Mind the Gap:
Disagreement and Credible Monetary Policy

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25-minute talk

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Motivation

Expectations, Policy Effectiveness, Credibility

*"[…] there are times when **market participants' policy expectations differ from the FOMC's**, which raises the question about the **effectiveness** of our communications in terms of their transparency and/or credibility."*

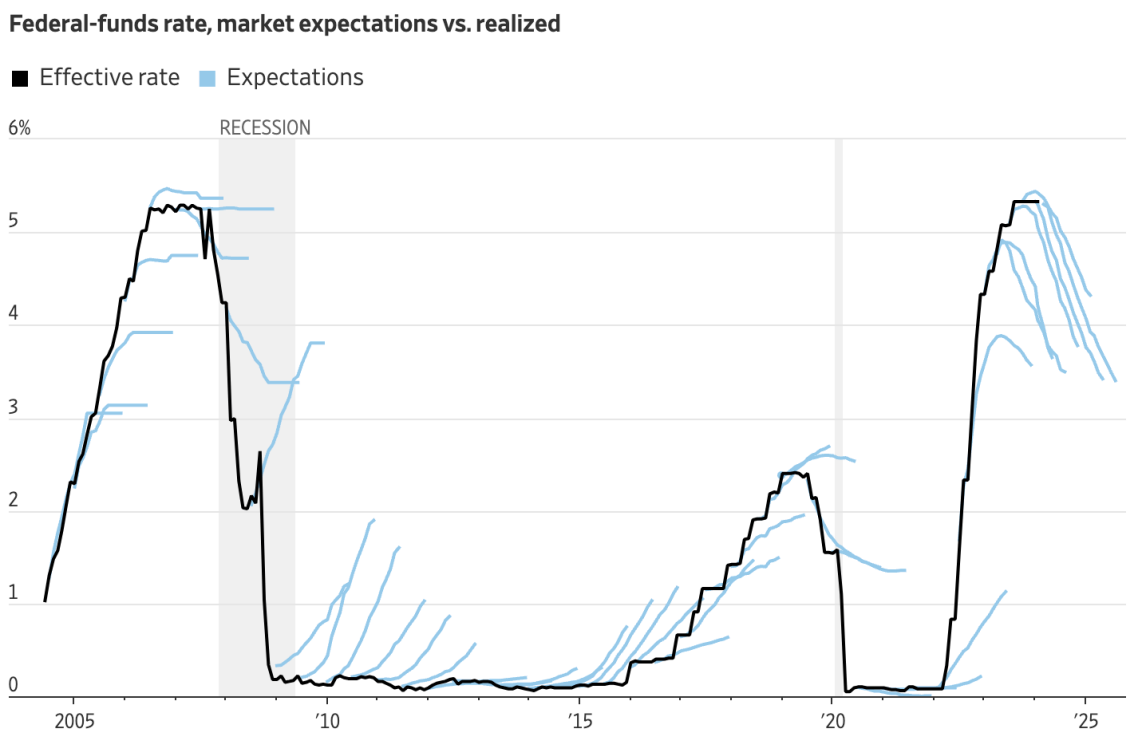
FOMC Statement, 2024

THE WALL STREET JOURNAL.

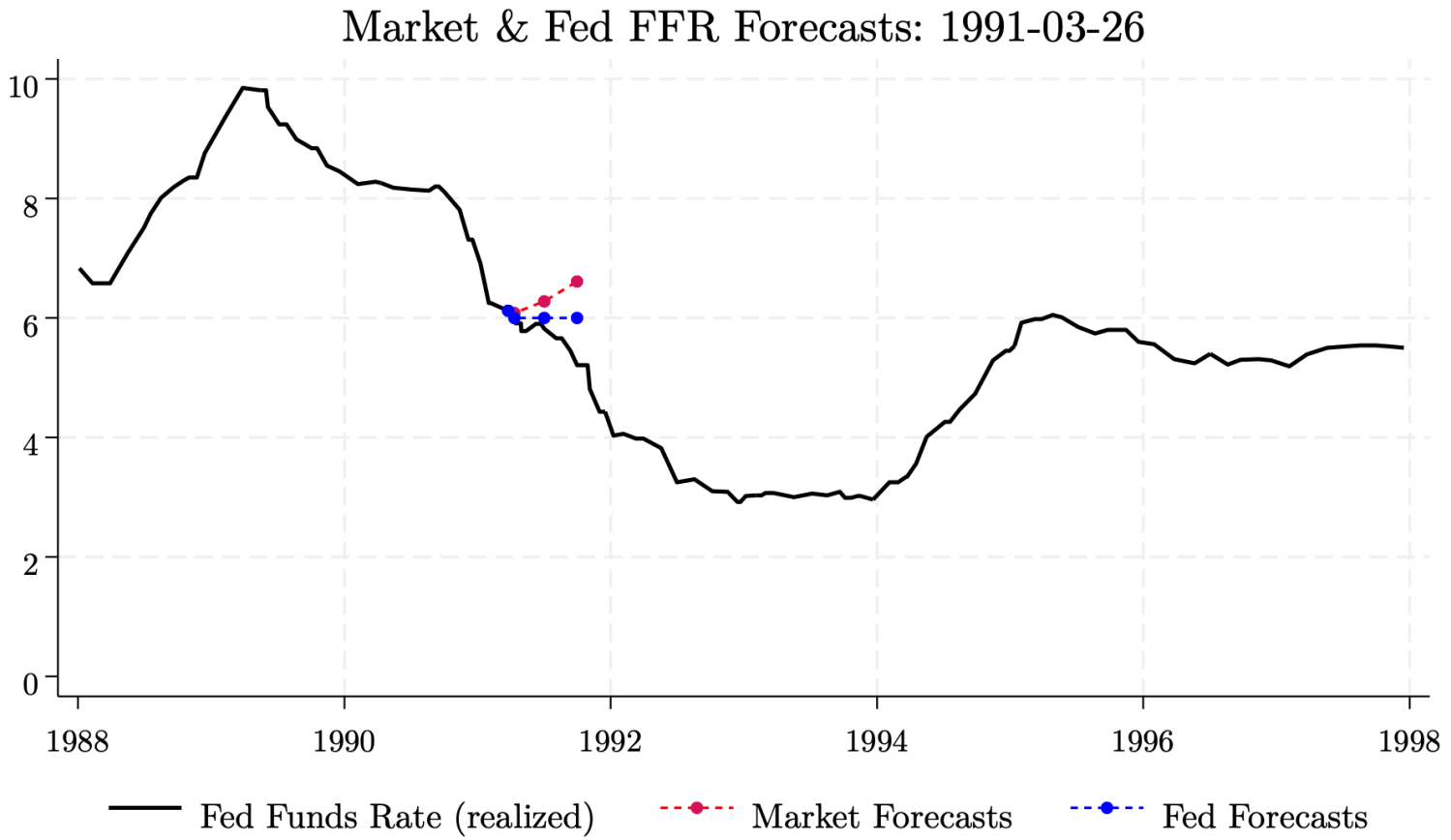
MARKETS & FINANCE | INVESTING

Investors Are Almost Always Wrong About the Fed

Wall Street clings to hopes for interest-rate cuts despite inflation fears



Fed vs. Market: A Moving Picture



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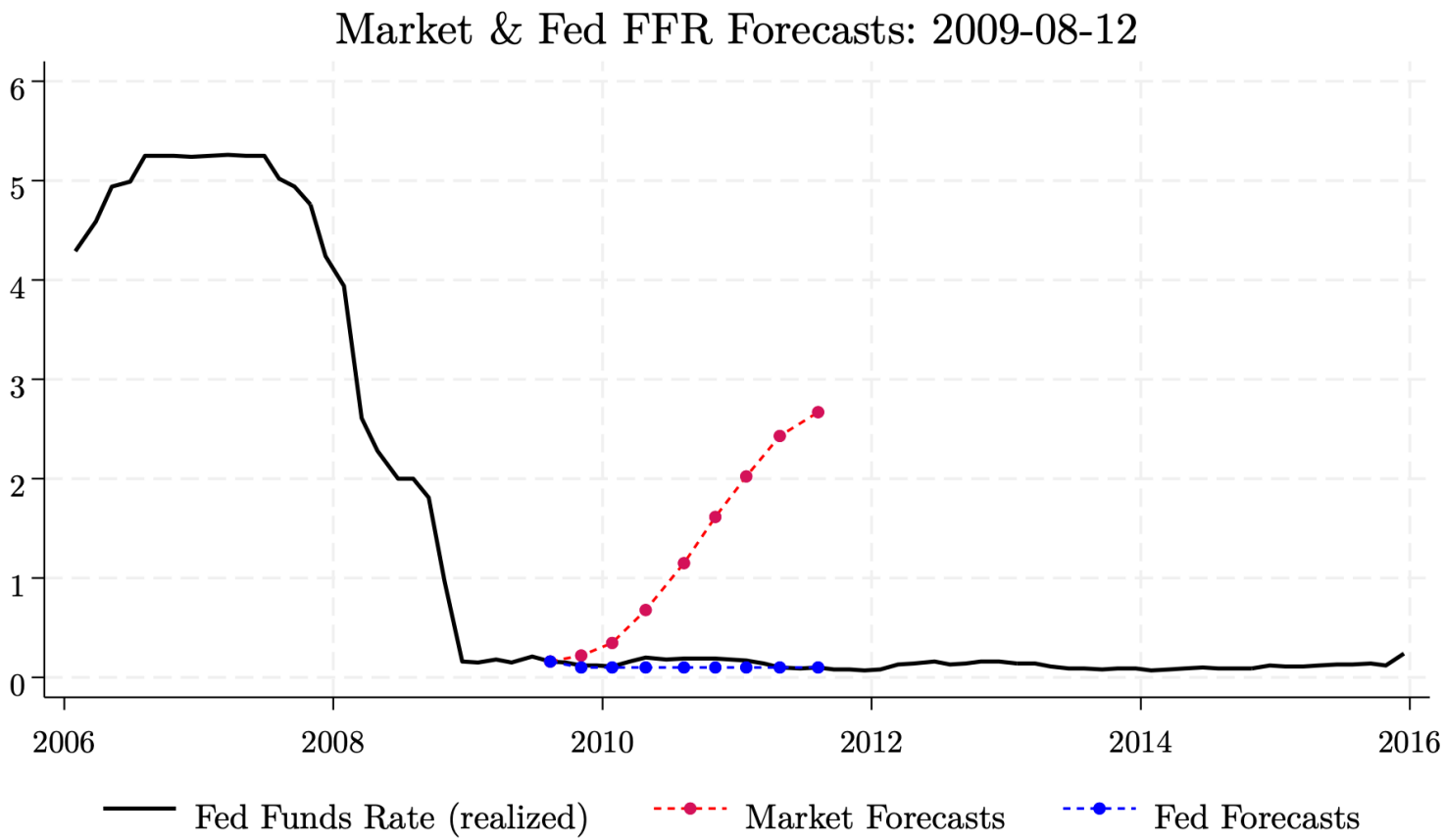
Fed's Forecasts from the Tealbook, produced 5-7 days *before* FOMC meeting

Market's Forecasts from Futures at *closing* price before FOMC meeting

Research Question

How does Fed-Market interest rate *disagreement* affect monetary policy transmission?



Plan for Today / Takeaways

How does Fed–Market *disagreement* affect monetary policy transmission?

1. Disagreement **matters**:
   - it *attenuates* (sometimes *reverses*) the response of activity to policy

2. "Information channels" can't be the whole story:
   - Forecasting Accuracy: **M** $\succ$ **F** + **No systematic** Fed Information Advantage

3. Generalized **New Keynesian** framework captures the mechanism:
   - Disagreement dynamics rationalize **attenuation**
   - State-space model of **learning** decomposes Disagreement drivers

Related Literature

1. **MP Perception, Communication & Forward Guidance**: Hamilton et al. (2011); Campbell et al. (2012, 2019); Melosi (2017); Nakamura & Steinsson (2018); Andrade et al. (2019); Bassetto (2019); Hansen et al. (2019); Jarociński & Karadi (2020); Miranda-Agrippino & Ricco (2021); Bauer & Swanson (2023a,b)

- *Predictability; policy vs. information shocks; CB communication*

Contribution: MP Transmission *net* of info effects

2. **Fed Information Advantage & Surveys**: Romer & Romer (2000); Gavin & Mandal (2003); D'Agostino & Whelan (2008); Vissing-Jorgensen (2020); Hoesch et al. (2023); Amodeo (2026);

- *Does the Fed hold an info edge?*

Contribution: Priced-in (& aligned!) $\mathbb{E}^M$ revert results: no systematic edge

3. **Disagreement, Credibility & Learning**: Bullard & Mitra (2002); Sims (2003); Moscarini (2007); Lorenzoni (2009); Eusepi & Preston (2010); De Grauwe (2011); Angeletos & Lian (2018); Gabaix (2020); Giacoletti et al. (2020); Couture (2021); Falck et al. (2021); **Caballero & Simsek** (2022); Dong et al. (2024); **Sastry** (2026)

- *Policy under opinionated markets; commitment; learning*

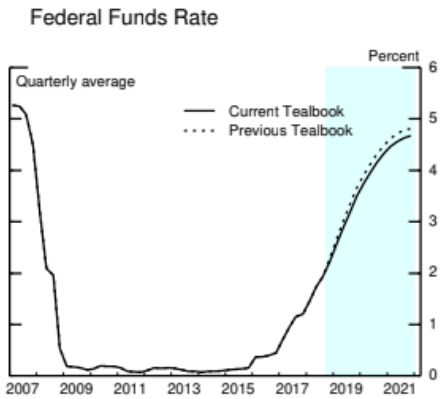
Contribution: Model disagreement; Belief-dependent transmission

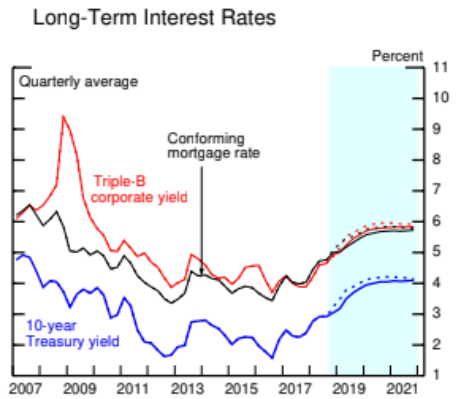
Empirics

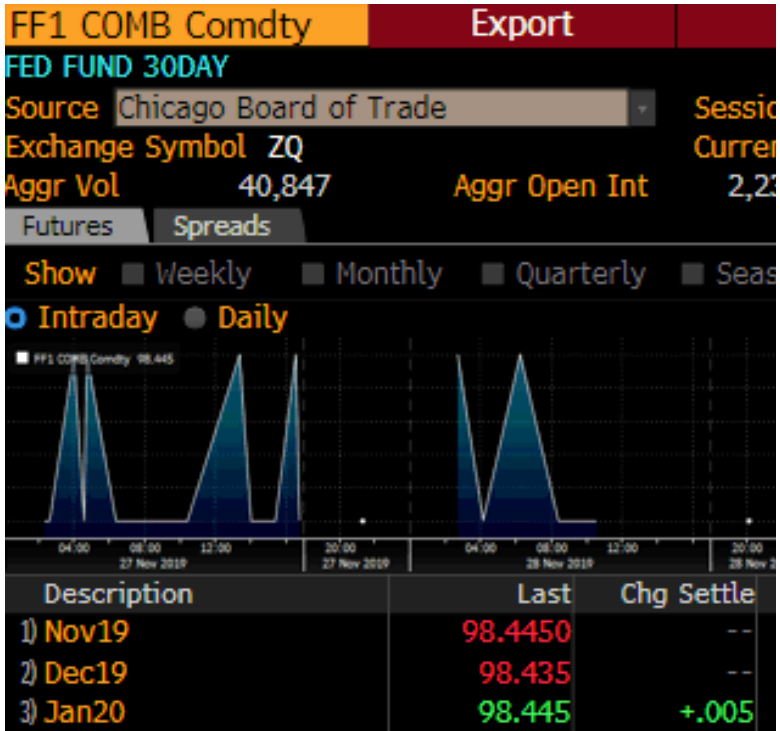
Data: Fed & Market Expectations; Shocks

- **MP dates**: NS (2018), Acosta (2024)
- **Fed**: Tealbooks, 0–8Q
- **Market**: FF futures, 0–8Q
- **Shocks**: Amodeo (2026); BS, GK, JK

Key Background Factors underlying the Baseline Staff Projection







$$y_{t+h} = \alpha_h s_t + \beta_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \gamma_h^l s_{t-l} + \sum_{l=0}^{L} \delta_h^l |\bar{D}_{t-l}| + \sum_{l=1}^{L} \zeta_h^l s_{t-l} |\bar{D}_{t-l}| + \epsilon_{t+h}$$

Treatment Homogeneity | Plot $\bar{D}_t$

- $\bar{D}_t \coloneqq \frac{1}{J} \sum_{j=0}^{J} \left[\mathbb{E}^F(i_{t+j}) - \mathbb{E}^M(i_{t+j}) \right]$: Average Disagreement over j
- s_t: MP shock; Amodeo (2026); BS (2023), GK (2015), JK (2020), ...

