A Reassessment of Monetary Policy Surprises and High-Frequency Identification

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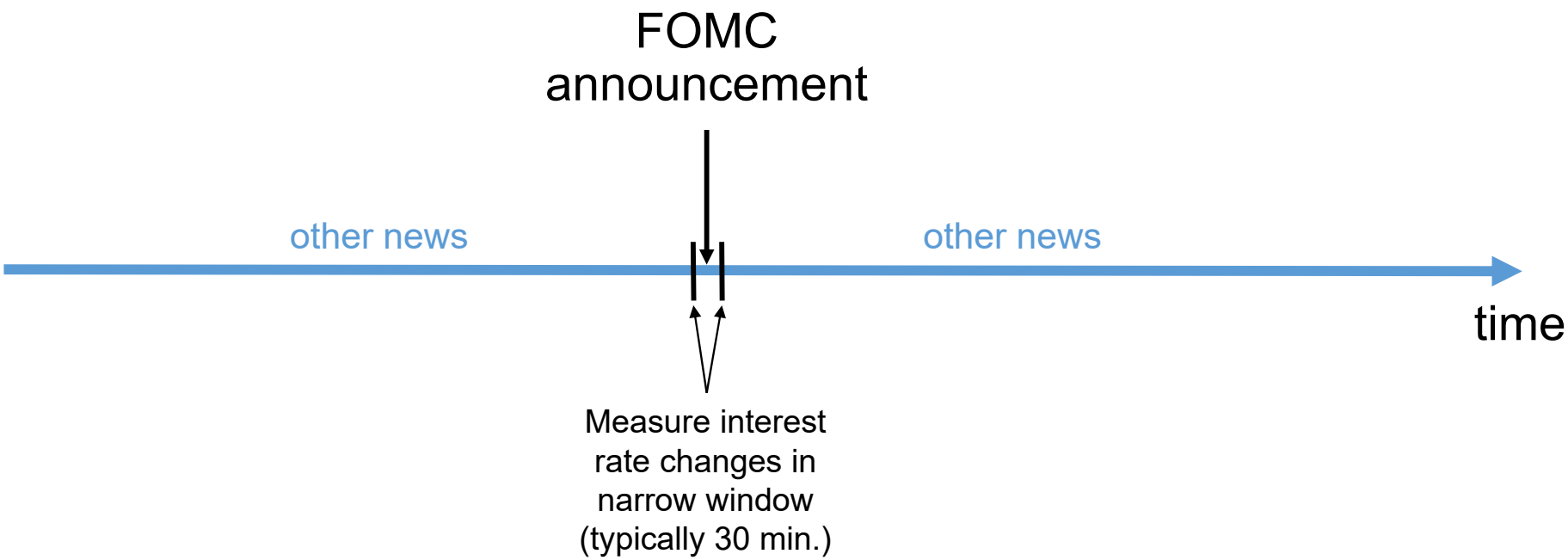
High-Frequency Monetary Policy Surprises



High-frequency monetary policy surprises are an important tool for estimating effects of monetary policy on asset prices and macroeconomic variables:

- asset prices: high-frequency OLS regressions
- macro variables: monetary policy surprises used as external instrument in structural VAR or LP

High-Frequency Monetary Policy Surprises

However, there are two growing concerns:

- **exogeneity:** monetary policy surprises are *correlated* with macroeconomic and financial data that *pre-dates* the FOMC announcement:
  - Cieslak (2018), Miranda-Agrippino (2017), Miranda-Agrippino-Ricco (2021), Karnaukh (2020), Bauer-Swanson (2021), Bauer-Chernov (2021), Sastry (2021)

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- **relevance:** monetary policy surprises are a small fraction of interest rate changes each month
  - Ramey (2016), Bauer-Swanson (2021)

Monetary Policy Surprises Are Predictable

Predictive Regressions $mps_t = \alpha + \beta' X_{t-} + \varepsilon_t$

Nonfarm payrolls surp.	0.094**
	(2.442)
Empl. growth (12m)	0.005**
	(2.108)
Δ log S&P 500 (3m)	0.084
	(1.433)
Δ Slope (3m)	-0.010
	(-1.406)
Δ log Comm. price (3m)	0.120**
	(2.392)
Treasury skewness	0.032***
	(3.006)
R^2	0.161
Sample	1988:1–2019:12
N	322

