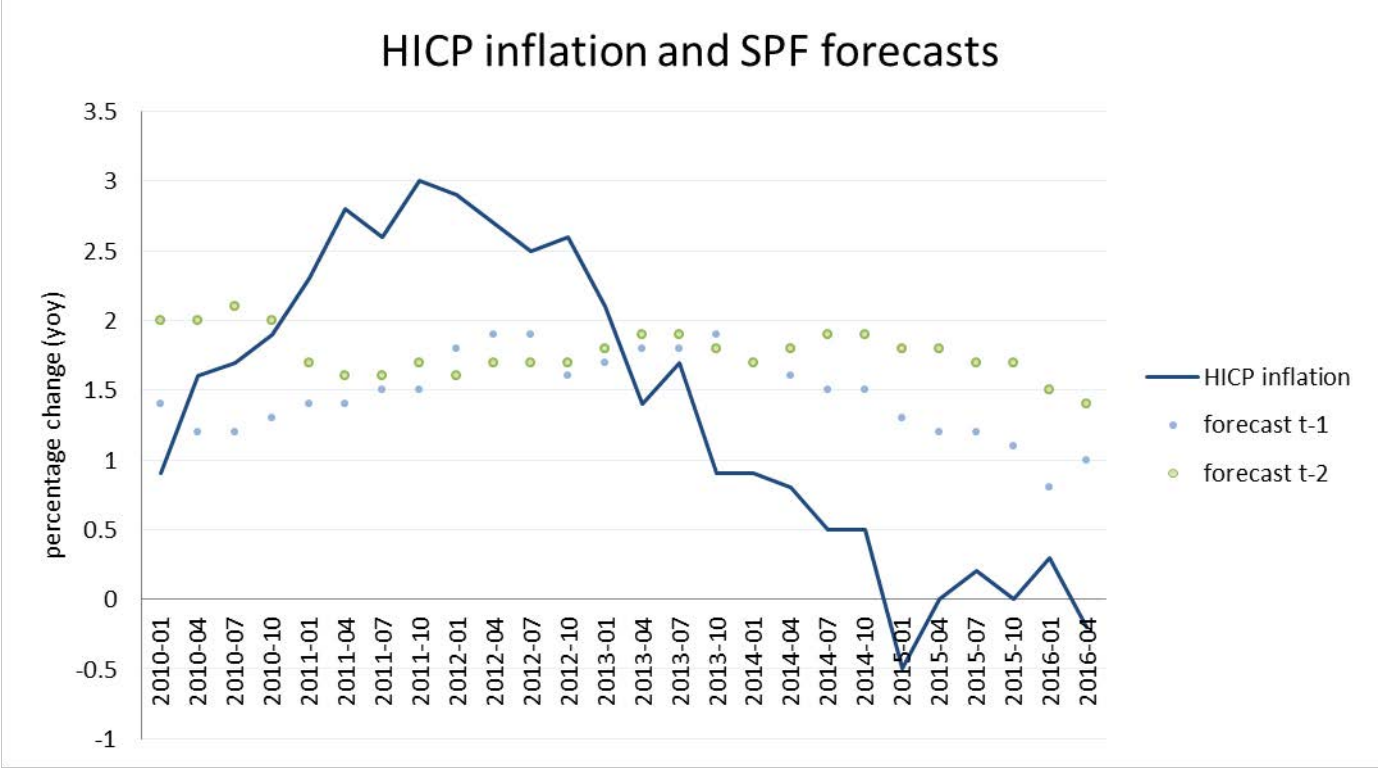
  - focus on density forecasts
  - cross-country dimension

(1) Focus on inflation forecasts using survey information

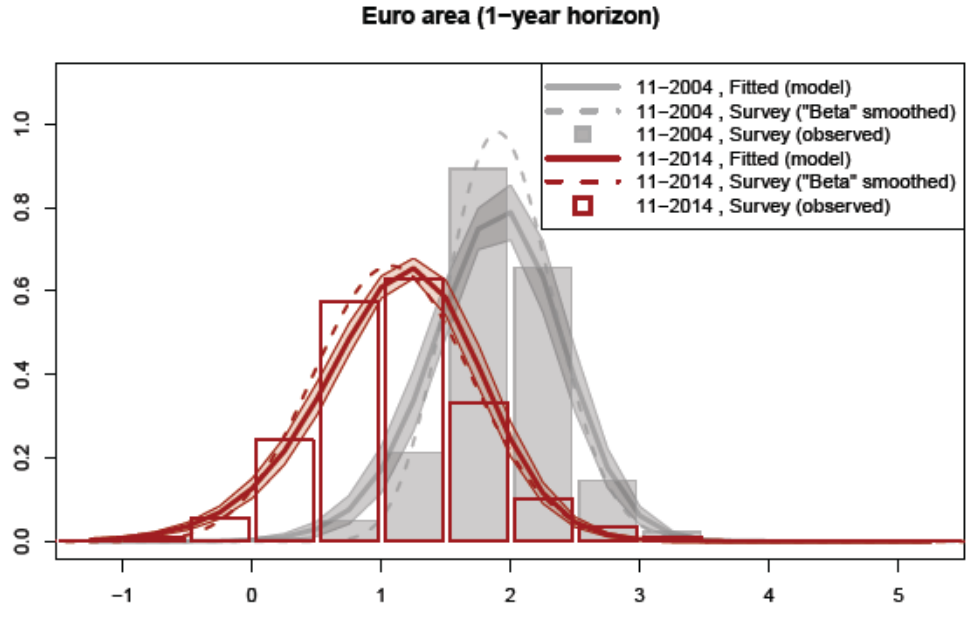
- Show the benefits of including survey information in a forecasting model (a' la Ang, Bekaert and Wei, 2007)
  - can do it for different forecast horizons, not just 1y ahead
- Results are not obvious. Inflation developments in the past few years were hard to predict also for professional forecasters
- 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
percentage change (yoy)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
2010-01
2010-04
2010-07
2010-10
2011-01
2011-04
2011-07
2011-10
2012-01
2012-04
2012-07
2012-10
2013-01
2013-04
2013-07
2013-10
2014-01
2014-04
2014-07
2014-10
2015-01
2015-04
2015-07
2015-10
2016-01
2016-04
HICP inflation
forecast t-1
forecast t-2

(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 (bimodaility, asymmetry) of the survey distributions
- Is the joint EA-US dimension crucial from a density forecasting perspective?

Figure 4: Fit of survey distributions



(3) International dimension

- Why?

FRED

Consumer Price Index for All Urban Consumers: All Items

Harmonized Index of Consumer Prices: All Items for Euro area (19 countries)©

(Percent Change from Year Ago)

6
5
4
3
2
1
0
-1
-2

2000
2002
2004
2006
2008
2010
2012
2014
2016

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(3) International dimension

- Why?
  - Why not!

FRED

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)©

(Percent Change from Year Ago)

3.0
2.5
2.0
1.5
1.0
0.5

2000
2002
2004
2006
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- The benefit of focusing on a single country could be a more parsimonious model (fewer factors)
- 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 desitable to underline the key contribution to the literature