Coefficients of interest:

- α_h: response to s_t **in the absence** of Disagreement ($|\bar{D}_t| = 0$)
- β_h: response to s_t **proportional** to Disagreement ($|\bar{D}_t| > 0$)

$$\textbf{Total Effect}_h = \alpha_h + \beta_h |\bar{D}_t|$$

$\beta_h \neq 0 \implies$ response to MP is $f(|\bar{D}_t|)$

Corr(s_t, $|\bar{D}_t|$) | Lead–Lag(s_t, D_{t+h})

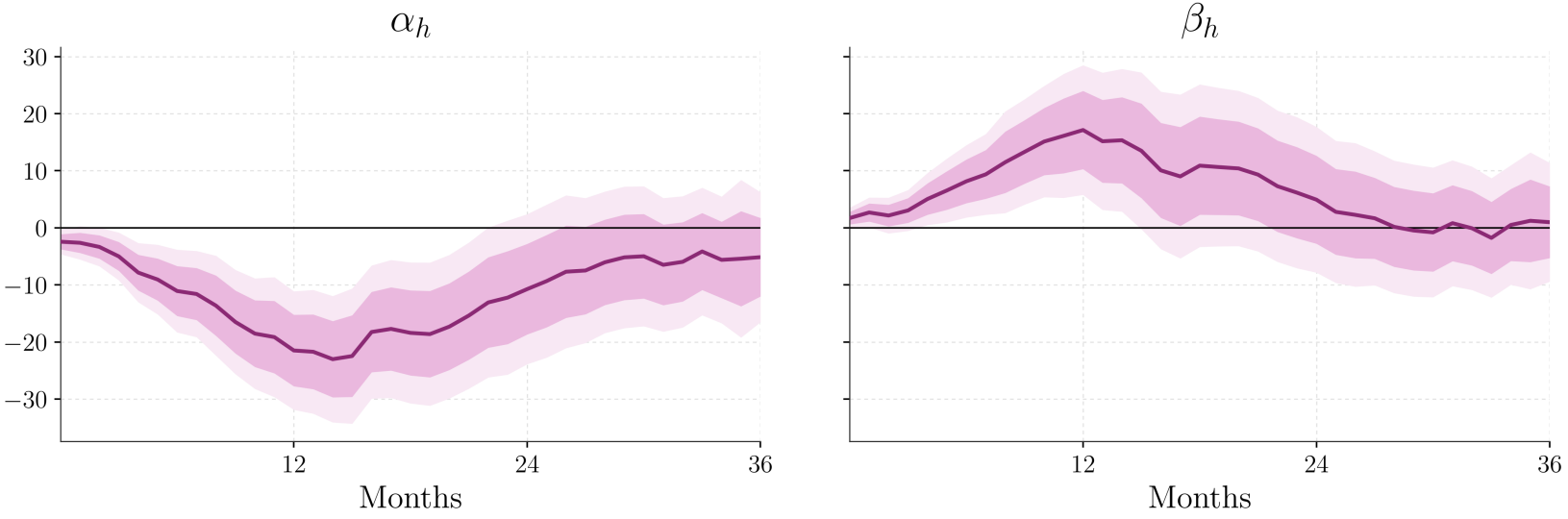
Disagreement attenuates MP Transmission

Let's start with a standard 3-variable system: $[CPI, IP, FFR]$

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t|\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \sum_{l=1}^{L} \boldsymbol{\zeta}_h^l s_{t-l}|\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

$\boldsymbol{\alpha}_h$: response to s_t when $|\bar{D}_t| = 0$ $\boldsymbol{\beta}_h$: response proportional to $|\bar{D}_t|$

Industrial Production



$\boldsymbol{\alpha}_h < 0$: CONTRACTION $\boldsymbol{\beta}_h > 0$: ATTENUATION

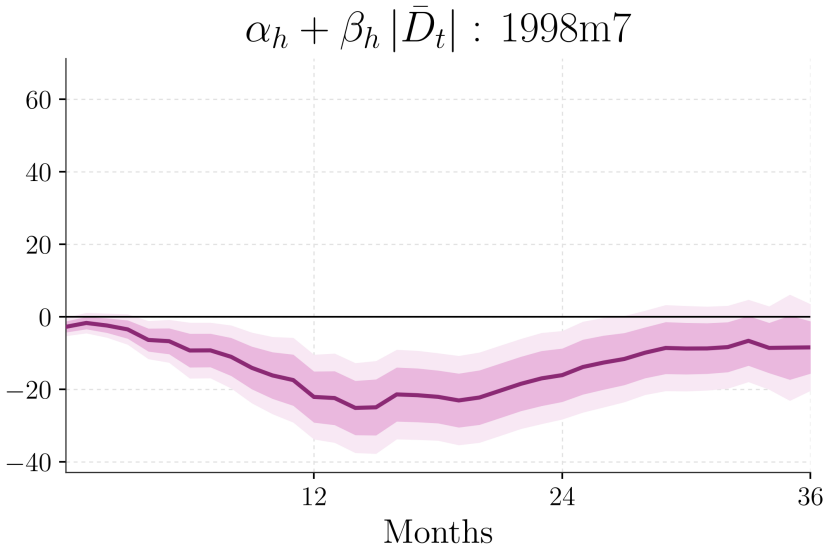
+25bp in $|\bar{D}_t|$ $\Longrightarrow$ ~50% attenuation contractionary 12-month IP response

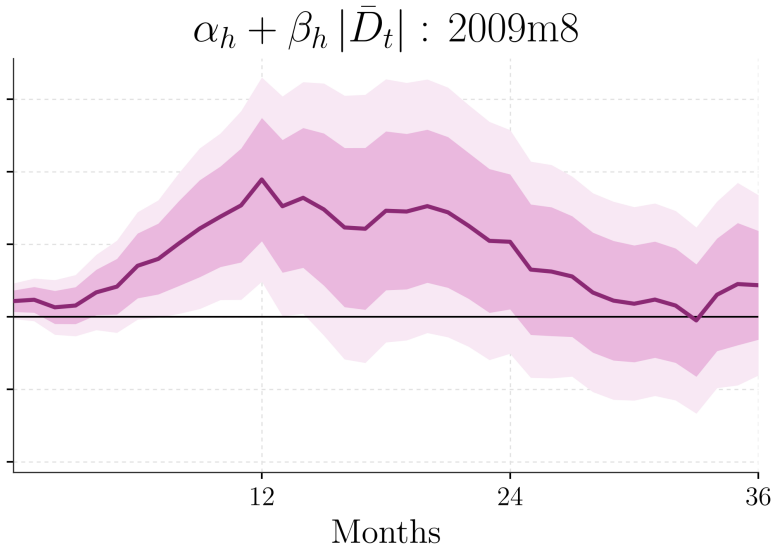
Scale: Low vs. High Disagreement

A sense of **scale**: *Total Effects* at High v. Low Disagreement

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \, \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h \, s_t + \boldsymbol{\beta}_h \, s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l \, s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l \, |\bar{D}_{t-l}| + \sum_{l=1}^{L} \boldsymbol{\zeta}_h^l \, s_{t-l} |\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

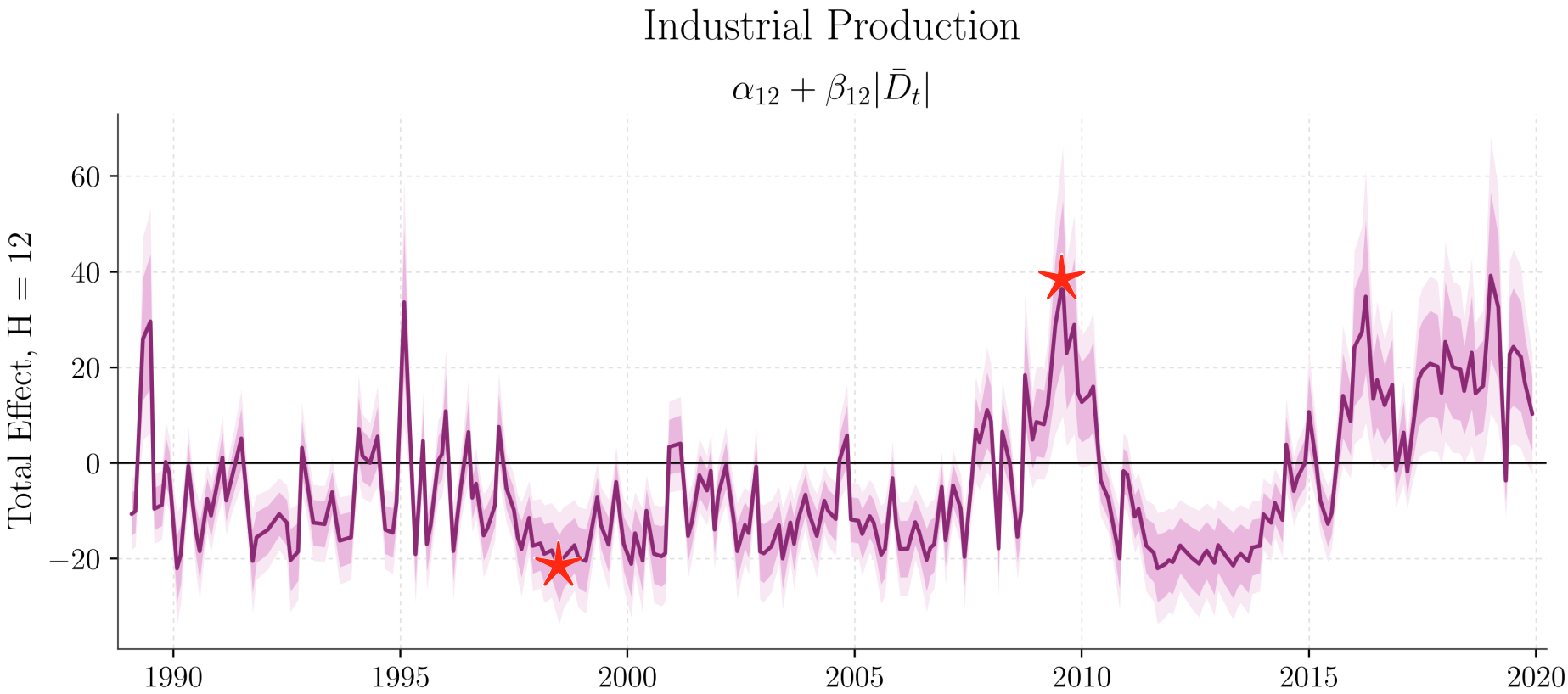
Industrial Production





12-Month Response Along the Sample

A historical perspective: Same result, along the sample



31% of months in sample exhibit a **positive IP response** point estimate!

Identification threats: What can go wrong?

What can go wrong? Alternative stories

1. Is disagreement a proxy for another state?

Uncertainty: $s_t \times$ VIX, EPU, SPF dispersion, MPU	→ β_h intact	VIX MPU
Inflation outlook: $s_t \times$ Fed–SPF *inflation* gap	→ β_h intact	Go
Who is more hawkish: signed + absolute gap	→ sign insignificant	Asym. Sign

2. Are the shocks different across states?

Distribution, information content	→ no difference	Go Rates

3. Is it the design?

Tealbook choice: SEP-implied disagreement	→ $\beta_h > 0$ holds	Go
No ZLB; other shocks; 6-variable system	→ $\beta_h > 0$ holds	ZLB Shocks Sys.
Omitted confounder: Imbens (2003) sensitivity	→ robust up to ≈15%	Go

Attenuation loads on the size of the rate-path gap

Is this just another Information Channel?

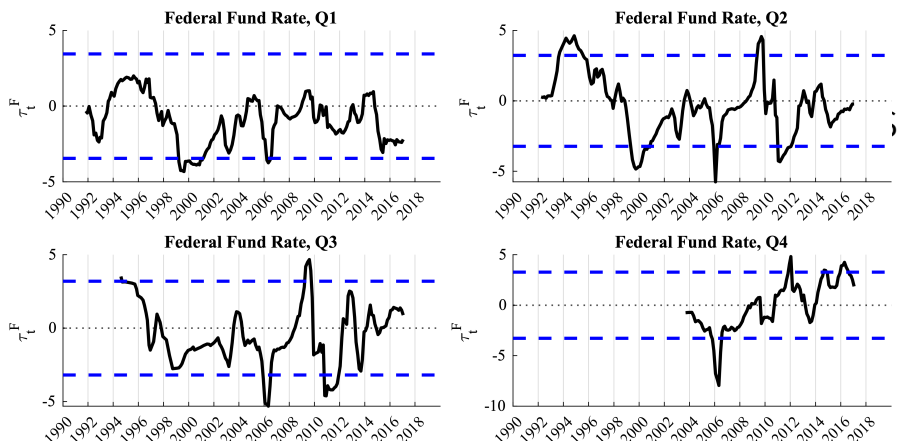
Monetary transmission **attenuates** with existing disagreement

Is this just another information channel story?

Conv. Info Channel $\longrightarrow$ Markets interpret shocks as Fed's "**superior info**"

Empirical Corollary $\longrightarrow$ Superior info should translate into **superior forecasts**

Is this just another information channel story?



; interpret shocks as Fed's "**superior info**"

Superior info should translate ir

Testable!

$\longrightarrow$ No evidence of systematic Fed edge

(1) M vs. F Accuracy "Horse Race"

Theory

Disagreement... in New Keynesian disguise

Mission: Embed Disagreement in New-Keynesian Framework

I relax Full Information and assume Market & Fed observe different signals

$$c_t = -\frac{1}{\sigma}\left[i_t - \mathbb{E}_t^M(\pi_{t+1}) - r_t^N\right] + \mathbb{E}_t^M(c_{t+1})$$

Next, use $D_{t+h|t} := \mathbb{E}_t^F(i_{t+h}) - \mathbb{E}_t^M(i_{t+h})$ $\quad (\mathbb{E}_t^M(\pi_{t+h}) = \mathbb{E}_t^F(\pi_{t+h})$, Relaxed Soon)

$$c_t = \underbrace{-\frac{1}{\sigma}\sum_{h=0}^{\infty}\left\{\mathbb{E}_t^F(i_{t+h}) - \mathbb{E}_t^F(\pi_{t+h+1}) - r_{t+h}^N\right\}}_{c_t^{\text{Agreement}}} + \underbrace{\frac{1}{\sigma}\sum_{h=1}^{\infty} D_{t+h|t}}_{W_t \text{ belief wedge}}$$

Disagreement enters the Euler equation as an intertemporal wedge

Model IRFs: a Decomposition

Let's study the **effect of a monetary shock** $u_t^S = \rho_S\, u_{t-1}^S + \varepsilon_t^M$

$$\begin{cases} y_t = -\dfrac{1}{\sigma}\left[\phi_\pi\ \mathbb{E}_t^F(\pi_t) + u_t^S - \mathbb{E}_t^F(\pi_{t+1})\right] + \mathbb{E}_t^F(y_{t+1}) - \mathbb{E}_t^F(W_{t+1}) + W_t & \text{IMPOSING C = Y} \\ \pi_t = \beta\ \mathbb{E}_t^M(\pi_{t+1}) + \kappa\, y_t & W_t \text{ ONLY ENTERS IS} \end{cases}$$

Solving for Output's IRF

$$\Psi_y = -\frac{(1-\beta\rho_S)(1-\sigma(1-\rho_S)\Psi_W)}{\sigma(1-\beta\rho_S)(1-\rho_S)+\kappa(\phi_\pi-\rho_S)}$$

Ψ_y (Output IRF) is Ψ_W–dependent $\longrightarrow$ Map to Empirical State-Dependent IRFs!

$$\Psi_y = \underbrace{-\frac{(1-\beta\rho_S)}{\sigma(1-\beta\rho_S)(1-\rho_S)+\kappa(\phi_\pi-\rho_S)}}_{\text{Baseline} < 0 \quad (\alpha)} + \underbrace{\frac{(1-\beta\rho_S)\,\sigma(1-\rho_S)\,\Psi_W}{\sigma(1-\beta\rho_S)(1-\rho_S)+\kappa(\phi_\pi-\rho_S)}}_{-\text{Baseline} \times \Delta\text{Disagreement} \quad (\beta)}$$

State-Dependent (Testable) Predictions

$$\Psi_y^{H,L} = -\frac{(1-\beta\rho_s)}{\sigma(1-\beta\rho_s)(1-\rho_s)+\kappa(\phi_\pi-\rho_s)} + \frac{(1-\beta\rho_s)\sigma(1-\rho_s)\,\Psi_W^{H,L}}{\sigma(1-\beta\rho_s)(1-\rho_s)+\kappa(\phi_\pi-\rho_s)}$$

Empirical Restrictions. $\beta_h > 0 \implies \Psi_y^L < \Psi_y^H \iff \underbrace{\Psi_W^L < \Psi_W^H}_{\text{Testable!}}$

$$W_{t+h} = \mathbf{c}_h + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t|\bar{D}_t| + \text{Lags}_{t-1}^L + \boldsymbol{\varepsilon}_{t+h}$$

Differentiating with respect to s_t:

$$\underbrace{\frac{\partial W_{t+h}}{\partial s_t}}_{\Psi_W^{H,L}!} = \boldsymbol{\alpha}_h + \boldsymbol{\beta}_h|\bar{D}_t|$$

Expectational Wedge

What drives Disagreement?

State space. $z_t = \left[x_t,\ \Phi_t,\ u_t^G\right]'$ fundamentals, rule perception, FG credibility

Estimation. Nonlinear in (Φ_t, x_t) $\Longrightarrow$ **Extended** Kalman Filter

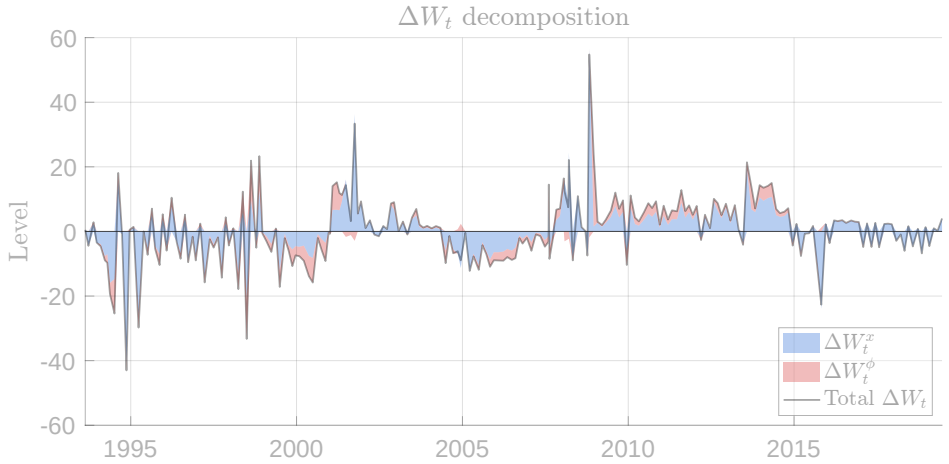
Anatomy of disagreement.

$$
\begin{aligned}
D_{t+h|t} &= \mathbb{E}_t^F(i_{t+h}) - \mathbb{E}_t^M(i_{t+h}) \\
&= \rho^h\left(\hat{\Phi}_{t+h}^{\prime F}\hat{x}_t^F - \hat{\Phi}_{t+h}^{\prime M}\hat{x}_t^M\right) + \rho_u^h\left(\hat{u}_t^{G,F} - \hat{u}_t^{G,M}\right) + \text{Cov}
\end{aligned}
$$

- $\hat{x}_t^i$: disagreement about **fundamentals** (information channel)
- $\hat{\Phi}_{t+h}^{\ i}$: disagreement about **policy-rule perception** (response-to-news)
- $\hat{u}_t^{G,i}$: disagreement about **forward-guidance credibility** (credibility channel)

Higher disagreement $\longmapsto$ slower learning $\longmapsto$ attenuated transmission

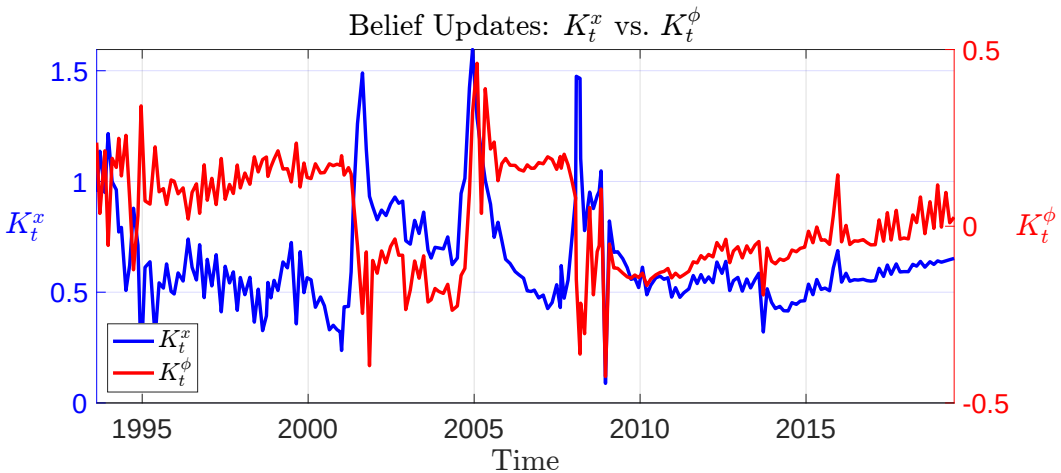
2-D EKF: Wedge and Belief Primitives *illustrative*



Economy or rule: what moves W_t?

$$\Delta W_t = \Delta W_t^x + \Delta W_t^\phi$$

Read: wedge's move splits into revised beliefs about economy (blue) v rule (red)



How much each belief update?

$$K_{i,t}^x,\ K_{i,t}^\phi$$

Read: how far each belief moves per unit of surprise, economy (blue) v rule (red)

Mechanism: higher disagreement ⇒ a surprise reads more as noise ⇒ smaller gains $K_{i,t}$ ⇒ the Market revises its path less ⇒ attenuated transmission

