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Dicussion of

The Structure of Multivariate Disagreement

by Edward Herbst and Fabian Winkler

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Idea of the Paper

- Observation of disagreement in survey-based macro expectations
- What drives expectation disagreement?
  - Part of larger current research program that also looks at data sets on expectations of firms and households with large-cross sections and many informative covariates
- SPF data offers: ...
  - expectations of individual forecasters
  - many forecast horizons / long sample
  - **expectations for many variables**
- Reduction of information about disagreement to two unobserved factors:
  - How much can they explain for different variables?
  - How do they evolve across time?
  - How can we make economic sense of them?

Summary of Econometric Approach

- Dyn. factor model in which every **individual forecast disagreement** is function of a set of forecaster-specific factors:

$$\hat{y}_{it} - \bar{y}_t = \underset{n\times 1}{y_{it}} = \underset{n\times\kappa}{\Lambda}\ \underset{\kappa\times 1}{f_{it}} + \xi_{it}$$

$$f_{it} = \begin{pmatrix} \phi_1 & 0 & \dots & 0 \\ 0 & \phi_2 & \dots & 0 \\ \vdots & \vdots & \ddots & 0 \\ 0 & \dots & 0 & \phi_\kappa \end{pmatrix} f_{it-1} + u_{it}$$

$$\xi_{it} = \begin{pmatrix} \rho_1 & 0 & \dots & 0 \\ 0 & \rho_2 & \dots & 0 \\ \vdots & \vdots & \ddots & 0 \\ 0 & \dots & 0 & \rho_n \end{pmatrix} \xi_{it-1} + \nu_{it}$$

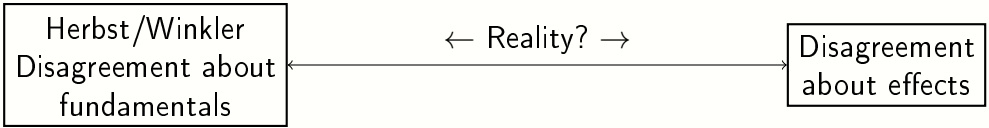
Summary of Econometric Approach

- Dyn. factor model in which every **individual forecast disagreement** is function of a set of forecaster-specific factors
- Factor loadings are common to all forecasters $\Rightarrow$ homogeneous interpretation of underlying business cycle factors/macroeconomic shocks
- Factors and individual error terms are modeled as AR(1) processes to capture persistence
- Bayesian estimation
- Consistent with (semi-)structural model of the economy:
  - Limited information $\Rightarrow$ disagreement (about the presence, NOT the past)
  - Shows how factors can be interpreted in a structural way ($\Lambda \Rightarrow$ IRFs)

Comments on Model

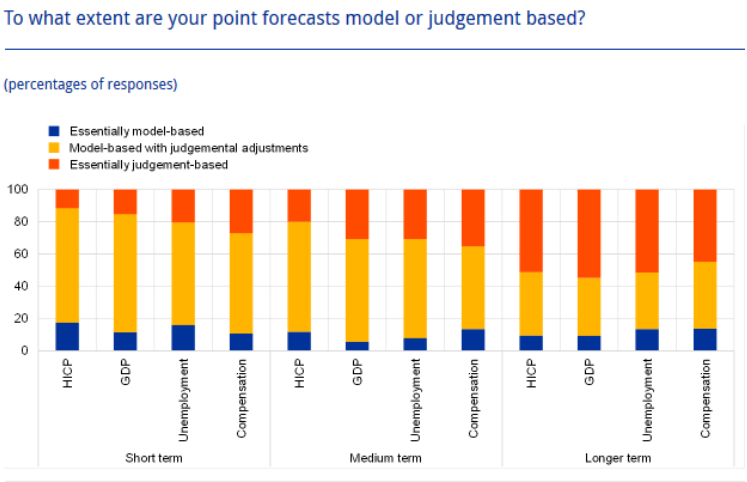
- Disagreement about business cycle/nature of shocks? Or rather about effects of those shocks on observable variables?

$$
\begin{aligned}
y_{it} &= \Lambda_i f_t + \xi_{it} \\
f_t &= \Phi f_{t-1} + u_t \\
\xi_{it} &= P\xi_{i,t-1} + \nu_{it}
\end{aligned}
$$



- Minor question: What about non-zero constants?