What We Do

- Present a simple model that explains this correlation in terms of imperfect information: the "Fed response to news" channel of Bauer-Swanson (2021)
- Address the **exogeneity** concern by projecting out the correlation with the publicly observed data X_{t-}
- Address the **relevance** concern by including speeches by the Fed Chair in the set of monetary policy announcements

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- Address the **exogeneity** concern by projecting out the correlation with the publicly observed data X_{t-}
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- Revisit high-frequency asset price regressions and monetary policy SVARs, LPs to assess effects of these changes

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Then:

$$\begin{aligned} mps_t &\equiv i_t - E[i_t | x_t, \mathcal{H}_{t-1}] \\ &= (\alpha_t - a_t) x_t + \varepsilon_t \end{aligned}$$

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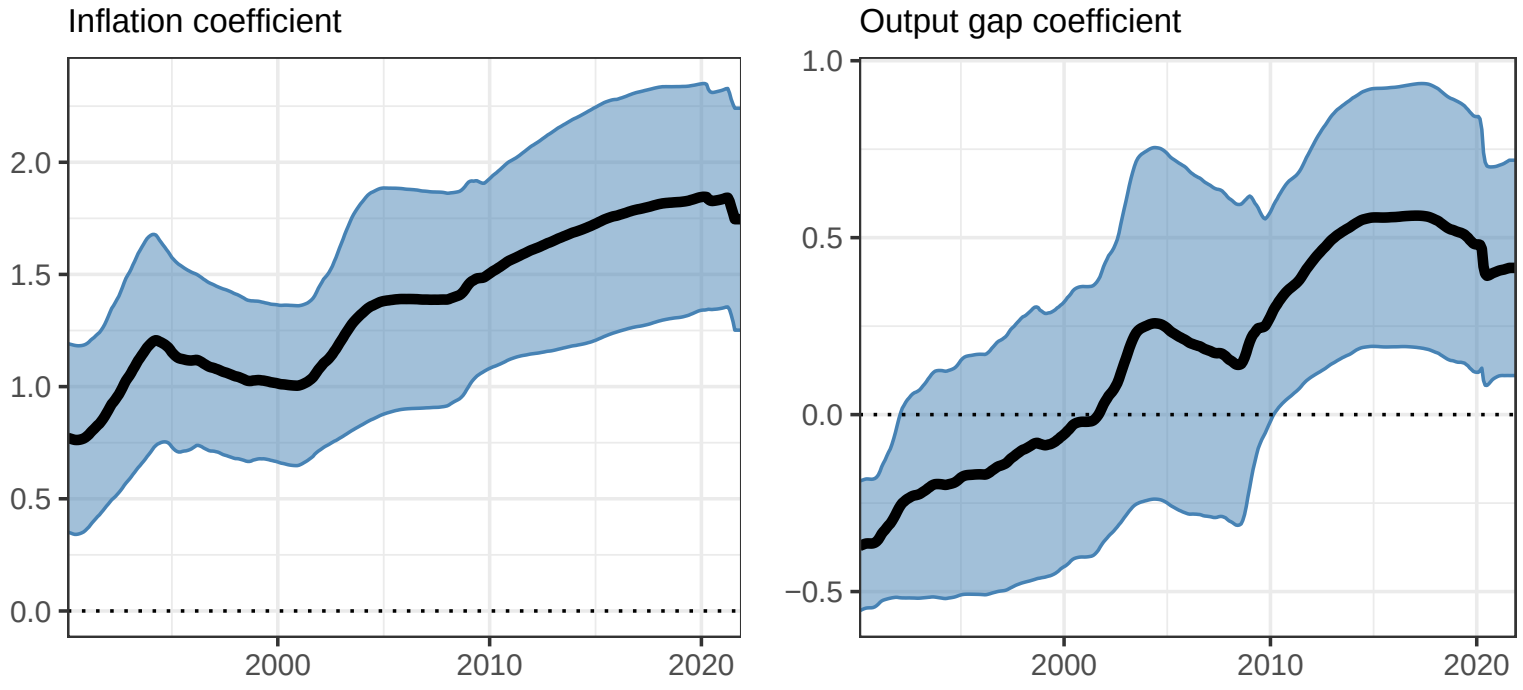
- Nevertheless, mps_t can be correlated with x_t *ex post*
- For a procyclical variable x_t, this correlation is positive when $a_t < \alpha_t$
- Note that a_t can be $< \alpha_t$ for several periods if there is an increase in α_t and it takes time for the private sector to learn about the increase