Concluding Remarks

1. **Disagreement** between Fed and Market *matters*

   Fed-Market belief gaps **attenuate** the transmission of MP to output

2. Attenuation **is not** just hidden information

   Forecast and information-advantage tests do not support a systematic Fed edge

3. Disagreement is **tractable** in **New Keynesian models**

   a. It appears as a **belief wedge** muting intertemporal substitution

   b. State-space model of **learning** decomposes Disagreement drivers

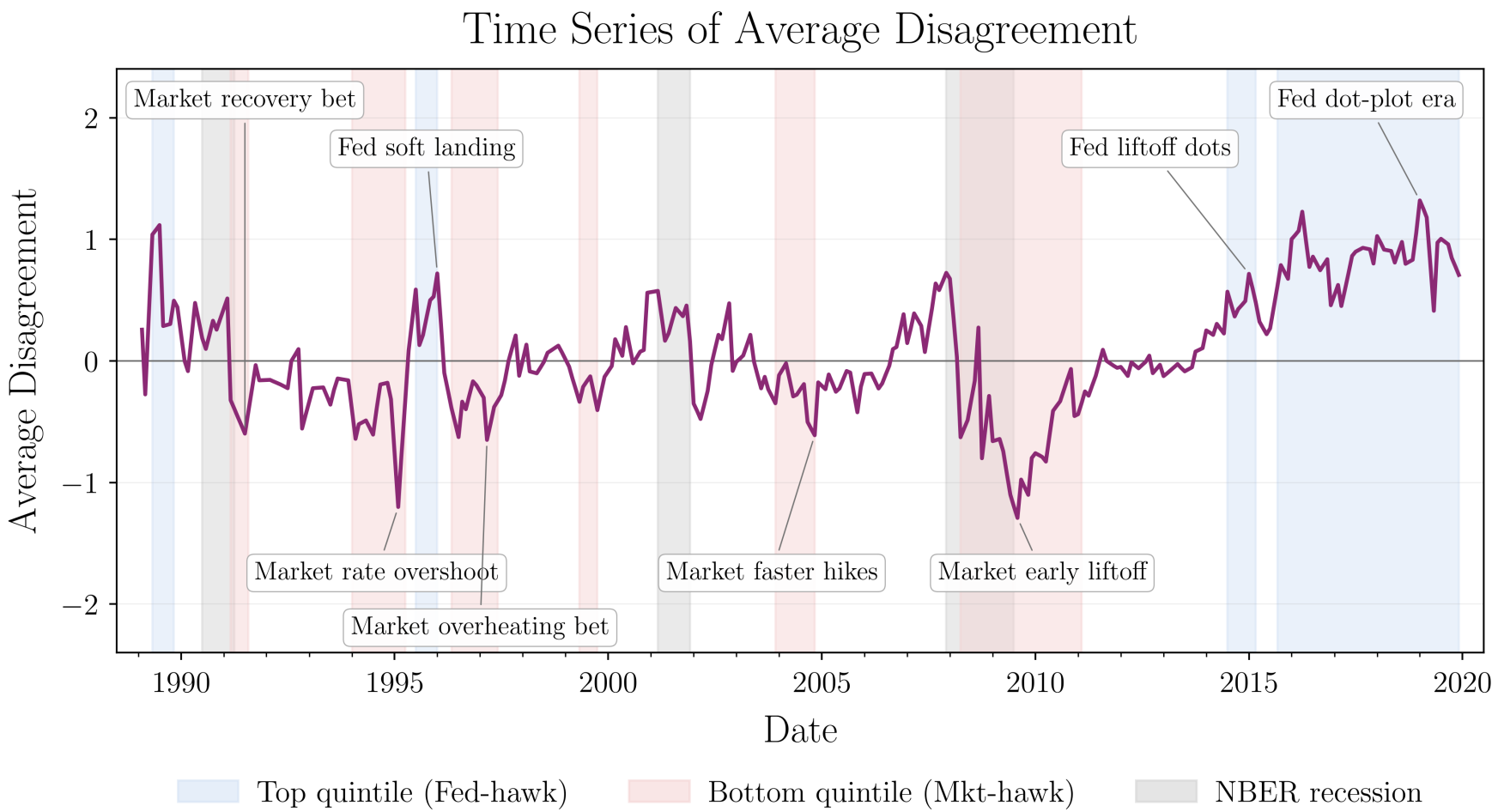
Dashboard: Visit the Paper's Webpage

If you would like to see again the Empirical Results, and play with shocks, controls and much more, visit

https://www.amodeo-mindthegap.com/

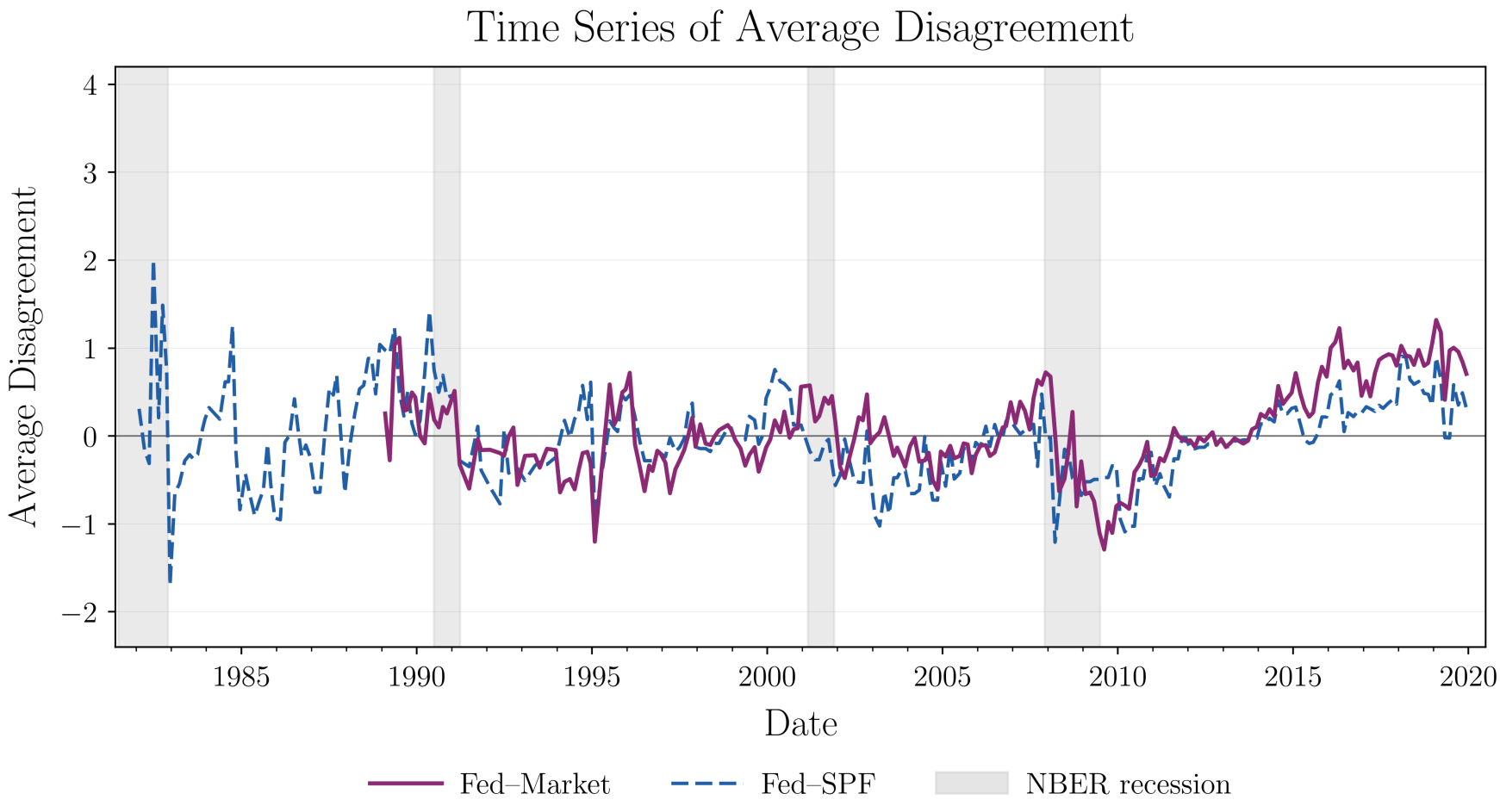
Appendix

Time Series of Average Disagreement



Market- and Survey-Based Disagreement

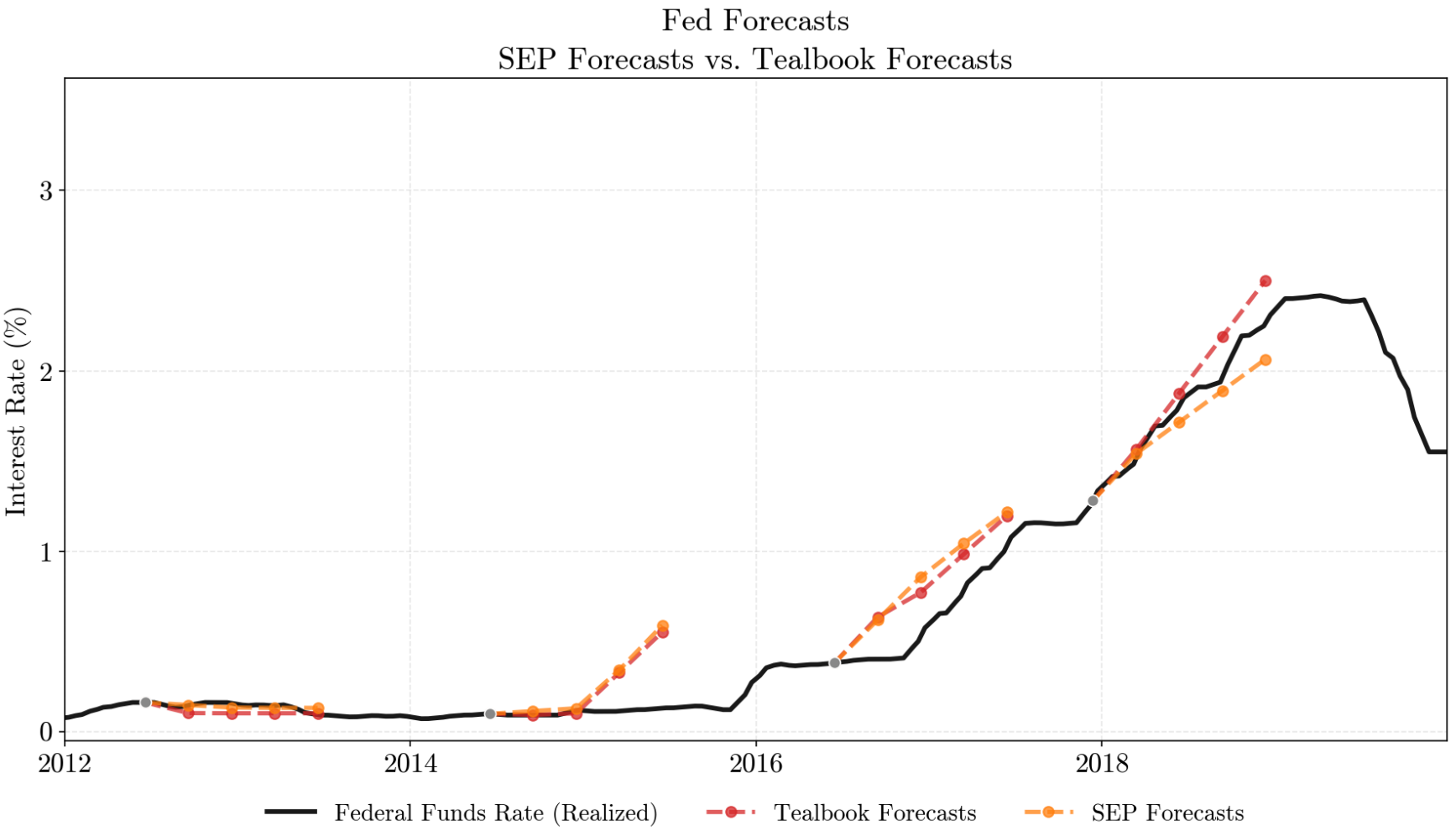
Back



Survey-based *Fed–SPF* gap tracks the Market-based Disagreement.

Alternative Fed/Market forecasts

Back



Disagreement: Descriptive Statistics

Back

Panel A. Unconditional moments

	Mean	SD	AR(1)	$Pr(>0)$
$\bar{D}_t$	0.058	0.487	0.925	0.462
$\lvert\bar{D}_t\rvert$	0.383	0.308	0.865	1.000

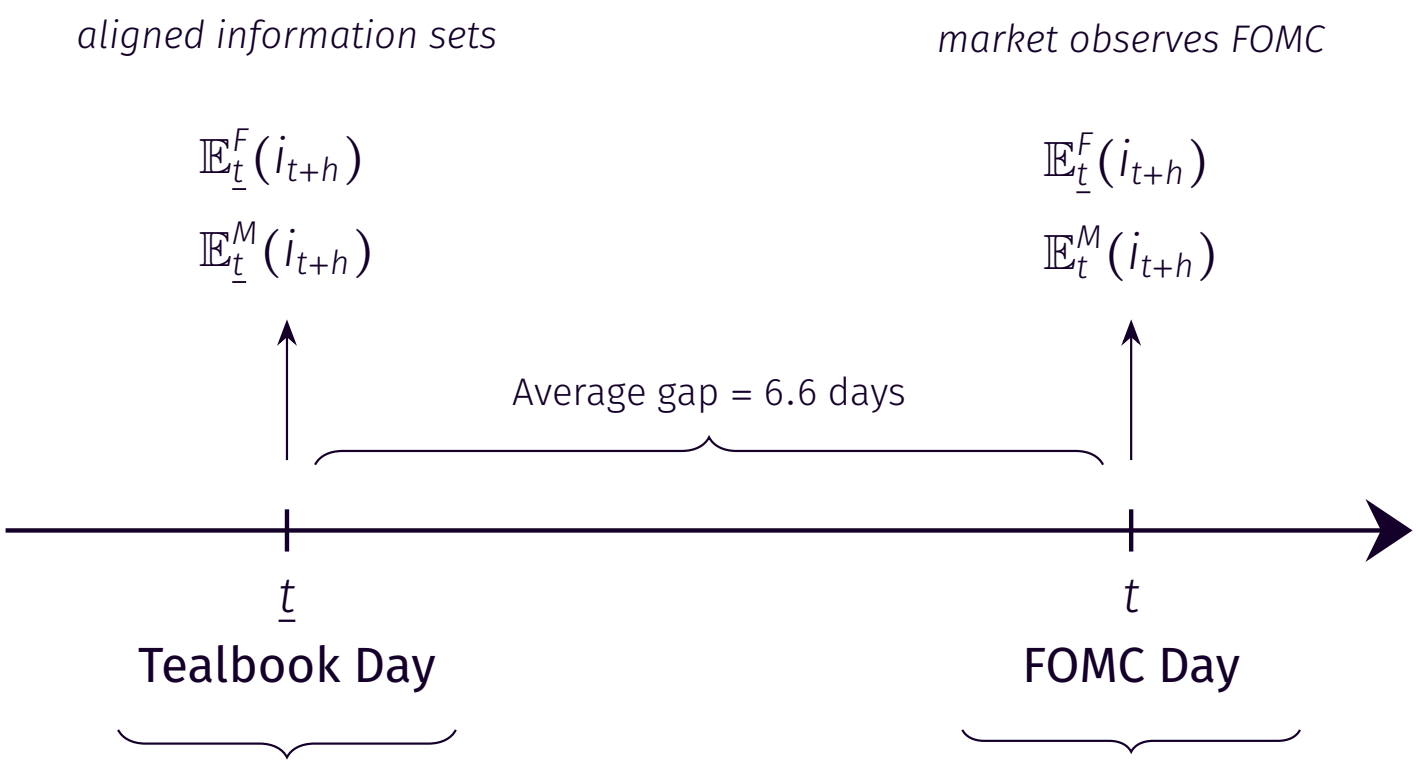
Panel B. Means by business-cycle regime

	Exp. (N=334)	Rec. (N=36)	Rec−Exp	p-val
$\bar{D}_t$	0.069	-0.041	-0.110	0.571
$\lvert\bar{D}_t\rvert$	0.376	0.450	0.074	0.320

Notes: Monthly data, 1988:10–2019:12, NBER recessions. Units: percentage points. $\bar{D}_t = \frac{1}{H}\sum_h (\mathbb{E}^F i_{t+h} - \mathbb{E}^M i_{t+h})$; $|\bar{D}_t|$ is its absolute value.

Measuring Expectations: a Timeline

Back



$$D_{t+h|\underline{t}} = \mathbb{E}_{\underline{t}}^F(i_{t+h}) - \mathbb{E}_{\underline{t}}^M(i_{t+h})$$

- Accuracy comparison
- Information Advantage Tests

$$D_{t+h|t} = \mathbb{E}_{\underline{t}}^F(i_{t+h}) - \mathbb{E}_{t}^M(i_{t+h})$$

- Reduced-form forecasting (VAR)
- Causal analysis: robustness LPs

Baseline local projections: market expectations from the day before the meeting

Information-Advantage Fluctuation Tests: Details

Back

Setup. For variable x and horizon h:

$$x_{t+h} - x^{\text{BCEI}}_{t+h|t} = \delta + \beta^{GB} x^{\text{GB}}_{t+h|t} + \beta^{\text{BCEI}} x^{\text{BCEI}}_{t+h|t} + \eta_{t+h}.$$

Roll m-meeting windows, estimate $\hat{\beta}^{GB}_t$ and

$$\tau^{GB}_t = \hat{\beta}^{GB}_t \Big/ \sqrt{\hat{\sigma}^2_{GB}/m}, \qquad \mathcal{I}^{GB} = \max_t |\tau^{GB}_t|$$

$\hat{\sigma}^2_{GB}$: Newey–West HAC with truncation $\lfloor m^{1/4} \rfloor$.
Rejection: Fed's info hedge at *some* t

Implementation.

- Choose m (HRS use $m = 60$ meetings);
- Expectations: BCEI vs. Greenbook

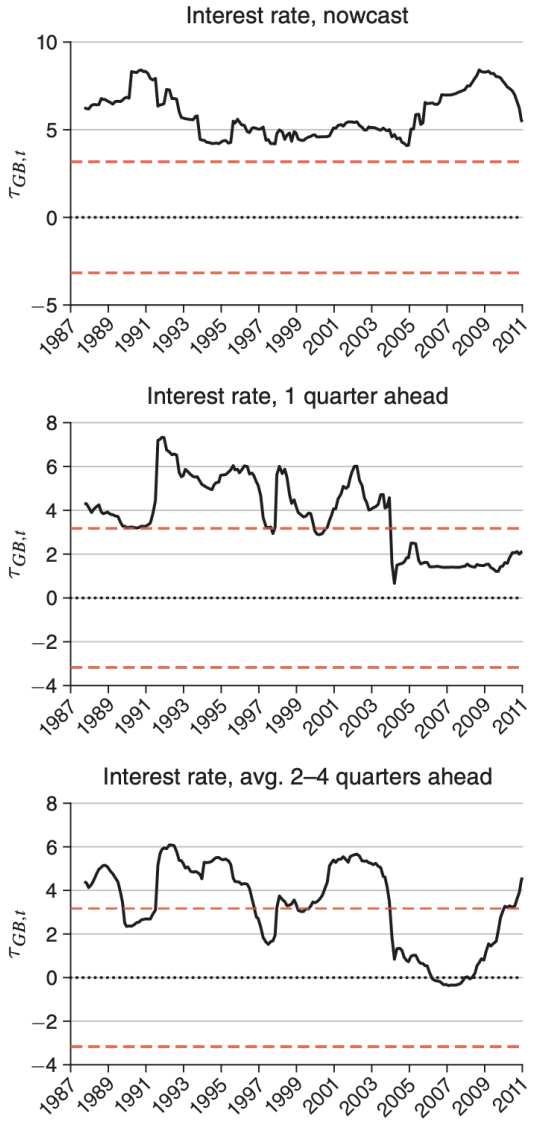


Figure 1: HRS (2023), Figure 2 – *AEJ: Macroeconomics*

Forecast-Accuracy Fluctuation Test

Back

Is the Fed more accurate, over time?