Comments on Model



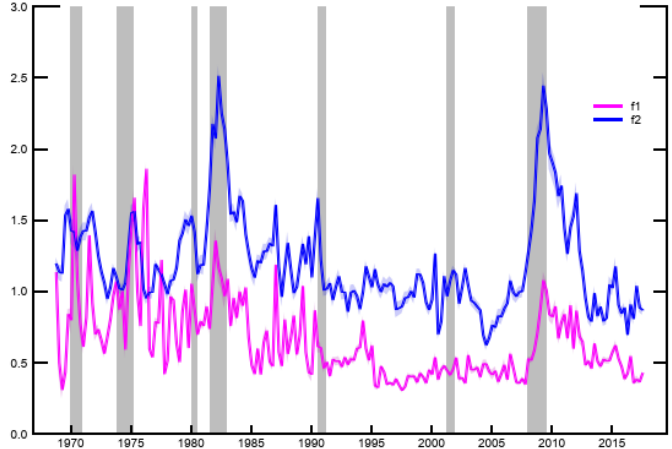
Source: European Central Bank

How Do We Interpret the Results?

- Could you identify more meaningful factors if you disciplined your model more?
  - Imposing sign restrictions?
  - Disagreement about economic policy
  - Disagreement about financial markets
- Isn't it strange that almost all variation in disagreement about 4-quarters-ahead GDP is explained by the two factors (while other variables remain virtually unexplained)?
- What about correlation of "factor dispersions" (Fig. 5) with dispersion for important variables?
- **Cardinal question:** How similar are firms/households with their completely different economic literacy background?

How Do We Interpret the Results?

Figure 5: Cross-Sectional Dispersion of Factors over time.

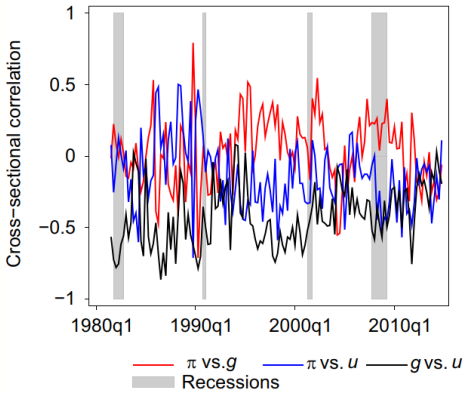


Source: Herbst and Winkler (2019)

How Do We Interpret the Results?

- Can you present complementary evidence that convince readers that you measure disagreement about supply shocks / demand shocks?

- For instance, look at comovement with bivariate cross-sectional correlations



Source: Dovern (2015)

Minor Points That We Can Discuss over Coffee

- How do empirical results change if forecasters in the semi-structural model still only observe $\tilde{x}_{t-1}$ or a $\tilde{x}'_{t-1}$ with higher signal-to-noise ratio (instead of the true x_t) and you include lagged factors in model?

- Condition in equation (15) not consistent with posterior means in Table 3? Flipped inequality sign? Mixing rows and columns of Λ?

- Equation (4), the covariance of dispersions, does not allow for different forecast horizons (in contrast to equation for covariance of disagreement)

Minor Points That We Can Discuss over Coffee

Table 3: Posterior of Λ

Variable	Mean $\Lambda_{\cdot 1}$	[5, 95]	Mean $\Lambda_{\cdot 2}$	[5, 95]
GDP components				
RGDP4	0.79	[0.76, 0.81]	0.41	[0.37, 0.45]
RCONSUM4	0.56	[0.52, 0.59]	0.31	[0.28, 0.34]
RNRESIN4	0.92	[0.82, 1.03]	0.76	[0.68, 0.83]
RRESINV4	1.50	[1.32, 1.67]	1.12	[0.98, 1.26]
RSLGOV4	0.27	[0.22, 0.31]	0.15	[0.11, 0.18]
RFEDGOV4	0.26	[0.17, 0.35]	-0.06	[-0.12, 0.00]
RCBI4	0.03	[0.02, 0.04]	0.04	[0.03, 0.04]
REXPORT4	0.07	[0.05, 0.09]	-0.02	[-0.03, 0.00]
Other real activity				
HOUSING4	0.50	[0.31, 0.70]	1.54	[1.35, 1.73]
INDPROD4	0.20	[0.15, 0.24]	0.61	[0.57, 0.65]
CPROF4	0.41	[0.26, 0.56]	1.37	[1.24, 1.50]
Labor market				
UNEMP4	-0.39	[-0.41, -0.37]	0.12	[0.10, 0.15]
EMP4	-0.27	[-0.30, -0.24]	0.18	[0.16, 0.20]
Inflation	-0.25	[-0.29, -0.22]	0.18	[0.16, 0.20]
PGDP4	-0.23	[-0.26, -0.20]	0.17	[0.15, 0.18]
CPI4				
CORECPI4	-0.03	[-0.04, -0.02]	-0.12	[-0.13, -0.12]
COREPCE4	0.15	[0.12, 0.18]	0.12	[0.10, 0.14]

Source: Herbst and Winkler (2019)

Summary

- We need to learn more about why and under which circumstances agents disagree about the future!!!
- Idiosyncratic disagreement vs. genuine heterogeneity of expectation formation
- Current DFG Priority Program 1859 “Experience and Expectation”

Congratulation for a very interesting paper with an innovative view on disagreement!!!

Thank You for Your Attention!

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