Evidence that $a_t < \alpha_t$

Rolling-window Taylor Rule regressions:



- Greenspan: “The Federal Reserve has seen the need to respond more aggressively than had been our wont in earlier decades” (March 2001)
- Bernanke: “By way of historical comparison, this policy response stands out as exceptionally rapid and proactive” (December 2008)

Additional Implications of the Simple Model

- Changes in interest rates affect asset prices entirely through mps_t (no separate role for ε_t)
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- Changes in interest rates affect asset prices entirely through mps_t (no separate role for ε_t)
- High-frequency OLS regressions of asset price changes on mps_t remain valid
- But *ex post* correlation of mps_t with x_t violates exogeneity assumption of high-frequency IV regressions in macro SVARs and LPs
- To eliminate this correlation, we recommend using orthogonalized $mps_t^{\perp} \equiv mps_t - \hat{\alpha} - \hat{\beta} X_{t-}$

High-Frequency Asset Price Regressions

$$\Delta y_t = \gamma + \delta mps_t + \varepsilon_t,$$

	mps_t	$mps_t^{\perp}$
Two-year yield	0.73	0.74
t-stat.	(18.6)	(16.7)
R^2	0.784	0.689
Five-year yield	0.63	0.64
t-stat.	(14.4)	(13.8)
R^2	0.626	0.550
Ten-year yield	0.41	0.41
t-stat.	(9.5)	(9.9)
R^2	0.435	0.363
30-year yield	0.25	0.25
t-stat.	(6.3)	(6.7)
R^2	0.206	0.173
S&P500	-5.39	-5.50
t-stat.	(-7.7)	(-6.6)
R^2	0.304	0.266
Observations	322	322

High-Frequency Identification of SVARs, LPs

Reduced-form VAR:

$$Y_t = \alpha + B(L)Y_{t-1} + u_t,$$

Reduced-form residuals related to structural shocks:

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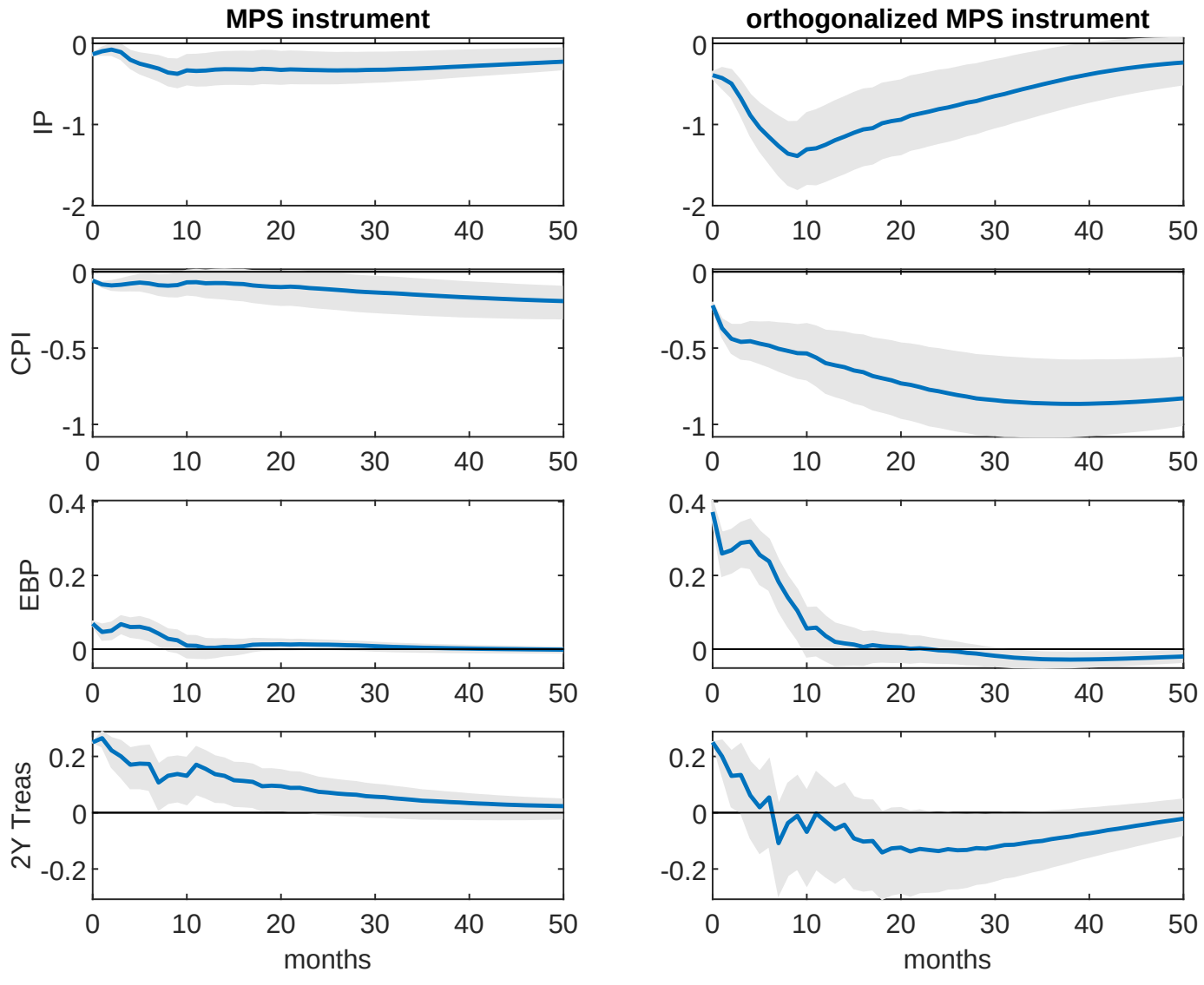
Identify impact effect of ε_t^{mp} on u_t by regressing u_t on u_t^{mp} by 2SLS using mps_t as an external instrument

instrument **relevance**: $E[mps_t\, \varepsilon_t^{mp}] \neq 0,$

instrument **exogeneity**: $E[mps_t\, \varepsilon_t^{-mp}] = 0,$

Revisiting Gertler-Karadi (2015)



Revisiting Gertler-Karadi (2015)

- unadjusted *mps* instrument is correlated with output, inflation
- estimated effects of monetary policy are attenuated or can even have opposite, puzzling sign if *mps* is unadjusted
- orthogonalized *mps* reduces this bias—IRFs about 4 times larger

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- including Fed Chair speeches in *mps* instrument leads to similar IRFs but much larger first-stage *F*-statistics:

MPS measure	first-stage *F*-statistic
FOMC announcements only	8.19
FOMC + Chair Speeches	30.44