Giacomini & Rossi (2010) rolling test:

$$d_{s,h} = e^{M2}_{s,h} - e^{F2}_{s,h}$$

Constant-only regression:

$$d_{s,h} = \mu_{t,h} + u_{s,h}.$$

Test statistic and fluctuation measure

$$\tau^{GR}_{t,h} = \bar{d}_{t,h} \Big/ \left(\widehat{\sigma}_{t,h}/\sqrt{m}\right)$$

$$\mathcal{A}_h = \max_t \tau^{GR}_{t,h}$$

$$H_0 : \mu_{t,h} = 0 \ \forall t \qquad H_1 : \exists t \ \mu_{t,h} > 0$$

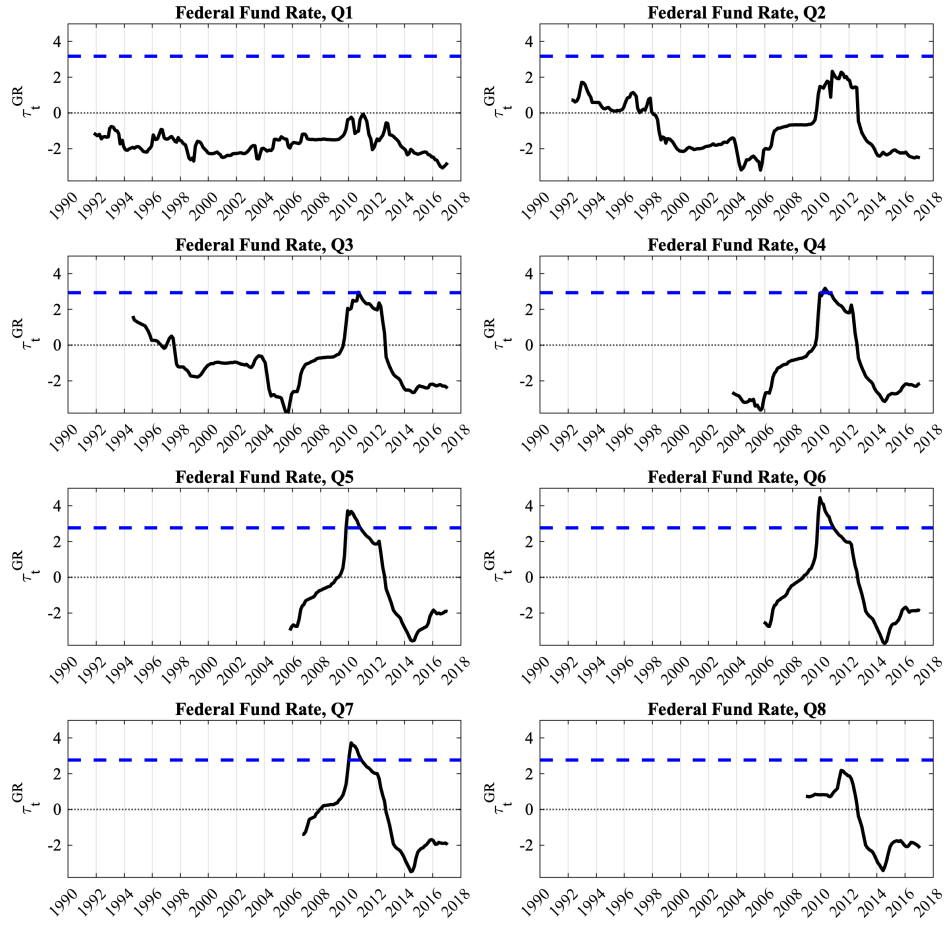


Figure 2: Rolling $\tau^{GR}_{t,h}$, $m = 30$ meetings; one-sided 5% Giacomini–Rossi bands; futures aligned to Tealbook.

Interpretation. τ^{GR} almost never above the 5% line: no durable $F > M$

Lag-Augmented Local Projection à la Montiel Olea & Plagborg-Møller (2021)

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t|\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \sum_{l=1}^{L} \boldsymbol{\zeta}_h^l s_{t-l}|\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h} \quad (1)$$

- $\bar{D}_t \coloneqq \frac{1}{J} \sum_{j=0}^{J} \left[\mathbb{E}^F(i_{t+j}) - \mathbb{E}^M(i_{t+j})\right]$: Average Disagreement over j
- s_t: MP shock; Amodeo (2026); BS (2023), GK (2015), JK (2020), ...

Coefficients of interest:

- $\boldsymbol{\alpha}_h$: response to s_t **in the absence** of Disagreement ($|\bar{D}_t| = 0$)
- $\boldsymbol{\beta}_h$: response to s_t **proportional** to Disagreement ($|\bar{D}_t| > 0$)

$$\textbf{Total Effect}_h = \boldsymbol{\alpha}_h + \boldsymbol{\beta}_h|\bar{D}_t| \quad (2)$$

$\boldsymbol{\beta}_h \neq 0 \implies$ response to MP is $f(|\bar{D}_t|)$

0.02 | Lead–Lag(s_t, D_{t+h})

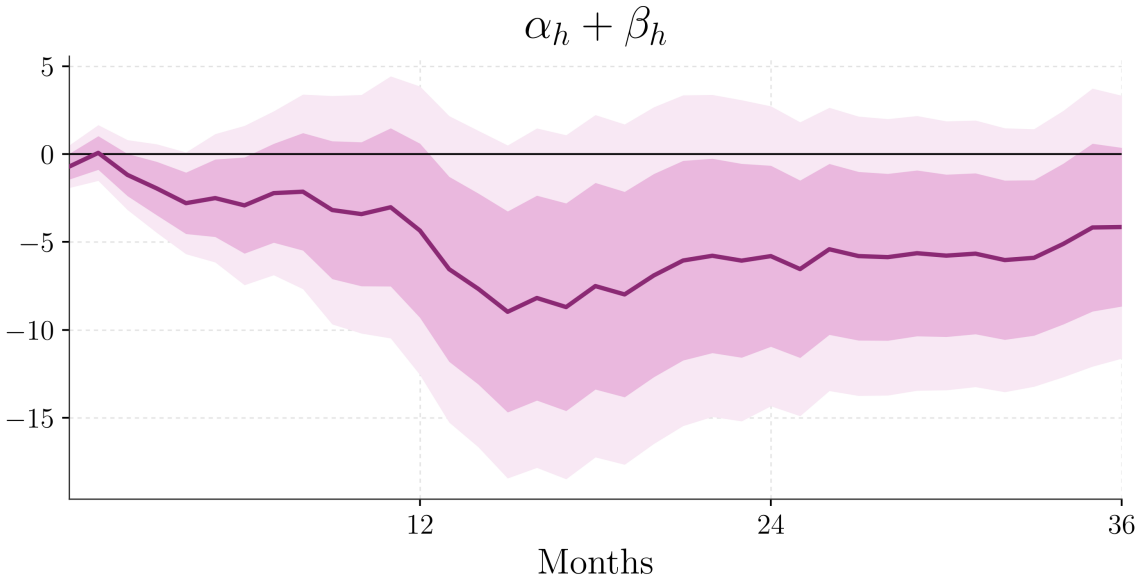
Monetary Policy and Disagreement: $\alpha_h + \beta_h|\bar{D}_t|$

Back

Let's start with a standard 3-variables system: $[CPI, IP, FFR]$

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t|\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \sum_{l=1}^{L} \boldsymbol{\zeta}_h^l s_{t-l}|\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



Monetary Policy and Disagreement – Shocks I: JK (2020)

Back

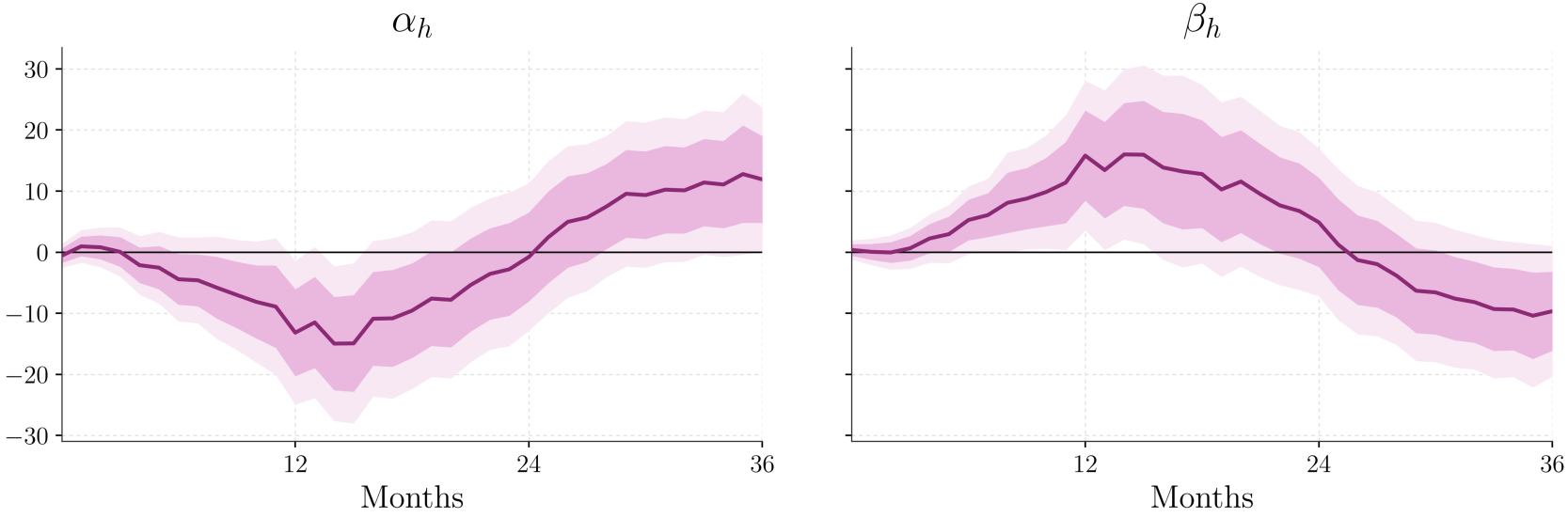
3-variables system: $[CPI, IP, FFR]$

s_t : Jarociński-Karadi (2020)

MAR (2021)

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



Monetary Policy and Disagreement – Shocks II: MAR (2021)

Back

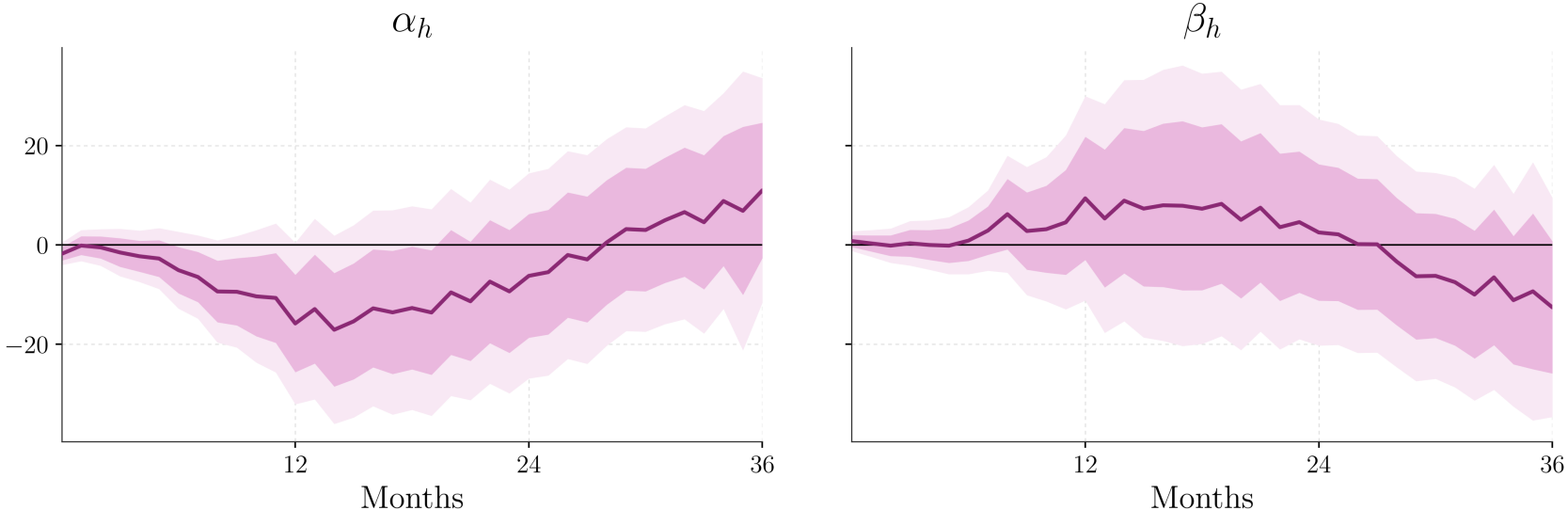
3-variables system: $[CPI, IP, FFR]$

s_t : Miranda Agrippino-Ricco (2021)

GK (2015)

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



Monetary Policy and Disagreement – Shocks III: GK (2015)

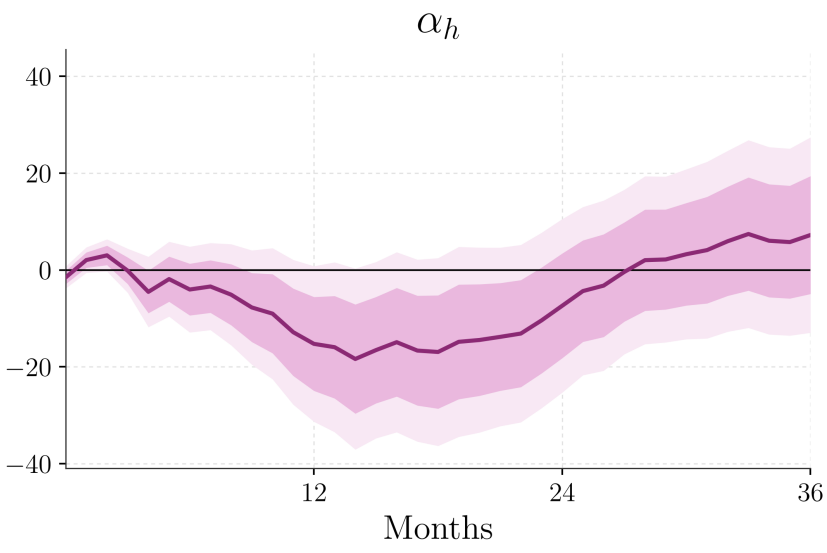
Back

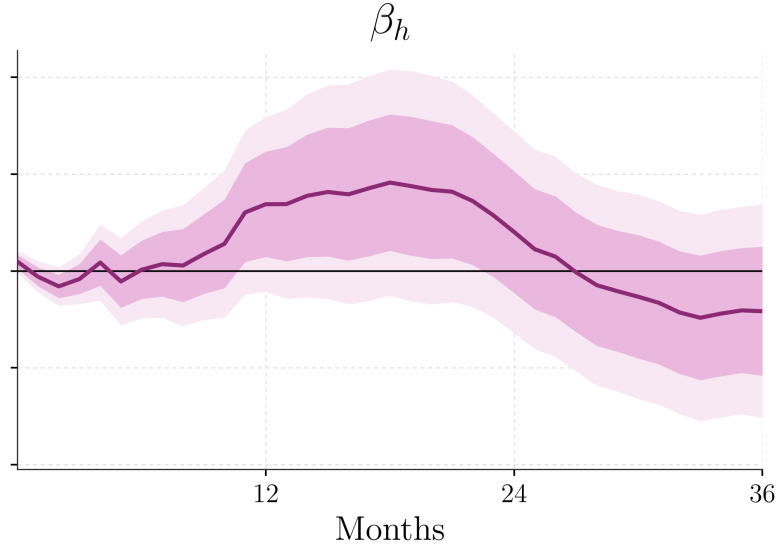
3-variables system: $[CPI, IP, FFR]$

s_t : Gertler-Karadi (2015)

$$y_{t+h} = c_h + \sum_{l=1}^{L} \Phi_h^l y_{t-l} + \alpha_h s_t + \beta_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \gamma_h^l s_{t-l} + \varepsilon_{t+h}$$

Industrial Production





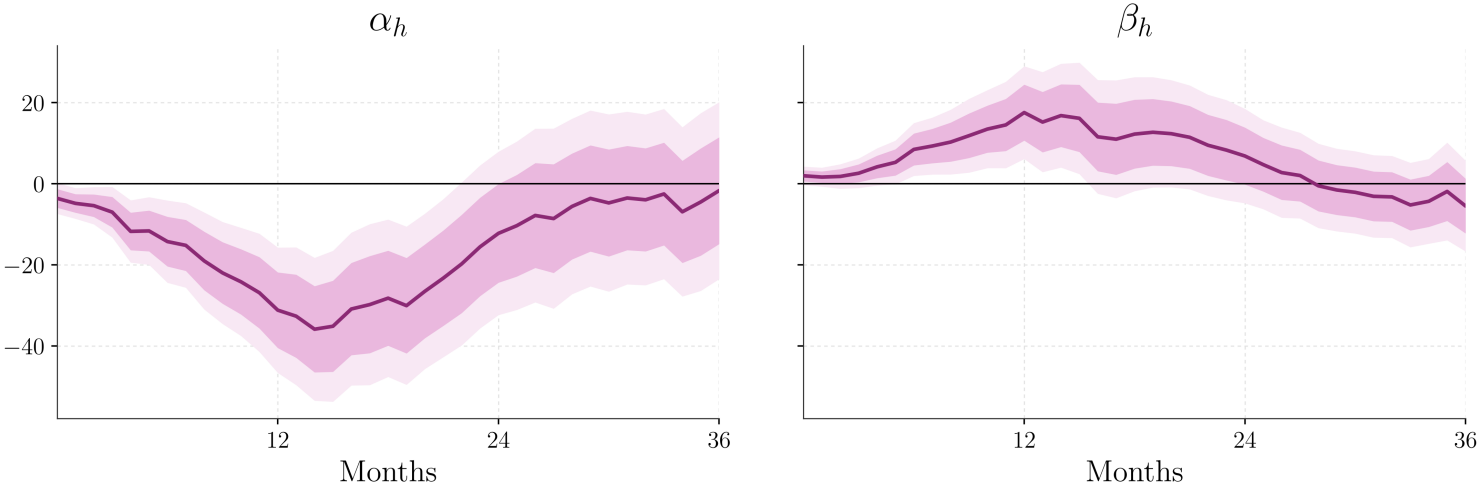
What can go wrong?

