

External Assumptions and Macroeconomic Forecasts: Disagreement, Revisions and Forecast Errors

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Motivation

- ▶ Expert's macroeconomic expectations are shaped by their ex-ante assumptions on e.g., future oil prices and exchange rates
- ▶ Few papers have analyzed the linkage between forecasts and assumptions (Engelke et al. 2019, Fioramanti et al. 2016)
⇒ small samples and focus on GDP growth
- ▶ We analyze the connection between assumptions and forecasts with respect to heterogeneity, revisions and accuracy in the European Central Bank's Survey of Professional Forecasters

Research questions:

- ▶ Is forecast disagreement related to assumption heterogeneity?
- ▶ Are macro forecasts and assumptions jointly updated?
- ▶ Are forecast errors linked to incorrect assumptions?
- ▶ Do experts predict macroeconomic outcomes in line with well-known theoretical relationships?

Survey of Professional Forecasters (SPF)

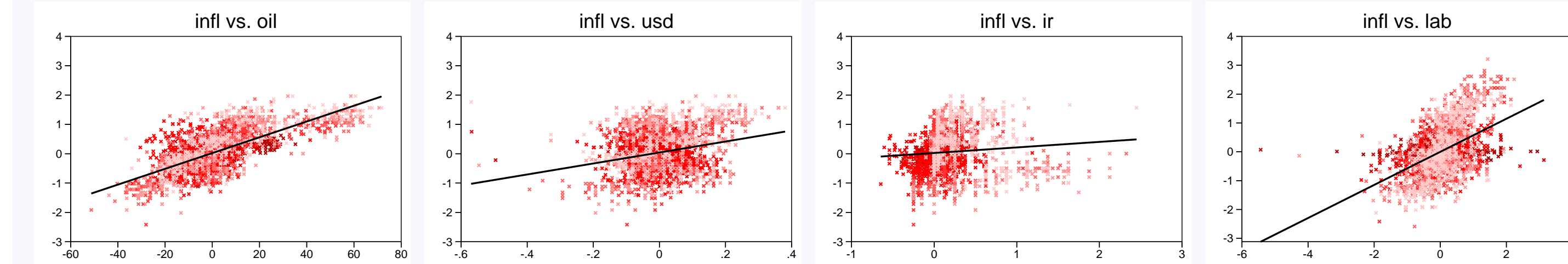
- ▶ The SPF provides forecasts and assumptions for the current and the next calendar year
- ▶ **Forecast horizons:** $h \in \{1, 2, \dots, 8\}$ quarters
- ▶ 72 quarterly survey rounds for the period 2002Q1–2019Q4
- ▶ **Institutions:** 101 (approx. 50 per wave)
- ▶ **Macroeconomic variables** (y):
 - ▶ Inflation rate (*infl*)
 - ▶ Real GDP growth (*gdp*)
 - ▶ Unemployment rate (*une*)
- ▶ **Assumption variables** (x):
 - ▶ Oil price in USD (*oil*)
 - ▶ USD/EUR exchange rate (*usd*)
 - ▶ ECB's main refinancing rate (*ir*)
 - ▶ Annual growth in compensation per employee (*lab*)

Forecast vs. Assumption Disagreement

$$s_{y,t,h} = \alpha + \sum_x \beta_x s_{x,t,h} + \lambda_t + \lambda_h + \nu_{y,t,h},$$

where $s_{z,t,h} = \sqrt{1/(N-1) \sum_{i=1}^N (\hat{z}_{i,t,h} - \bar{z}_{t,h})^2}$ for $z \in \{x, y\}$. We also include target year- and horizon-fixed effects, λ_t and λ_h .

Forecast vs. Assumption Errors



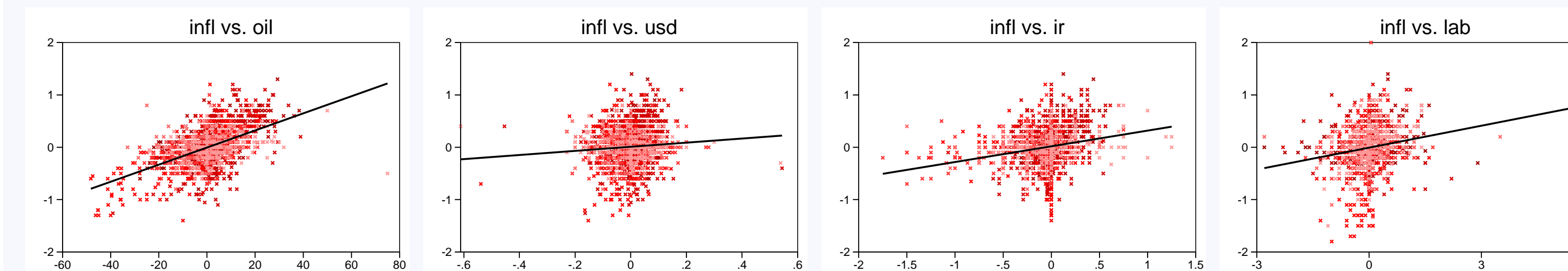
$$e_{y,i,t,h} = \alpha + \sum_x \beta_x e_{x,i,t,h} + \lambda_i + \lambda_t + \lambda_h + \nu_{y,i,t,h},$$