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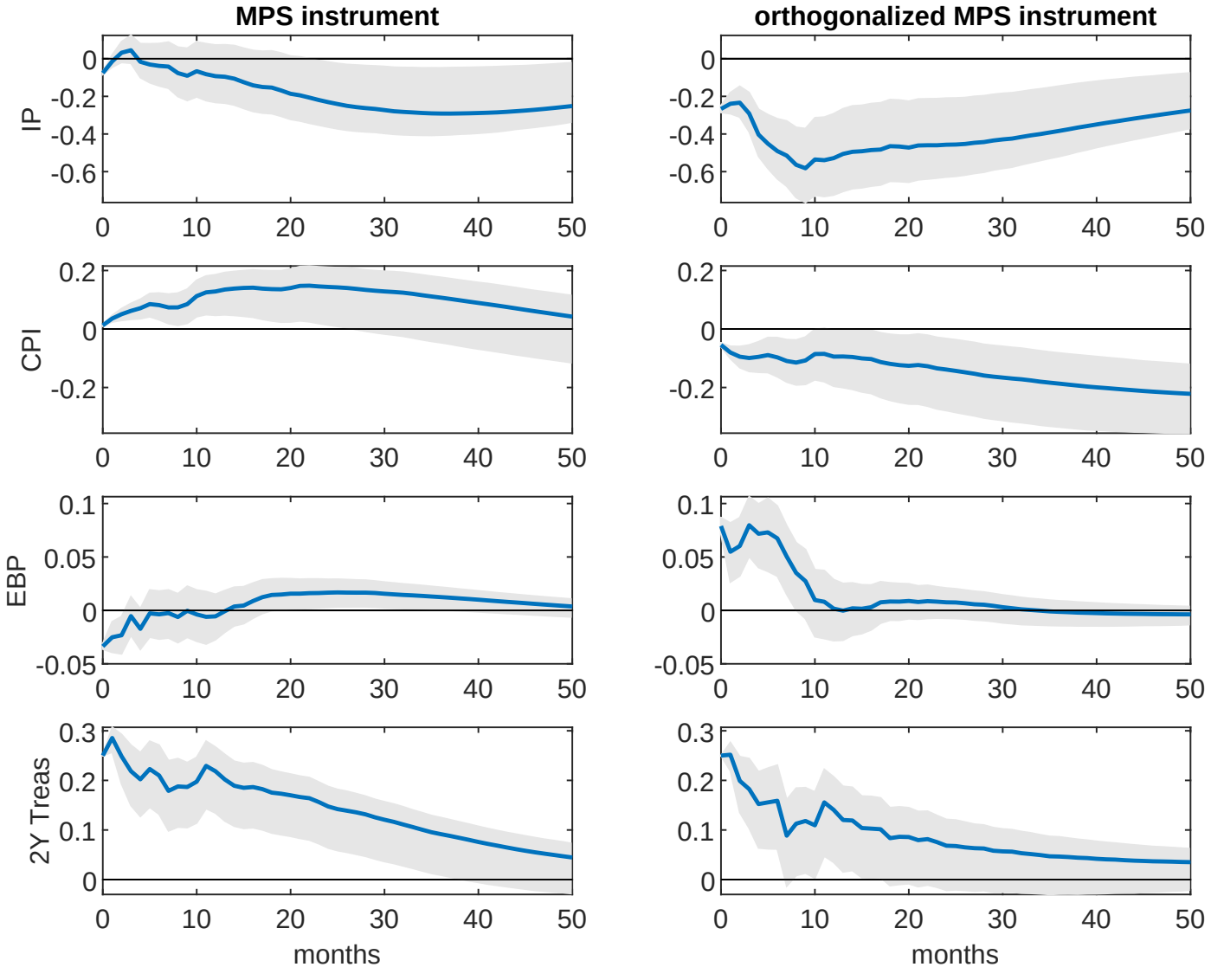
MPS measure	first-stage *F*-statistic
FOMC announcements only	8.19
FOMC + Chair Speeches	30.44
orthogonalized FOMC anncmts. only	1.83
orthogonalized FOMC + Chair Speeches	12.37

Revisiting Gertler-Karadi (2015), incl. Chair Speeches



Conclusions

- HF monetary policy surprises are correlated with macro and financial data that pre-date the announcements
- This correlation is consistent with private sector underestimating Fed's responsiveness to the economy, with learning
- High-frequency OLS regressions of asset price changes on mps_t remain valid
- But *ex post* correlation of mps_t with x_t violates exogeneity assumption of high-frequency IV regressions in SVARs, LPs
- HF monetary policy surprises need to be orthogonalized wrt macro and financial data to avoid biased SVAR, LP estimates
- Including additional MP announcements such as Chair speeches improves instrument relevance and IRF precision