Key possible confounders: **Uncertainty**; Risk Premia; ZLB

Types of uncertainty: (*i*) financial (VIX); (*ii*) Macro (SPF); (*iii*) Policy

(*i*) $$\mathbf{y}_{t+h} = \mathbf{c}_h + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \boldsymbol{\delta}_h s_t VIX_t + \boldsymbol{\theta}_h \text{LAGS}^L_{t-1} + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



Financial uncertainty leaves $\boldsymbol{\beta}_h$ intact

Disagreement and *Macro* Uncertainty

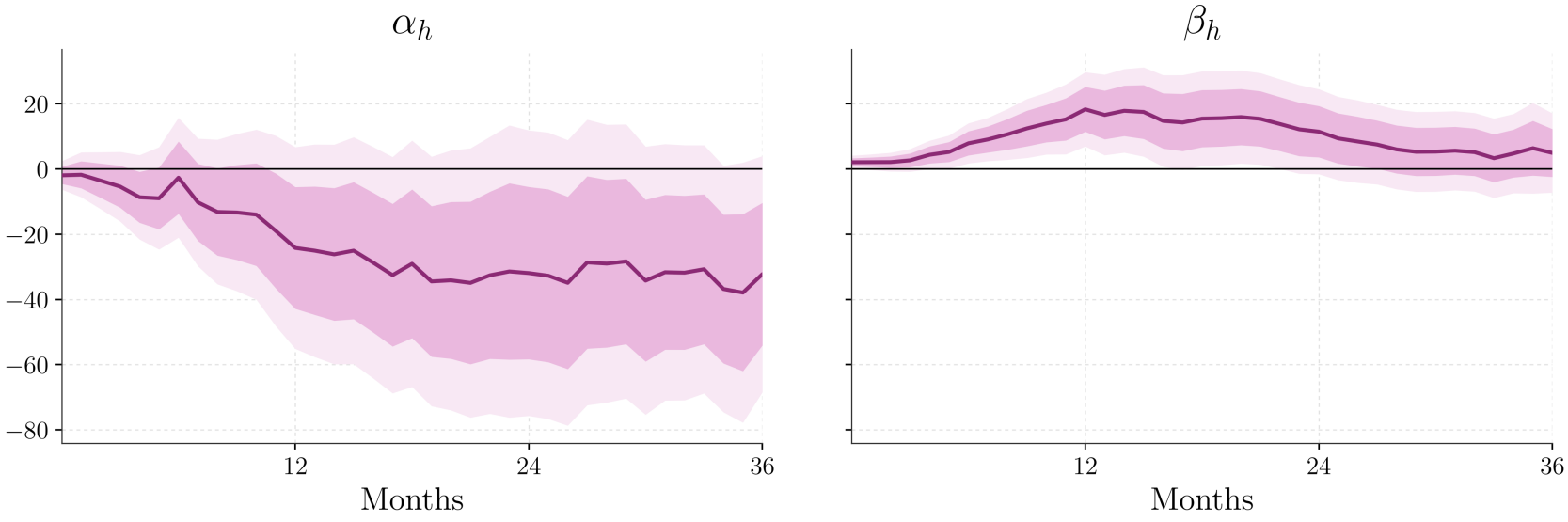
Back

3-variables system + SPF: $[CPI, IP, FFR, \text{SPF}]$

SPF forecast dispersion

$$y_{t+h} = c_h + \alpha_h s_t + \beta_h s_t |\bar{D}_t| + \delta_h s_t \text{SPF}_t + \theta_h \text{LAGS}_{t-1}^{L} + \varepsilon_{t+h}$$

Industrial Production



Macro uncertainty leaves β_h intact

Disagreement and *Policy* Uncertainty

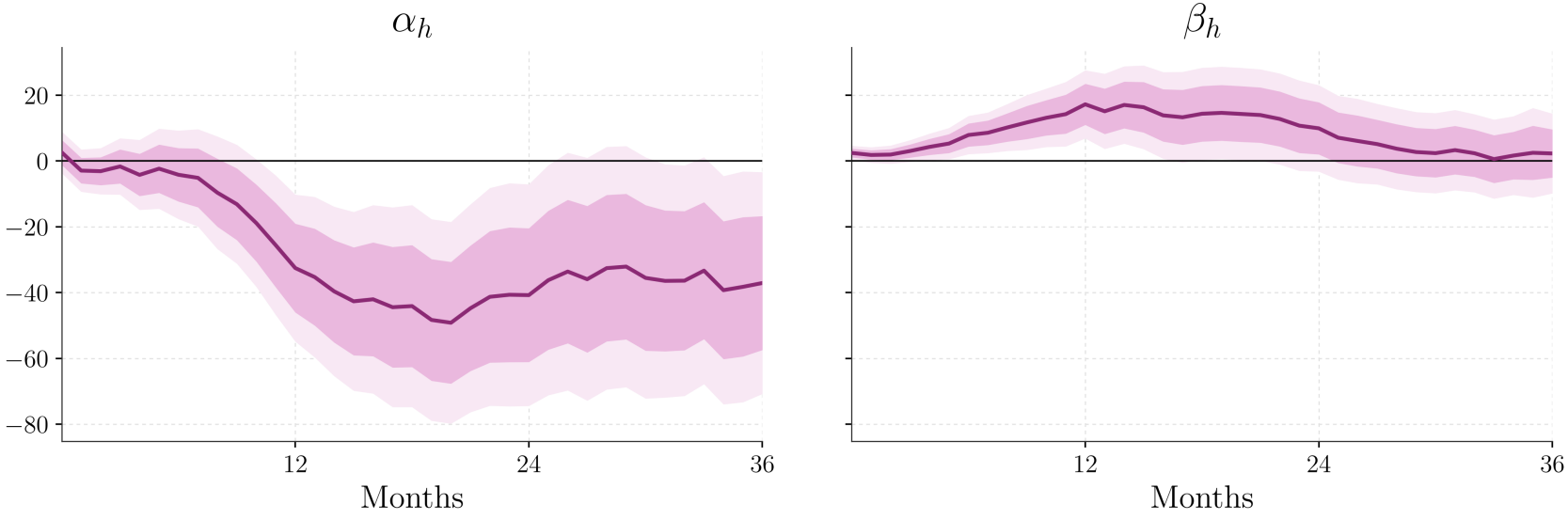
Back

3-variables system + EPU: [*CPI*, *IP*, *FFR*, **EPU**]

Baker–Bloom–Davis

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \boldsymbol{\delta}_h s_t \mathbf{EPU}_t + \boldsymbol{\theta}_h \mathrm{LAGS}_{t-1}^{L} + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



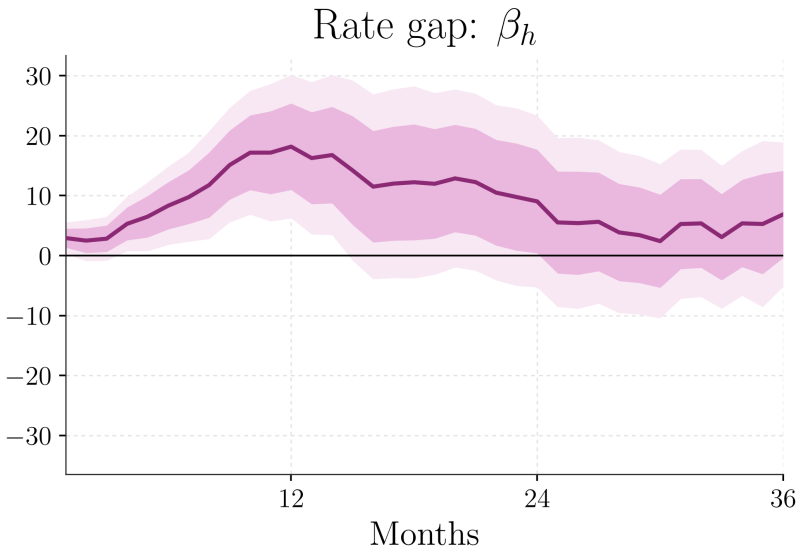
Policy uncertainty leaves $\boldsymbol{\beta}_h$ intact

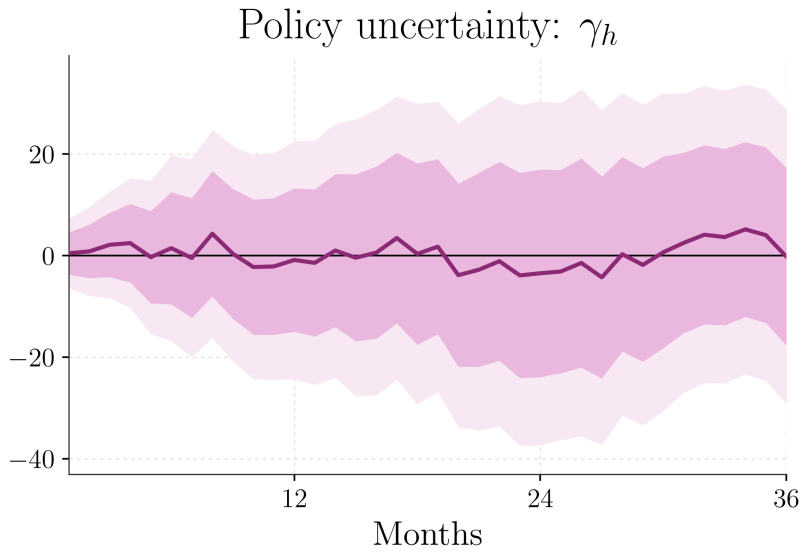
Policy-Path Uncertainty: A Horse Race

Back

MPU (Bauer, Lakdawala & Mueller 2022): uncertainty about the *same* rate path

$$y_{t+h} = c_h + \alpha_h s_t + \beta_h s_t |\bar{D}_t| + \gamma_h s_t \, MPU_t + \theta_h \text{LAGS}_{t-1}^{L} + \varepsilon_{t+h}$$





- γ_h insignificant at every horizon; β_{12} rises from 12.7 to 18.2 on the common sample

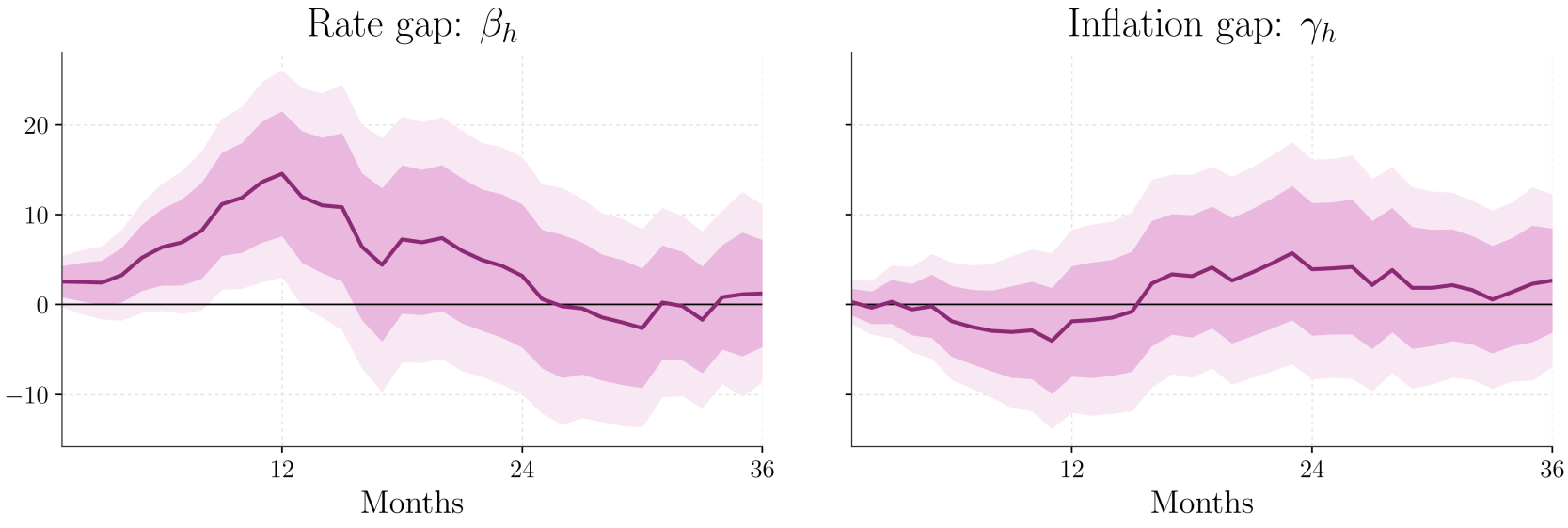
The rate gap wins the horse race

Inflation Disagreement

Back

Fed (Tealbook CPI) minus SPF inflation forecasts, same quarter, real time

$$y_{t+h} = c_h + \alpha_h s_t + \beta_h s_t |\bar{D}_t| + \gamma_h s_t |\bar{D}_t^{\pi}| + \theta_h \text{LAGS}_{t-1}^{L} + \varepsilon_{t+h}$$



- β_{12}: 14.50 → 14.55 on the common sample; γ_h insignificant at all 37 horizons

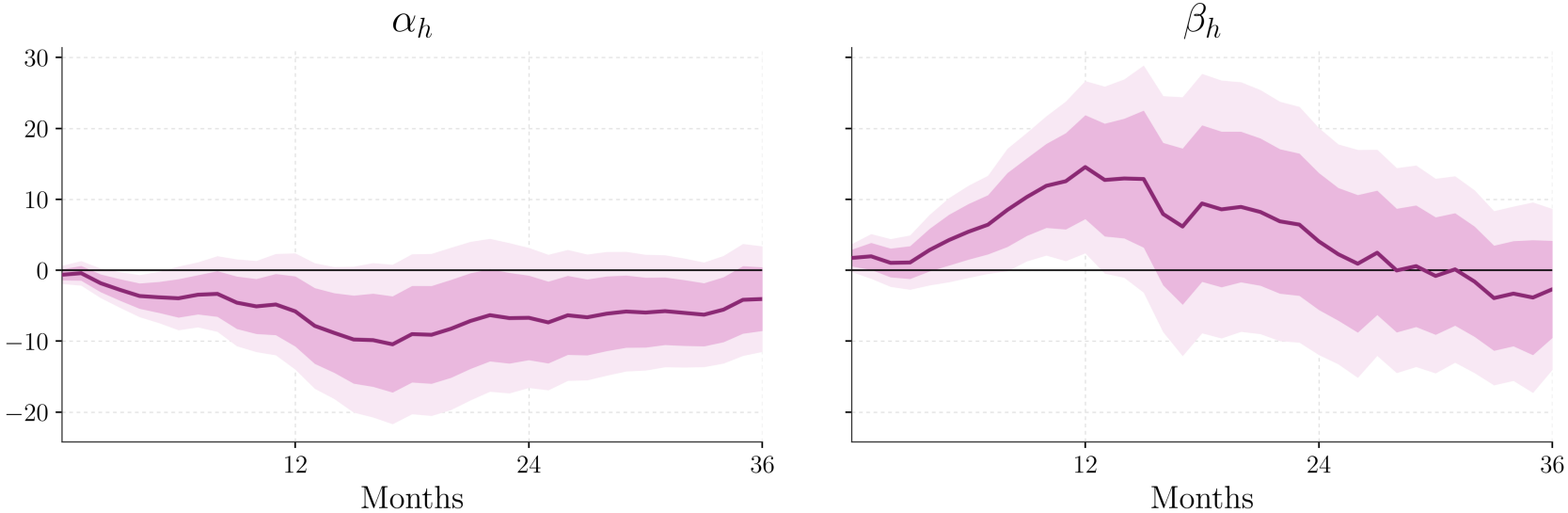
The rate gap carries the attenuation

Sample Exclusion: ZLB

Back

3-variables system excluding ZLB (2008:12-2015:12)

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \sum_{l=1}^{L} \boldsymbol{\zeta}_h^l s_{t-l} |\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

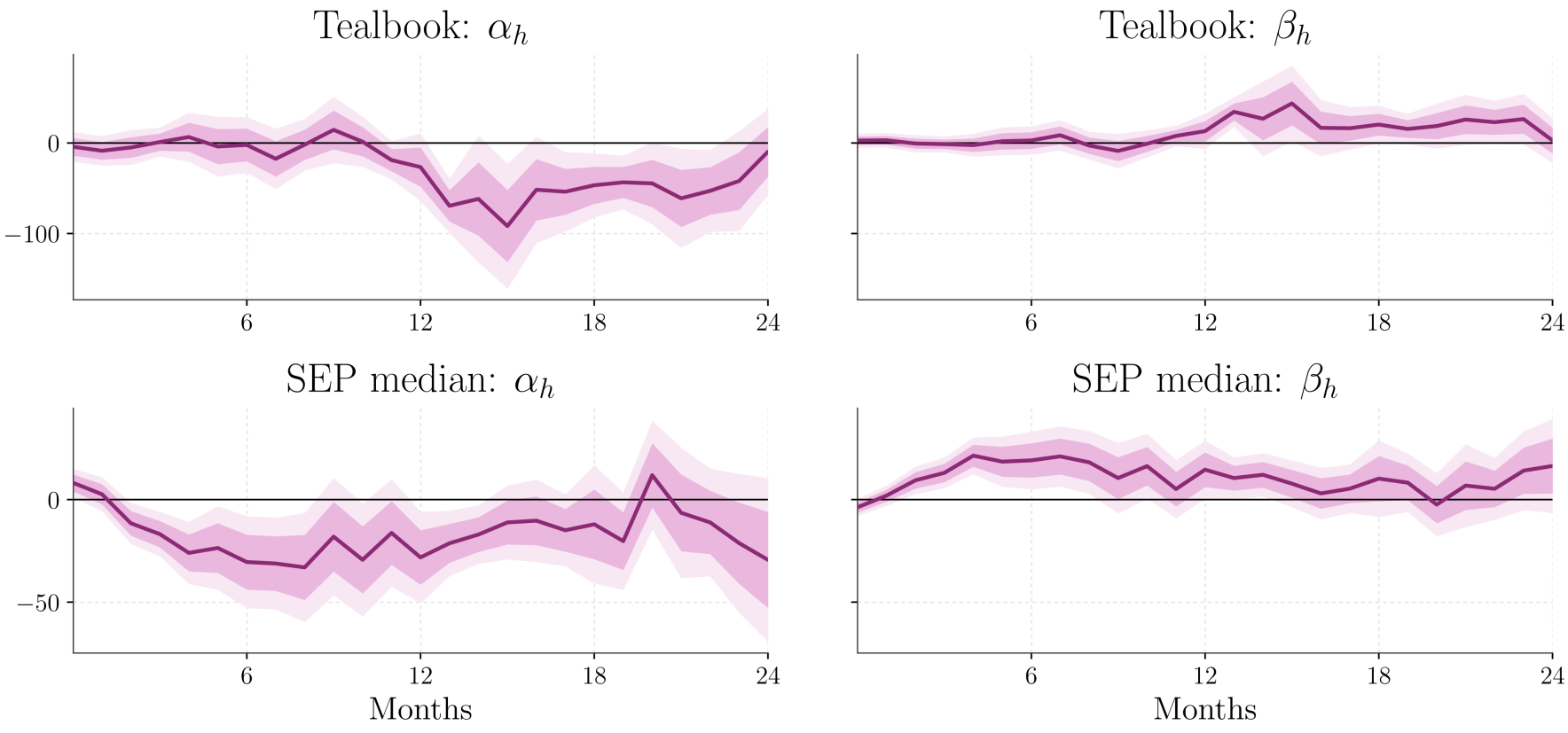


ZLB shocks: same centre and shape as outside the ZLB, smaller variance

SEP-Implied Disagreement

Back

Swap the Tealbook FFR projections for the **SEP** median



Tealbook 2012–2019, SEP 2012–2023. Pooled Wald of $H_0: \boldsymbol{\beta}_h^T = \boldsymbol{\beta}_h^S$ not rejected at any h

Attenuation holds with the SEP median as well

Robustness to Omitted Variables: Imbens (2003)

Back

Concern: omitted U_t correlated with both $s_t|\bar{D}_t|$ and Y_{t+h} biases $\hat{\beta}_h$

Imbens (2003) sensitivity: minimal *partial* R^2 an omitted U must have with both regressor and outcome residuals to flip the sign of $\hat{\beta}_h$

$$R^2_{\text{partial}}(\tilde{Z}, U) \equiv \frac{\text{Var}(\mathbb{E}[\tilde{Z} \mid U])}{\text{Var}(\tilde{Z})}, \qquad R^2_{\text{partial}}(\tilde{Y}, U) \equiv \frac{\text{Var}(\mathbb{E}[\tilde{Y} \mid U])}{\text{Var}(\tilde{Y})},$$

I report the symmetric robustness value $R^2_{\text{partial}}(\tilde{Z}, U) = R^2_{\text{partial}}(\tilde{Y}, U) \equiv r^2_{\textbf{min}}$

	$\hat{\beta}_{12}$	t-stat	$r^2_{\textbf{min}}$	VIX: $R^2_{\text{partial}}(\tilde{Z}, \text{VIX})$
Industrial Production	17.14	2.49	**14.8%**	3.3%

An omitted variable U explaining less than 14.8% of residual variance in *both* $s_t|\bar{D}_t|$ and IP cannot reverse the sign of $\hat{\beta}_{12}$. VIX explains 3.3%.