where $e_{z,i,t,h} = \hat{z}_{i,t,h} - z_t$ for $z \in \{x, y\}$.

Dependent variable: $s_{infl,t,h}$									
$s_{oil,t,h}$	0.021*** (0.002)								
$s_{usd,t,h}$		2.378*** (0.265)							
$s_{ir,t,h}$			0.488*** (0.067)						
$s_{lab,t,h}$				0.170** (0.085)	0.014 (0.023)	-0.039 (0.035)	0.038 (0.034)	-0.052 (0.035)	
Constant	0.093*** (0.010)	0.097*** (0.013)	0.132*** (0.015)	0.122*** (0.030)	0.077*** (0.012)	0.088*** (0.010)	0.126*** (0.036)	0.213*** (0.028)	
No. of obs.	107	107	107	120	97	97	97	97	
Time FE	no	no	no	no	no	yes	no	yes	
Horizon FE	no	no	no	no	no	no	yes	yes	
R^2	0.672	0.614	0.365	0.070	0.715	0.727	0.736	0.799	

Notes: OLS estimates along with HAC standard errors. *, **, and *** indicate 10%, 5% and 1% significance levels.

Forecast vs. Assumption Revisions



$$\Delta \hat{y}_{i,t,h} = \alpha + \sum_x \beta_x \Delta \hat{x}_{i,t,h} + \lambda_i + \lambda_t + \lambda_h + \nu_{y,i,t,h},$$

where $\Delta \hat{z}_{i,t,h} = \hat{z}_{i,t,h} - \hat{z}_{i,t,h+1}$ for $z \in \{x, y\}$ and λ_i denotes an institutional-fixed effect.

Dependent variable: $\Delta \widehat{infl}_{i,t,h}$									
$\Delta \widehat{oil}_{i,t,h}$	0.016*** (0.001)								
$\Delta \widehat{usd}_{i,t,h}$		0.393*** (0.116)							
$\Delta \widehat{ir}_{i,t,h}$			0.300*** (0.026)						
$\Delta \widehat{lab}_{i,t,h}$				0.140*** (0.024)	0.063*** (0.021)	0.067*** (0.021)	0.045** (0.018)	0.062*** (0.020)	0.045** (0.019)
Constant	-0.005 (0.004)	0.010* (0.005)	0.018*** (0.005)	-0.007 (0.007)	-0.007 (0.006)	0.072*** (0.005)	0.054*** (0.017)	-0.004 (0.020)	0.089*** (0.034)
No. of obs.	3,241	3,236	3,595	2,562	1,680	1,680	1,680	1,680	1,680
N	94	94	95	70	67	67	67	67	67
Institutional FE	no	no	no	no	no	yes	no	no	yes
Time FE	no	no	no	no	no	no	yes	no	yes
Horizon FE	no	no	no	no	no	no	no	yes	yes
R^2	0.269	0.006	0.048	0.030	0.305	0.301	0.417	0.310	0.420

Notes: OLS estimates along with HAC standard errors. *, **, and *** indicate 10%, 5% and 1% significance levels.

Summary and Conclusion

- ▶ Heterogeneity, updating and accuracy of expert's macro forecasts are related to underlying assumptions
- ▶ Importance of assumptions varies across macro variables:
 - ▶ Oil price assumptions → inflation forecasts
 - ▶ Interest rate assumptions → GDP growth and unemployment forecasts
 - ▶ Smaller role of exchange rate and wage growth assumptions
- ▶ Survey participants could improve forecast accuracy by up to 50% by reducing assumption errors
- ▶ Survey operators should elicit assumptions along with forecasts

References

- Engelke, C., Heinisch, K. & Schult, C. (2019), Effects of external assumptions on forecast errors, IWH Discussion paper 18, Halle Institute for Economic Research.
- Fioramanti, M., Laura, Gonzalez, R., Cabanillas, B. & Valterra, S. F. (2016), European commission's forecasts accuracy revisited: Statistical properties and possible causes of forecast errors, European Economy Discussion Papers 027, European Commission.