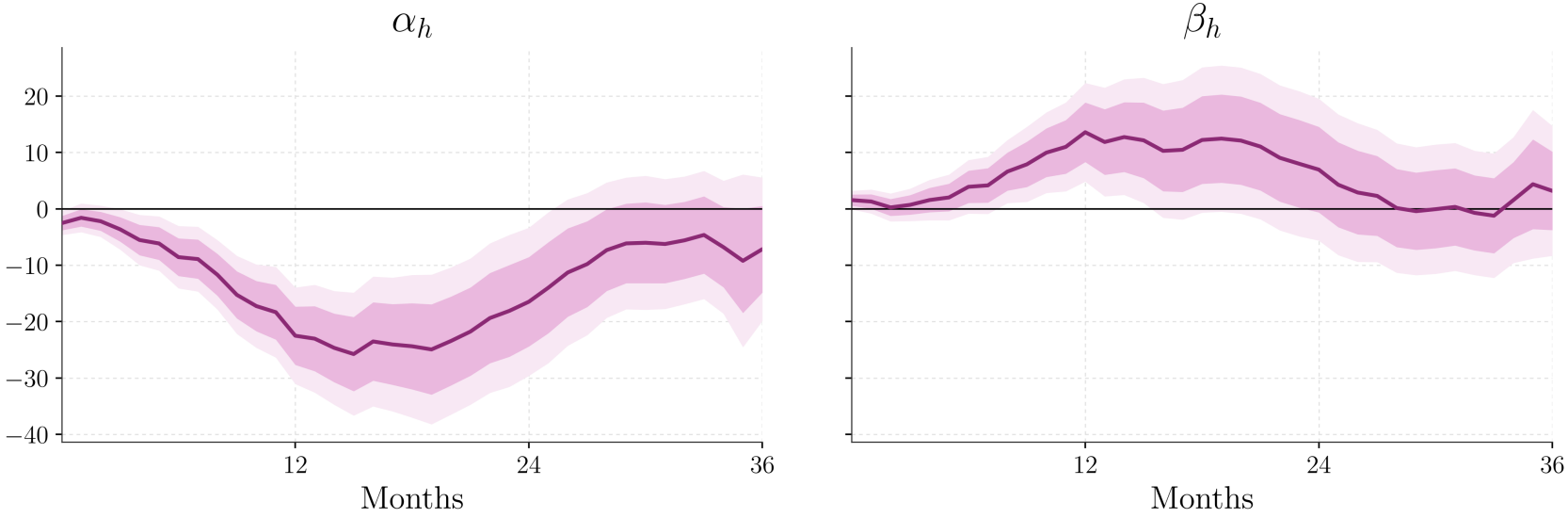
Gertler & Karadi (2015) + Disagreement: IP

Back

4-variables system: $[CPI, IP, \mathbf{EBP}, 1Y]$

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



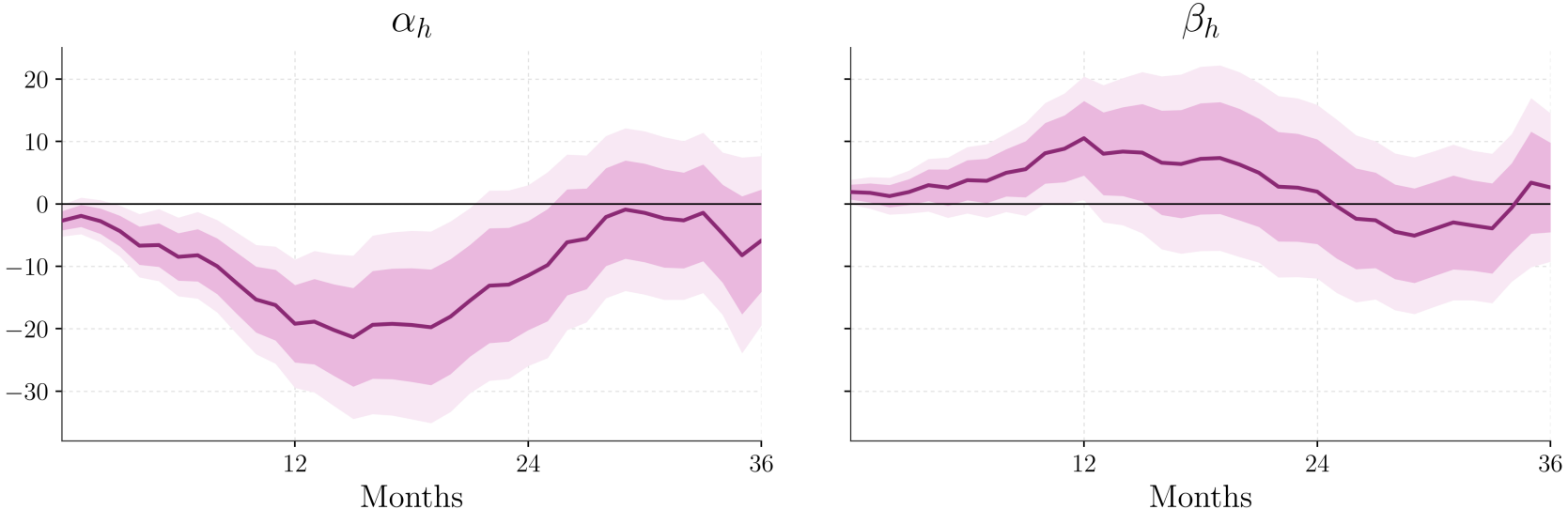
Bauer & Swanson (2023a): IP

Gertler & Karadi (2015) Back

6-variables system: $[CPI, IP, \mathbf{EBP}, \mathbf{UNEMP}, \mathbf{PCOMM}, 2Y]$

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h s_t + \boldsymbol{\beta}_h s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l |\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

Industrial Production



Asymmetric Disagreement: IP

Back

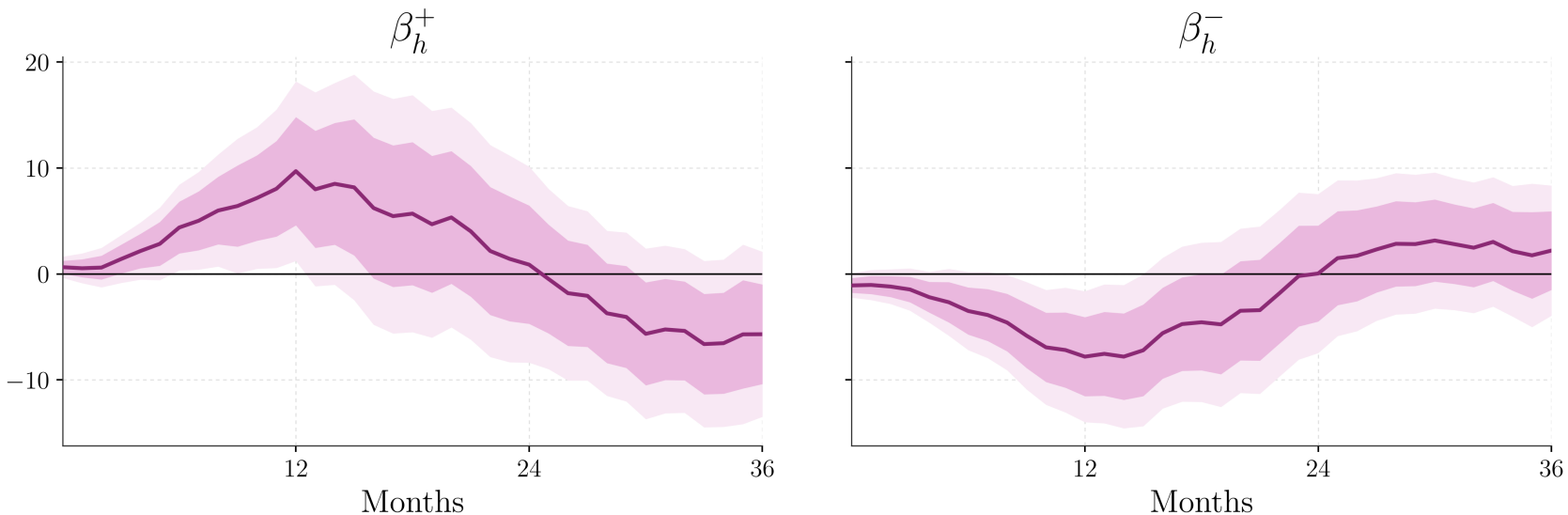
3-variables system: $[CPI, IP, FFR] + \bar{D}_t^{+,-}$

$$\bar{D}_t^+ = \max(\bar{D}_t, 0), \quad \bar{D}_t^- = \min(\bar{D}_t, 0)$$

$$y_{t+h} = c_h + \sum_{l=1}^{L} \Phi_h^l \, y_{t-l} + \alpha_h \, s_t + \beta_h^+ \left(s_t \, \bar{D}_t^+\right) + \beta_h^- \left(s_t \, \bar{D}_t^-\right) + \sum_{l=1}^{L} \gamma_h^l \, s_{t-l} + \varepsilon_{t+h}$$

Industrial Production

attenuation: $\beta_h^+ > 0$, $\beta_h^- < 0$



Why $|\bar{D}_t|$? Sign vs. Size of the Gap

Back

Toy example: the Fed expects rates at 3%. Where does the Market stand?

	Market: 4% more hawkish, $\bar{D}_t < 0$	Market: 2% more dovish, $\bar{D}_t > 0$
Sign $\Rightarrow$ level of c_t	**below** c_t^A	**above** c_t^A
Size $\Rightarrow$ response to a hike	**weaker**	**weaker**

c_t: spending; c_t^A: spending if the Market agreed with the Fed

Why weaker on both sides? The further the Fed's path sits from its own, the larger error the Market expects. It then puts less weight on Fed news, so a surprise moves its spending less

Sign: level of spending Size: how much policy moves it

Both terms in one regression Test

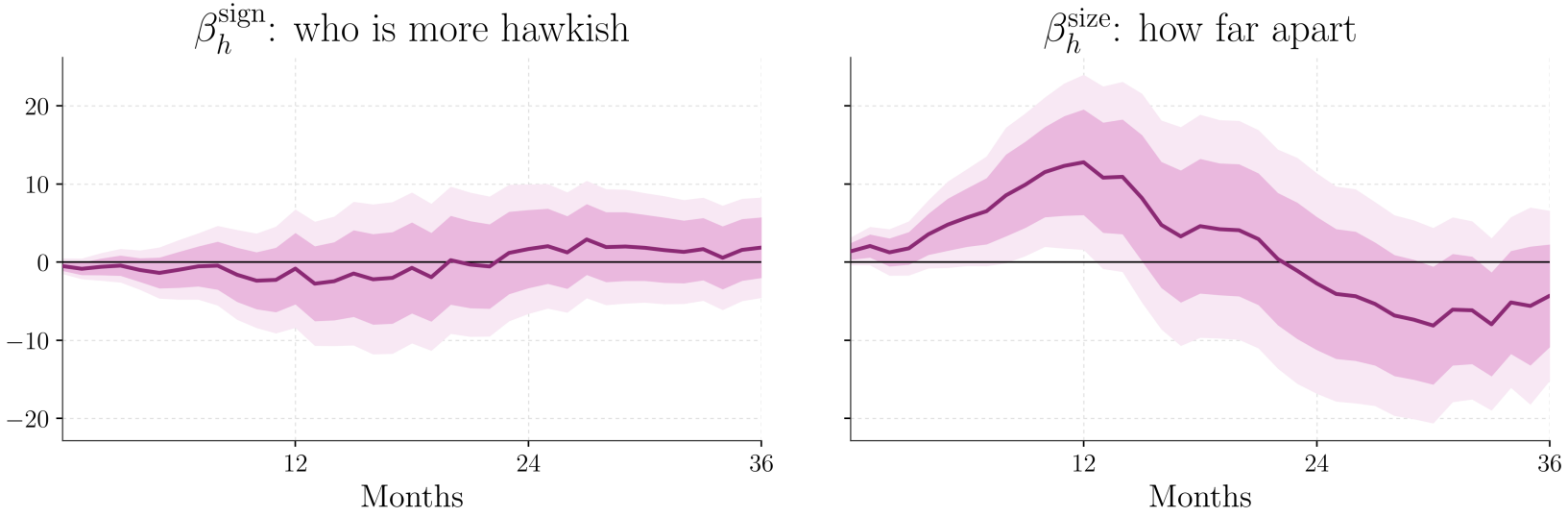
Sign or Size? Both in One Regression: IP

Back

Both the sign and the size of the gap interact with the shock

$$y_{t+h} = c_h + \alpha_h s_t + \beta_h^{\text{sign}} s_t \tilde{D}_t + \beta_h^{\text{size}} s_t |\tilde{D}_t| + \text{Lags}_{t-1}^{L} + \varepsilon_{t+h}$$

- $\tilde{D}_t = \bar{D}_t / \text{mean}|\bar{D}_t|$: one unit is a gap of average size, so the two loadings compare directly
- β_h^{sign}: extra effect when the Fed sits above the Market, reversed when it sits below
- β_h^{size}: extra effect as the two paths move apart, the same on either side

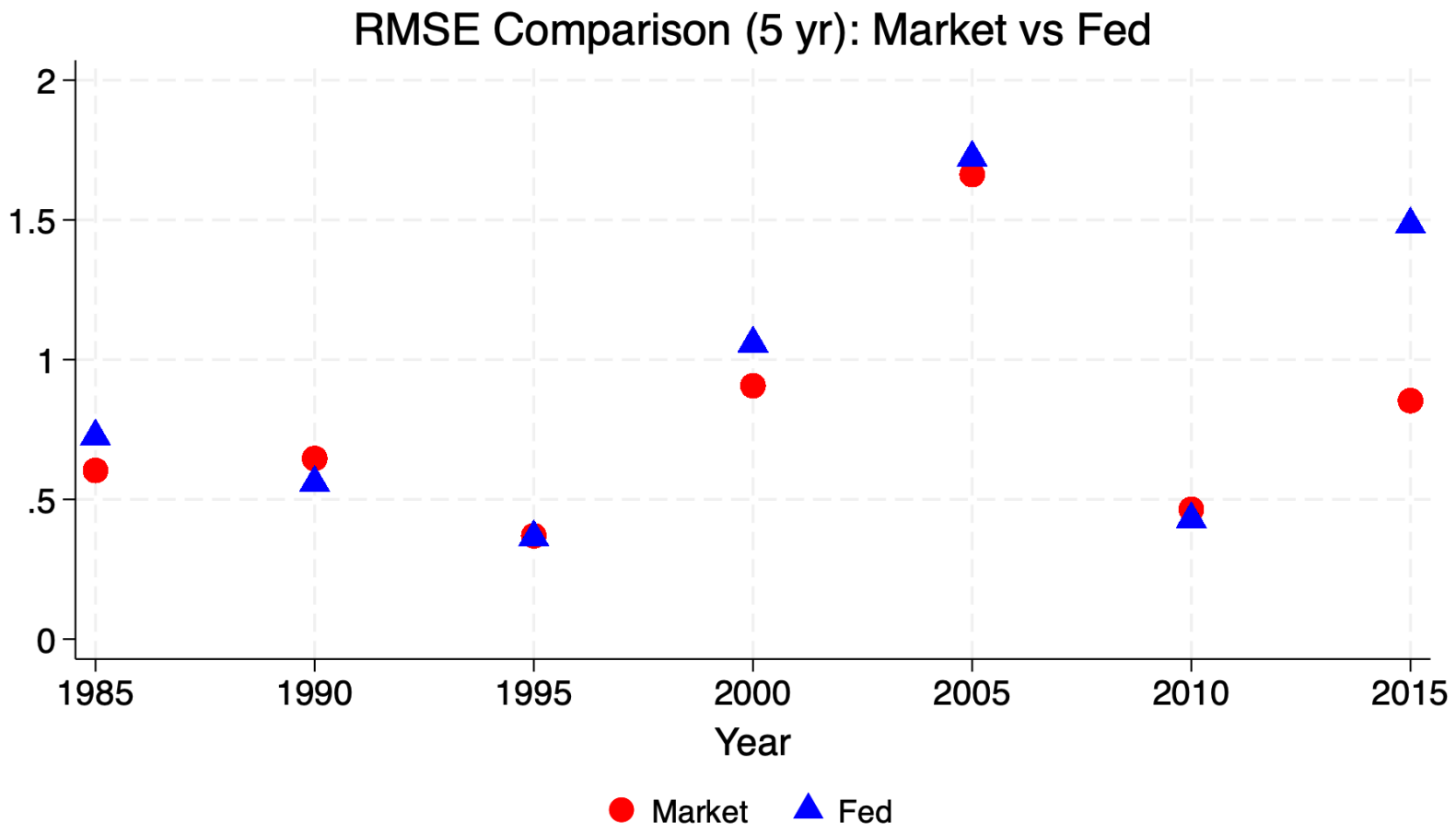


The size carries the attenuation; the sign adds nothing

(1) Fed vs. Market: Accuracy

Back

Fed / Market forecasting accuracy varies over time, with no clear "winner"



(1) Fed vs. Market: Diebold-Mariano Tests

DM test compares predictive accuracy, testing if difference in FE is significant

$$DM_h = \frac{\bar{d}_h}{\sqrt{\text{Var}(\bar{d}_h)}} \sim \mathcal{N}(0,1)$$

- $\bar{d}_h = \frac{1}{T}\sum_t^T \left(e_{t,h}^M - e_{t,h}^F\right)$ $\quad e_{t,h}^i = (y_t - \mathbb{F}_{t,h}^i)^2$
- H_0: Equal accuracy
- Under H_0: $DM \sim \mathcal{N}(0,1)$
- H_1: Superior accuracy

Comparison	Horizon	DM	pvalue	Winner
M v. F	1	-4.231	0.000	M
M v. F	2	-2.555	0.011	M
M v. F	3	-2.225	0.026	M
M v. F	4	-2.127	0.033	M
M v. F	5	-1.756	0.079	M
M v. F	6	-1.527	0.127	Insignificant
M v. F	7	-1.398	0.162	Insignificant
M v. F	8	-1.442	0.149	Insignificant

Table 1: Market vs. Fed. DM MSE-based Accuracy Contest.

(2) Information-Advantage Tests

Statistic:

$$\tau_t^F = \hat{\beta}_t^F \Big/ \sqrt{\widehat{\mathrm{Var}}(\hat{\beta}_t^F)/m}$$

$$\mathcal{I}^F = \max_t |\tau_t^F|$$

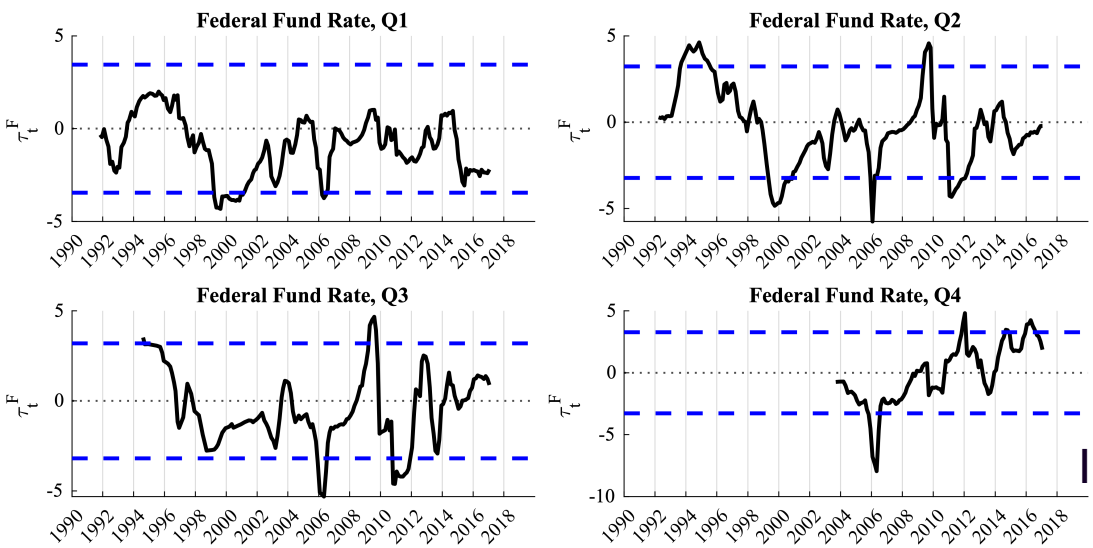
H_0: $\beta_t^F = 0 \quad \forall t$ $\qquad$ $H_1 : \beta_t^F \neq 0$

Statistic:

$$\tau_t^F = \hat{\beta}_t^F \Big/ \sqrt{\widehat{\mathrm{Var}}(\hat{\beta}_t^F)/m}$$

$$\mathcal{I}^F = \max_t |\tau_t^F|$$

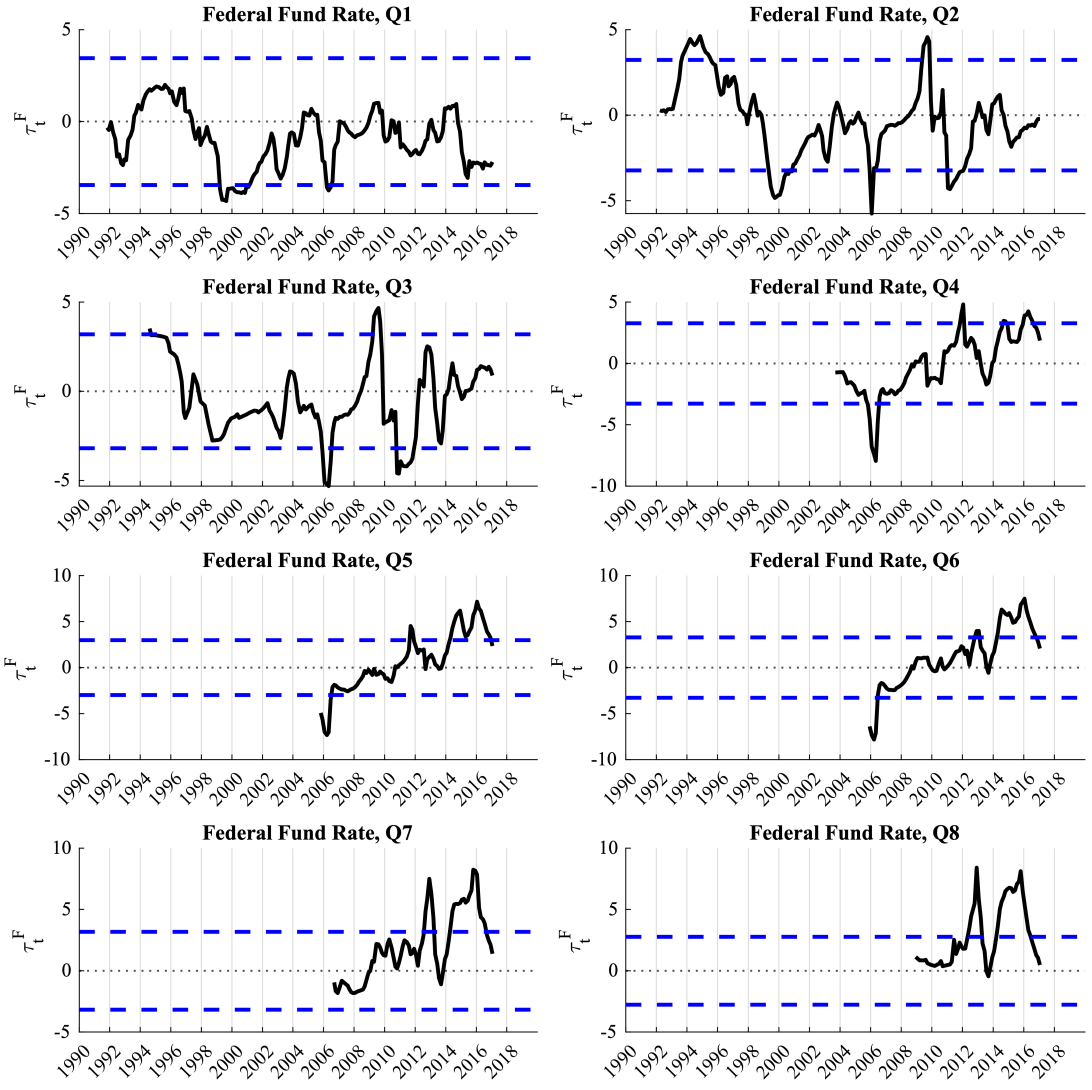
H_0: $\beta_t^F = 0 \forall t$ $\qquad$ $H_1 : \beta_t^F \neq 0$



Interpretation.

Information-Advantage Test: All Horizons

Back



Rolling t-statistics τ_t^F, m = 30 meetings; dashed: two-sided 5% critical values

"Ineffective" Monetary Policy: Heuristics

Back

Tightening shocks with *expansionary* effects

Date	MP Move	MPS	IP_{12}	Disag.	Interpretation
Dec 2015	+	+	$\alpha_h + \beta_h > 0$	+	M doesn't buy raise continuation
Feb 1991	−	+	$\alpha_h + \beta_h > 0$	+	M sees F's intent to boost growth

Easing shocks with *contractionary* effects

Date	MP Move	MPS	IP_{12}	Disag.	Interpretation
Nov 2004	+	−	$\alpha_h + \beta_h > 0$	−	"Too little too late"
Apr 2008	−	−	$\alpha_h + \beta_h > 0$	−	M doesn't buy cut continuation

From the Euler Equation to the Wedge

Back

Agreement-equivalent allocation $\widetilde{c}_t \equiv c_t - W_t$:

$$
\begin{aligned}
c_t &= -\tfrac{1}{\sigma}\left[\, i_t - \mathbb{E}_t^M(\pi_{t+1}) - \rho \,\right] + \mathbb{E}_t^M(c_{t+1}) && \text{Market's Euler} \\
&= -\tfrac{1}{\sigma}\sum_{h=0}^{\infty}\left\{\, \mathbb{E}_t^M(i_{t+h}) - \mathbb{E}_t^M(\pi_{t+h+1}) - \rho \,\right\} && \text{iterate forward (TVC)} \\
&= -\tfrac{1}{\sigma}\sum_{h=0}^{\infty}\left\{\, \mathbb{E}_t^F(i_{t+h}) - D_{t+h|t} - \mathbb{E}_t^M(\pi_{t+h+1}) - \rho \,\right\} && \text{def. } D_{t+h|t} \\
&= \underbrace{-\tfrac{1}{\sigma}\sum_{h=0}^{\infty}\left\{\, \mathbb{E}_t^F(i_{t+h}) - \mathbb{E}_t^F(\pi_{t+h+1}) - \rho \,\right\}}_{\equiv \widetilde{c}_t} + \underbrace{\tfrac{1}{\sigma}\sum_{h=1}^{\infty} D_{t+h|t}}_{= W_t} && \mathbb{E}_t^M(\pi) = \mathbb{E}_t^F(\pi) \\
&= -\tfrac{1}{\sigma}\left[\, i_t - \mathbb{E}_t^F(\pi_{t+1}) - \rho \,\right] + \mathbb{E}_t^F(c_{t+1}) - \mathbb{E}_t^F(W_{t+1}) + W_t && \text{LIE under } \mathbb{E}^F
\end{aligned}
$$

Impose $c_t = y_t$ and rule $i_t = \phi_\pi\, \mathbb{E}_t^F(\pi_t) + u_t^S \;\Rightarrow$ disagreement-augmented IS

Sum starts at h=1 since $D_{t|t}$=0; ϕ_π is the realized rule coefficient ($= \phi_\pi^F$); ϕ_π^M unrestricted.

Fixed Point (Closed-Form): Heterogeneous Beliefs on ϕ_π

Back

$$y_t = -\frac{1}{\sigma}\Big[\phi_\pi\ \mathbb{E}_t^F(\pi_t) + u_t^S - \mathbb{E}_t^F(\pi_{t+1})\Big] + \mathbb{E}_t^F(y_{t+1}) - \mathbb{E}_t^F(W_{t+1}) + W_t,$$

$$\pi_t = \beta\ \mathbb{E}_t^M(\pi_{t+1}) + \kappa\, y_t,$$

$$W_t = \tfrac{1}{\sigma}\sum_{h=1}^{\infty} D_{t+h|t} = \tfrac{1}{\sigma}\sum_{h=1}^{\infty}\Big[\ \mathbb{E}_t^F(i_{t+h}) - \mathbb{E}_t^M(i_{t+h})\Big].$$

Shock perceived homogeneously but different perceptions on ϕ_π

Conjecture (linear solution): $y_t = \Psi_y u_t^S, \qquad \pi_t = \Psi_\pi u_t^S, \qquad W_t = \Psi_w u_t^S$

Closed-form fixed point. Let

$$\mathcal{A} \equiv \frac{\kappa}{1-\beta\rho_s}, \qquad \mathcal{C} \equiv \frac{(\phi_\pi^F - \phi_\pi^M)\rho_s}{\sigma(1-\rho_s)}$$

Then

$$\Psi_y = \frac{-\frac{1}{\sigma}}{(1-\rho_s)(1-\mathcal{C}\mathcal{A}) + \frac{\mathcal{A}}{\sigma}(\phi_\pi - \rho_s)}, \qquad \Psi_\pi = \mathcal{A}\Psi_y, \qquad \Psi_w = \mathcal{C}\Psi_\pi$$

Ψ_W: Wedge Dynamics

Back

$$W_{t+h} = c_h + \beta_h^{\mathrm{L}} s_t \mathbf{1}_{\{|\bar{D}_t|<d\}} + \beta_h^{\mathrm{H}} s_t \mathbf{1}_{\{|\bar{D}_t|\geq d\}} + \text{LAGS} + \varepsilon_{t+h}$$

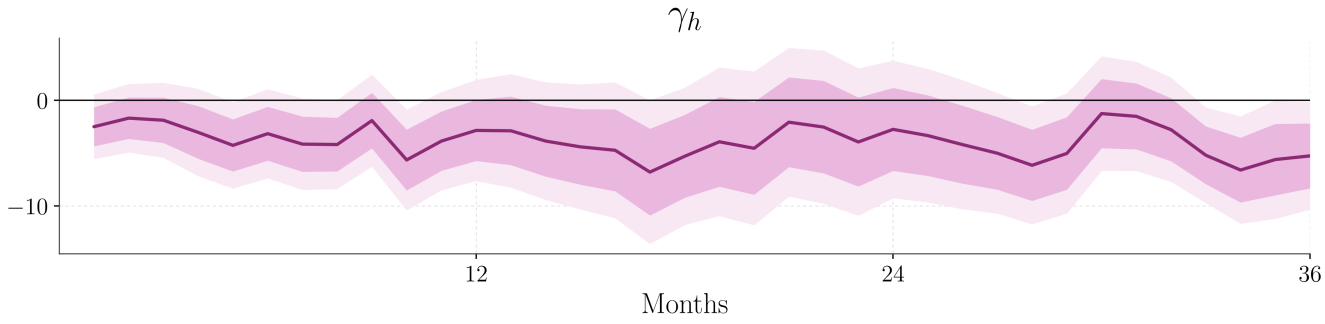


Figure 4: IRF of $W_t = \sum_{h=1}^{8} D_{t+h}$ | `min(8 quarters)` to a Orthogonalized Monetary Policy Surprise for low/high disagreement (60th percentile threshold).

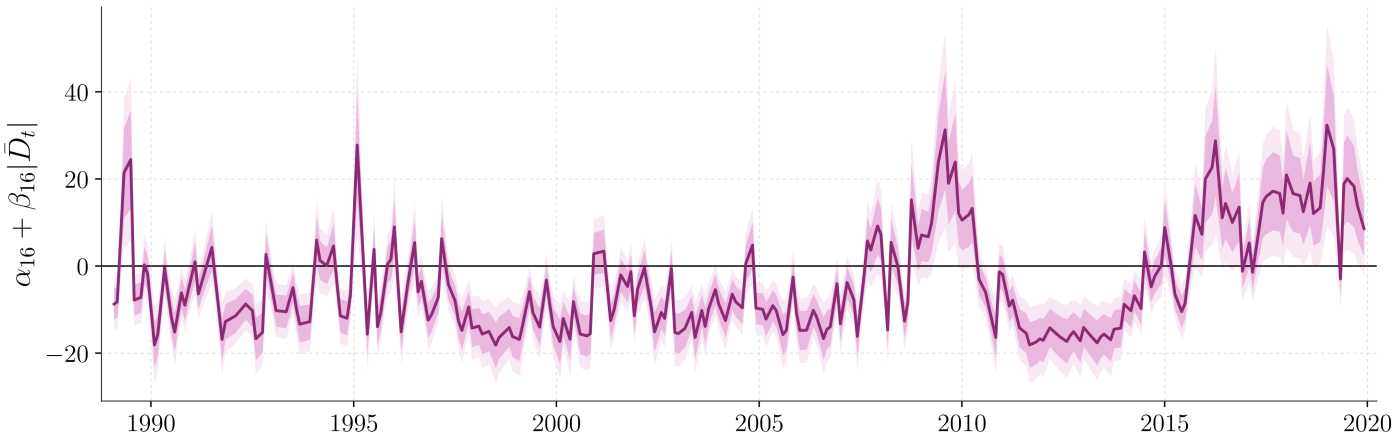
The Wedge's Total Response: Average and Over Time

Back

Average response, all months: $W_{t+h} = c_h + \gamma_h s_t + \text{LAGS} + \varepsilon_{t+h}$



Response at $h = 16$, evaluated at each month's $|\bar{D}_t|$: $\alpha_{16} + \beta_{16}|\bar{D}_t|$

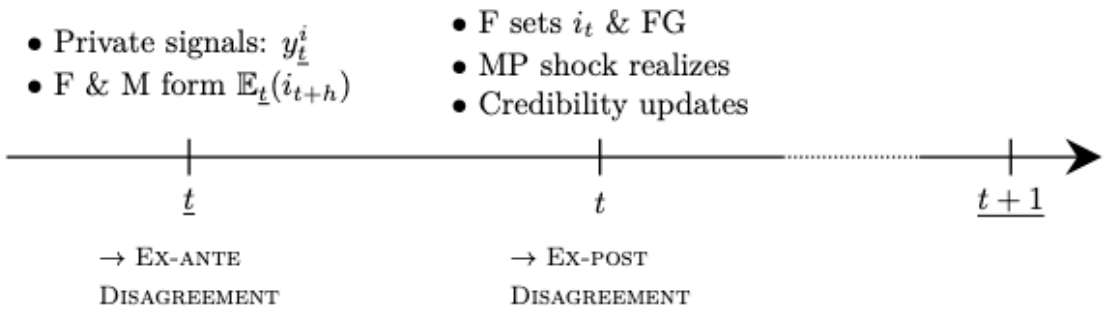


The wedge's response depends on the prevailing gap

Extended Kalman Filter (EKF)

Back

Timing. Ordering: (i) private signal $y_{\underline{t}}^M$; (ii) guidance g_t; (iii) rate i_t (nonlinear)



State and prior.

$$z_t = \begin{bmatrix} x_t \\ \phi_t \\ u_t^G \end{bmatrix}, \qquad \begin{aligned} x_t &= \rho x_{t-1} + \eta_t, & \eta_t &\sim N(0, Q_x) \\ \phi_t &= \phi_{t-1} + \omega_t, & \omega_t &\sim N(0, Q_\phi) \\ u_t^G &= \rho_G u_{t-1}^G + \zeta_t, & \zeta_t &\sim N(0, Q_G) \end{aligned}$$

Stacked: $z_t = Az_{t-1} + \varepsilon_t$, $A = \mathrm{diag}(\rho, 1, \rho_G)$, $\varepsilon_t \sim N(0, Q)$

$$\hat{z}_{t|t-1} = A\hat{z}_{t-1|t-1}, \qquad P_{t|t-1} = AP_{t-1|t-1}A' + Q$$

Measurements.

$$\begin{aligned} &\text{(linear)} && y_t^M = H_x z_t + \epsilon_t, \quad H_x = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix}, \quad \epsilon_t \sim N(0, R_x), \\ &\text{(linear)} && g_t = H_g z_t + \nu_t, \quad H_g = \begin{bmatrix} 0 & 0 & 1 \end{bmatrix}, \quad \nu_t \sim N(0, R_g), \\ &\text{(nonlinear)} && i_t = h(z_t) + u_t^S, \quad h(z) = \phi x + u^G, \quad u_t^S \sim N(0, R_i). \end{aligned}$$

Extended Kalman Filter (EKF)

Update A (process y_t^M).

$$\tilde{y}_x = y_t^M - H_x \hat{z}_{t|t-1}, \quad S_x = H_x P_{t|t-1} H_x' + R_x, \quad K_x = P_{t|t-1} H_x' S_x^{-1},$$

$$\hat{z}_{t|t}^{y} = \hat{z}_{t|t-1} + K_x \tilde{y}_x, \qquad P_{t|t}^{y} = P_{t|t-1} - K_x S_x K_x'.$$

Update B (process g_t).

$$\tilde{y}_g = g_t - H_g \hat{z}_{t|t}^{y}, \quad S_g = H_g P_{t|t}^{y} H_g' + R_g, \quad K_g = P_{t|t}^{y} H_g' S_g^{-1},$$

$$\hat{z}_{t|t}^{(y,g)} = \hat{z}_{t|t}^{y} + K_g \tilde{y}_g, \qquad P_{t|t}^{(y,g)} = P_{t|t}^{y} - K_g S_g K_g'.$$

(*Order invariance*: A–B or B–A is identical under linear–Gaussian independence)

Update C (process i_t, EKF). Linearize h at $(\bar{z}, \bar{P}) = (\hat{z}_{t|t}^{(y,g)}, P_{t|t}^{(y,g)})$:

$$H_i(\bar{z}) = \frac{\partial h}{\partial z'}\Big|_{\bar{z}} = \begin{bmatrix} \bar{\phi} & \bar{x} & 1 \end{bmatrix}, \quad \tilde{y}_i = i_t - h(\bar{z}), \quad S_i = H_i \bar{P} H_i' + R_i,$$

$$K_i = \bar{P} H_i' S_i^{-1}, \qquad \hat{z}_{t|t} = \bar{z} + K_i \tilde{y}_i, \qquad P_{t|t} = \bar{P} - K_i S_i K_i'.$$

Here $\tilde{y}_i$ is the (linearized) monetary policy surprise.

EKF: From surprise to state revisions

- Prior before i_t:

$$z_{t|t-} = \begin{bmatrix} \bar{x}_t \\ \bar{\phi}_t \end{bmatrix}, \quad P_t = \begin{bmatrix} P_{xx} & P_{x\phi} \\ P_{x\phi} & P_{\phi\phi} \end{bmatrix}.$$

- Linearized policy rule at the prior:

$$i_t \approx \bar{\phi}_t x_t + \bar{x}_t \phi_t, \quad H_t = [\, \bar{\phi}_t \;\; \bar{x}_t \,].$$

- Monetary policy surprise:

$$\mu_t^i \equiv i_t - \bar{\phi}_t \bar{x}_t.$$

- Kalman gain (how much each state moves per unit surprise):

$$K_t = \begin{bmatrix} K_{i,t}^x \\ K_{i,t}^\phi \end{bmatrix} = P_t H_t' (H_t P_t H_t' + R_i)^{-1}.$$

- Posterior revisions:

$$\Delta x_t = K_{i,t}^x \, \mu_t^i, \qquad \Delta \phi_t = K_{i,t}^\phi \, \mu_t^i.$$

- Belief–update shares (abstracting from wedge weights):

$$\kappa_t^x \approx \frac{K_{i,t}^x}{K_{i,t}^x + K_{i,t}^\phi}, \qquad \kappa_t^\phi \approx 1 - \kappa_t^x.$$

EKF: Dovish surprises and belief attribution

Back

One meeting with a dovish surprise $\mu_t^i < 0$: $K_{i,t}^x$ large (0.4–0.9), $K_{i,t}^\phi$ slightly negative

Signs from the covariance matrix

- In the data: $P_{xx} > 0$, $P_{\phi\phi} > 0$, $P_{x\phi} < 0$, $\bar{\phi}_t > 0$, $\bar{x}_t < 0$ (slack)
- Then

$$\underbrace{K_{i,t}^x}_{\propto \bar{\phi}_t P_{xx} + \bar{x}_t P_{x\phi}} > 0, \qquad \underbrace{K_{i,t}^\phi}_{\propto \bar{\phi}_t P_{x\phi} + \bar{x}_t P_{\phi\phi}} < 0$$

  These signs follow from $(P_t, \bar{x}_t, \bar{\phi}_t)$

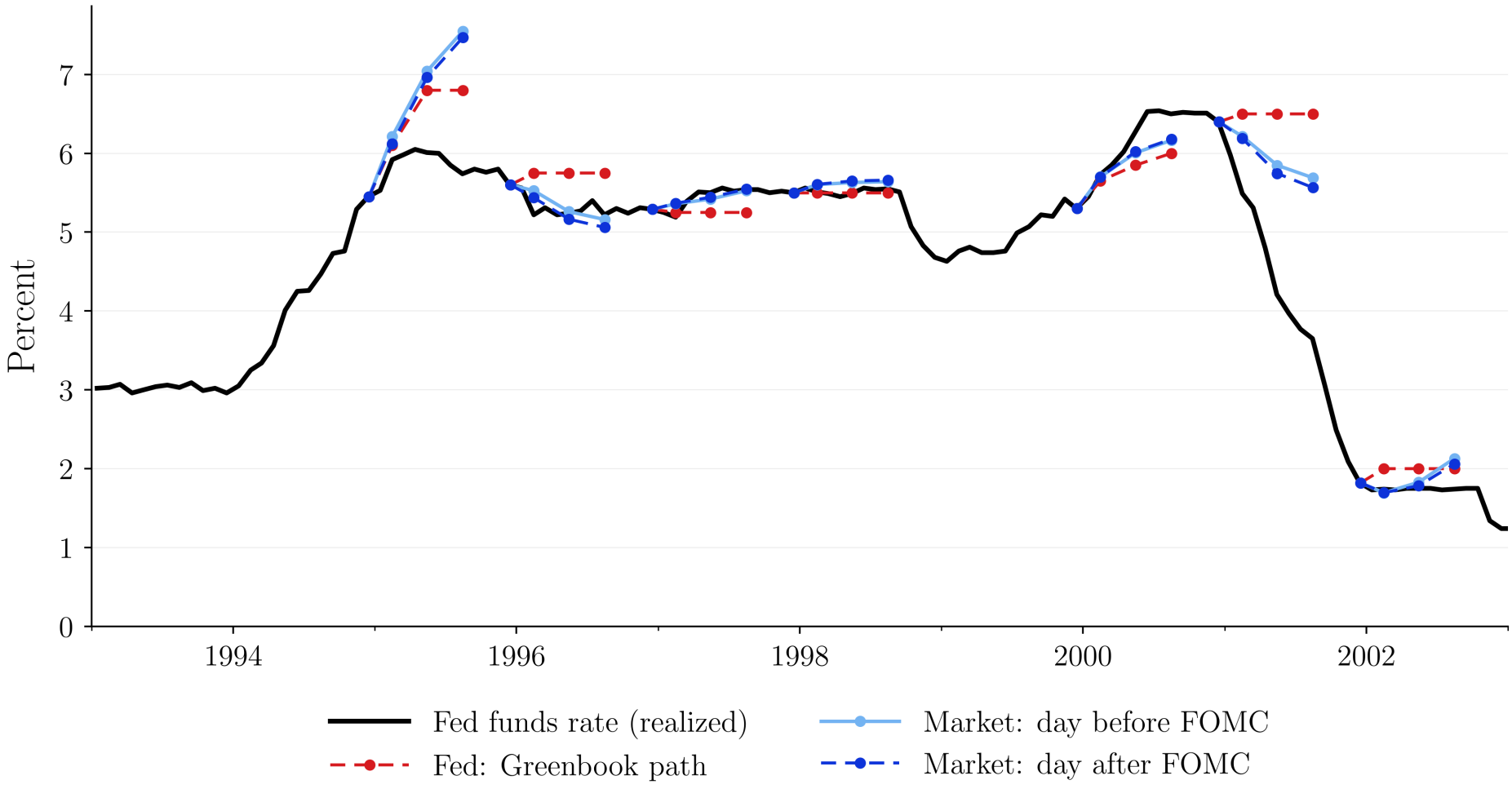
Economic Meaning (at this meeting)

- $\mu_t^i < 0$, $K_{i,t}^x > 0 \Rightarrow \Delta x_t < 0$: markets infer weaker conditions than expected
- $\mu_t^i < 0$, $K_{i,t}^\phi < 0 \Rightarrow \Delta \phi_t > 0$: given the slack, the rule is seen as more accommodative

Dovish surprise: weaker economy, more accommodative rule

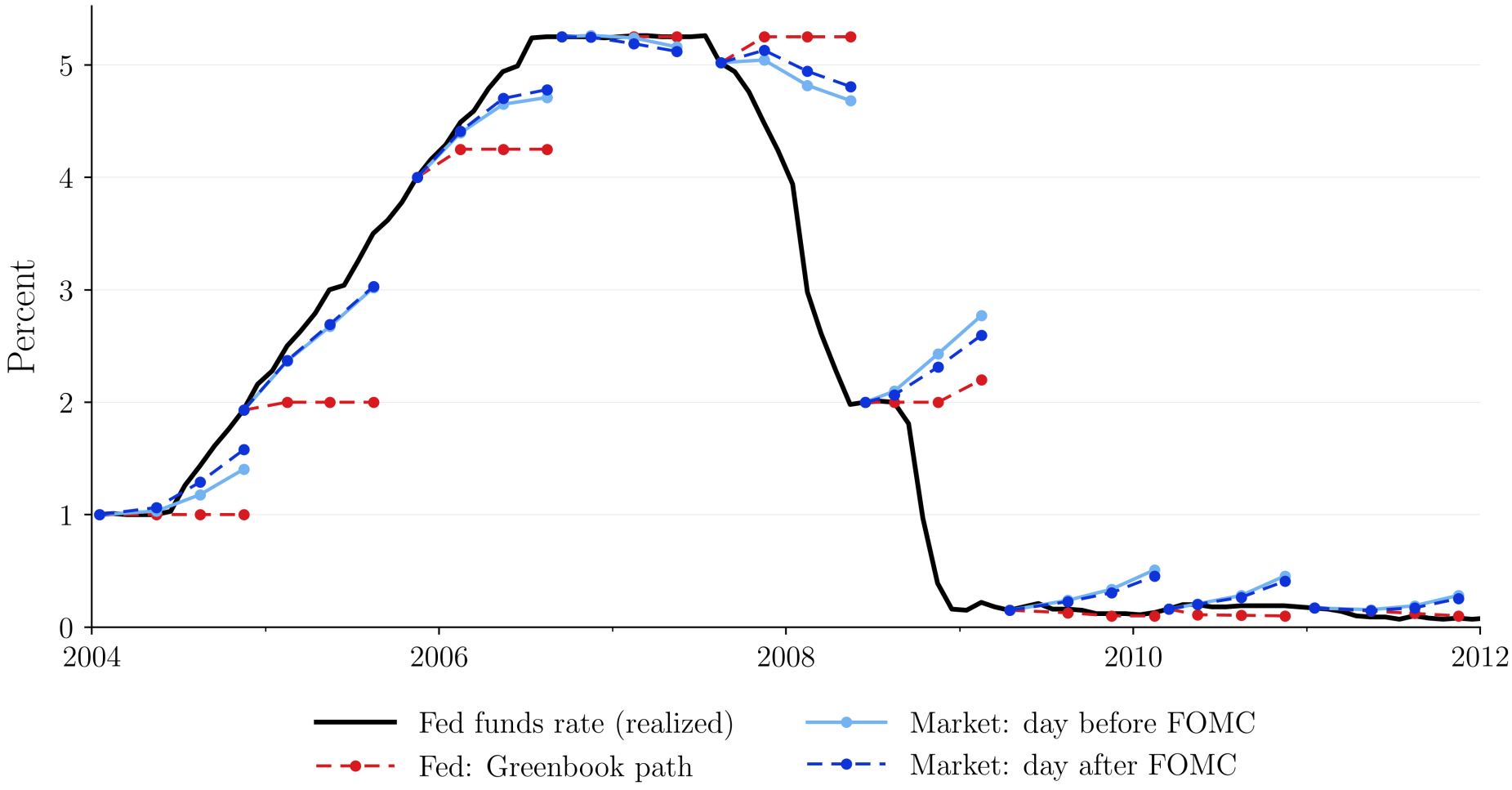
Δ_t Wedge: 1993–2003

At each meeting, the Market's path moves from the day before to the day after the FOMC; that revision moves the wedge



Δ_t Wedge: 2004–2012

At each meeting, the Market's path moves from the day before to the day after the FOMC; that revision moves the wedge



Δ_t Wedge decomposition

I've shown that ΔW_t accounts for MP attenuation. I now show what it is composed of

$$\Delta W_t = W_t - W_{\underline{t}} \overset{\text{Proof in Paper}}{=} -\sigma^{-1}\Bigg(\underbrace{\frac{\rho\,\bar{\phi}_t}{1-\rho}K^x_{i,t}}_{\text{x-channel}} + \underbrace{\frac{\rho\,\bar{x}_t}{1-\rho}K^\phi_{i,t}}_{\phi\text{-channel}}\Bigg)\tilde{y}_{i,t}$$

Channel contributions.

$$\Delta W_t = -\frac{\rho\,\sigma^{-1}}{1-\rho}\Big(\Delta W^x_t + \Delta W^\phi_t\Big), \qquad \Delta W^x_t = \bar{\phi}_t K^x_{i,t}\tilde{y}_{i,t}, \qquad \Delta W^\phi_t = \bar{x}_t K^\phi_{i,t}\tilde{y}_{i,t}$$

Time-varying Contributions.

$$\mathcal{C}^x_t = \frac{\Delta W^x_t}{\Delta W^x_t + \Delta W^\phi_t}, \qquad \mathcal{C}^\phi_t = 1 - \mathcal{C}^x_t$$

Interpretation.

For every FOMC meeting happening at t, the shift in market expectations of future interest rates is due $\mathcal{C}^x_t$% to revision in fundamentals and $\mathcal{C}^\phi_t$% to policy rule updates

Signal Extraction $\longrightarrow$ Attenuation via Learning

Back

$$\Delta W_t = -\frac{1}{\sigma}\left\{\left[\frac{\rho\,\bar{\mathbf{\Phi}}'}{1-\rho}K^{\mathsf{x}}_{g,t} + \frac{\rho\,\bar{\mathsf{x}}'}{1-\rho}K^{\mathbf{\Phi}}_{g,t} + \frac{\rho_u}{1-\rho_u}K^{u}_{g,t}\right]\tilde{\mu}^{g}_t + \left[\frac{\rho\,\bar{\mathbf{\Phi}}'}{1-\rho}K^{\mathsf{x}}_{i,t} + \frac{\rho\,\bar{\mathsf{x}}'}{1-\rho}K^{\mathbf{\Phi}}_{i,t} + \frac{\rho_u}{1-\rho_u}K^{u}_{i,t}\right]\tilde{\mu}^{i}_t\right\}$$

$$D_t \uparrow \implies \text{Variance} \uparrow \implies K_{i,t} \downarrow \implies K^{(\cdot),H}_{i,t} < K^{(\cdot),L}_{i,t} \implies \Delta W^H_t > \Delta W^L_t$$

$$(\equiv \Psi^H_w > \Psi^L_w)$$

Lemma (Signs of Updates).

$$\operatorname{sign}\left(\Delta\,\mathbb{E}^M_t(\mathsf{x}_t)\right) = \operatorname{sign}(\tilde{\mu}^i_t)\cdot\operatorname{sign}\left(P^{\mathsf{x}}_t\bar{\mathbf{\Phi}} + P^{\mathsf{x}\mathbf{\Phi}}_t\bar{\mathsf{x}} + P^{\mathsf{x}u}_t\right),$$

$$\operatorname{sign}\left(\Delta\,\mathbb{E}^M_t(\mathbf{\Phi}_t)\right) = \operatorname{sign}(\tilde{\mu}^i_t)\cdot\operatorname{sign}\left(P^{\mathbf{\Phi}\mathsf{x}}_t\bar{\mathbf{\Phi}} + P^{\mathbf{\Phi}}_t\bar{\mathsf{x}} + P^{\mathbf{\Phi}u}_t\right),$$

$$\operatorname{sign}\left(\Delta\,\mathbb{E}^M_t(u^G_t)\right) = \operatorname{sign}(\tilde{\mu}^i_t)\cdot\operatorname{sign}\left(P^{u\mathsf{x}}_t\bar{\mathbf{\Phi}} + P^{u\mathbf{\Phi}}_t\bar{\mathsf{x}} + P^{u}_t\right).$$

Example. For $\tilde{\mu}^i_t > 0$: $\quad \Delta\,\mathbb{E}^M_t(\mathsf{x}_t) > 0 \iff P^{x\phi}_t > -\dfrac{P^{\mathsf{x}}_t\mathbf{\Phi}_t + P^{\mathsf{x}u}_t}{\bar{\mathsf{x}}}$

Risk-Neutral Market Expectations

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Discussion

- Relevant discussion for **accuracy** comparisons, less so for **asset pricing**: Market discounts using risk-neutral expectations
- Piazzesi and Swanson (2008), Schmeling et al. (2022) estimate risk premia on short-term securities to be very small

Solutions

- **Rule-of-thumb**: subtract 1 bp per month from futures-implied rates
- **Truncate** disagreement to short forecast horizon ($\mathbb{E}_{Neutral} \sim \mathbb{E}_{Averse}$)

Why the Tealbook?

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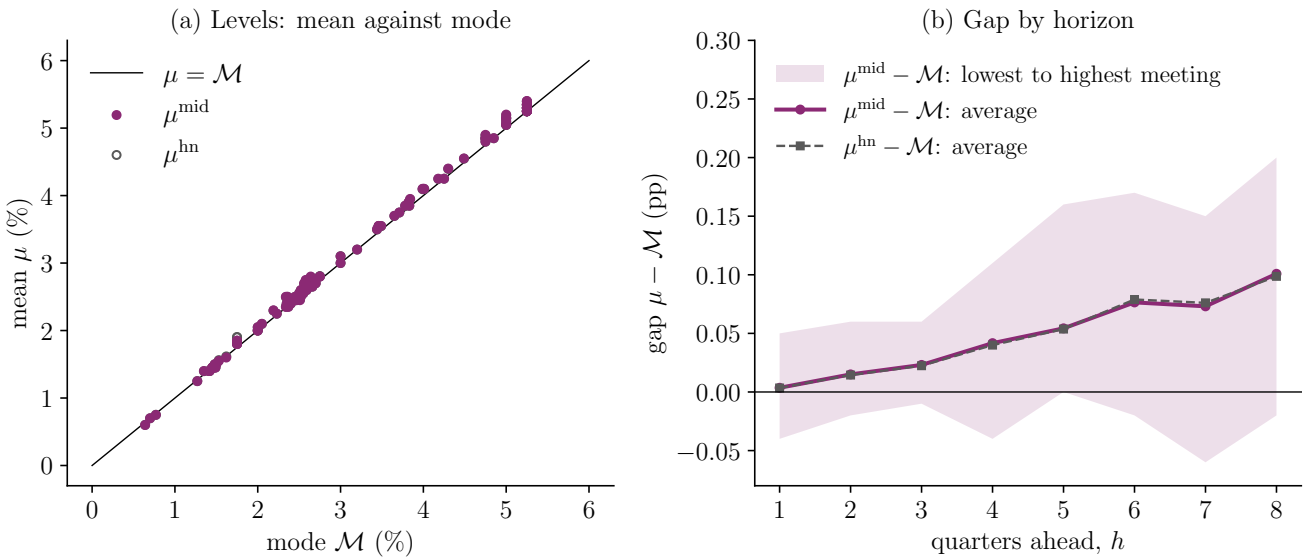
The path the Fed works with when it decides

- **Decision-relevant**: what the FOMC holds when it decides (Romer & Romer 2004)
- **Clean**: confidential, unlike the SEP, which markets partly price in
- **Conditioning**: partly an assumption, often flat before 2009

SEP check

Mode vs. mean: the staff's own mean sits within 10bp of its mode



μ^{mid}: band midpoint; μ^{hn}: two half-normals (BoE fan-chart shape); staff 70% bands, 2006–19

Disagreement rebuilt on the mean: corr. 0.996 with the baseline; 2009–15: mean 25–32bp above the mode

Are shocks drawn from the same distribution?

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Do shocks differ across $|\bar{D}_t|$ quartiles?

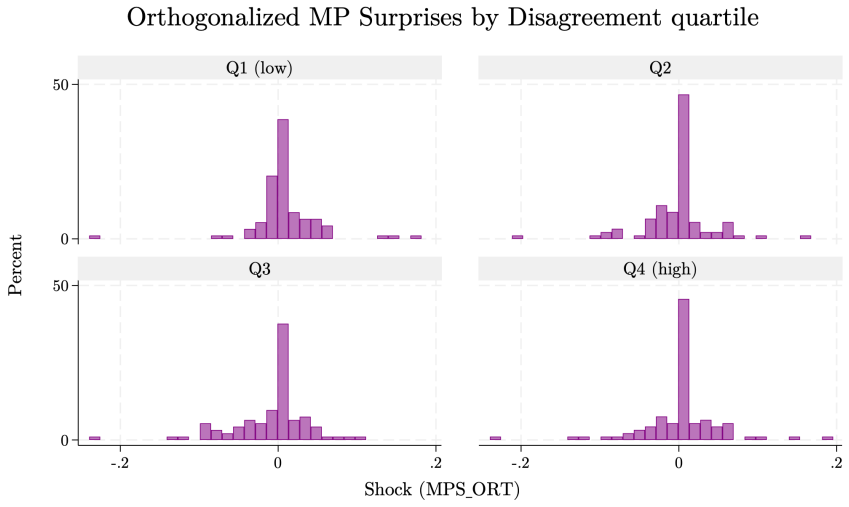
Takeaway: No distinct regimes
Centers at 0, same spike at 0, similar tails.

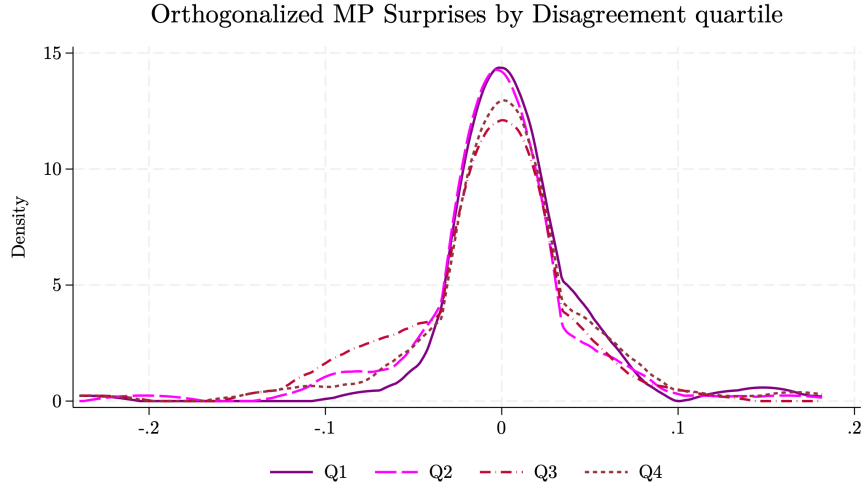
Distributional tests

- Kruskal–Wallis $\chi^2(3) = 6.36$ $p = 0.096$
- Zero-mass $\chi^2(3) = 1.10$ $p = 0.778$

Kolmogorov-Smirnov p-values

	Q1	Q2	Q3	Q4
Q1	—	0.304	0.027	0.519
Q2	—	—	0.551	0.771
Q3	—	—	—	0.291
Q4	—	—	—	—





Takeaway: shocks distributionally stable

Content: same information share across quartiles (Jarociński–Karadi split); equality never rejected

Do Rates Respond Differently Across States?

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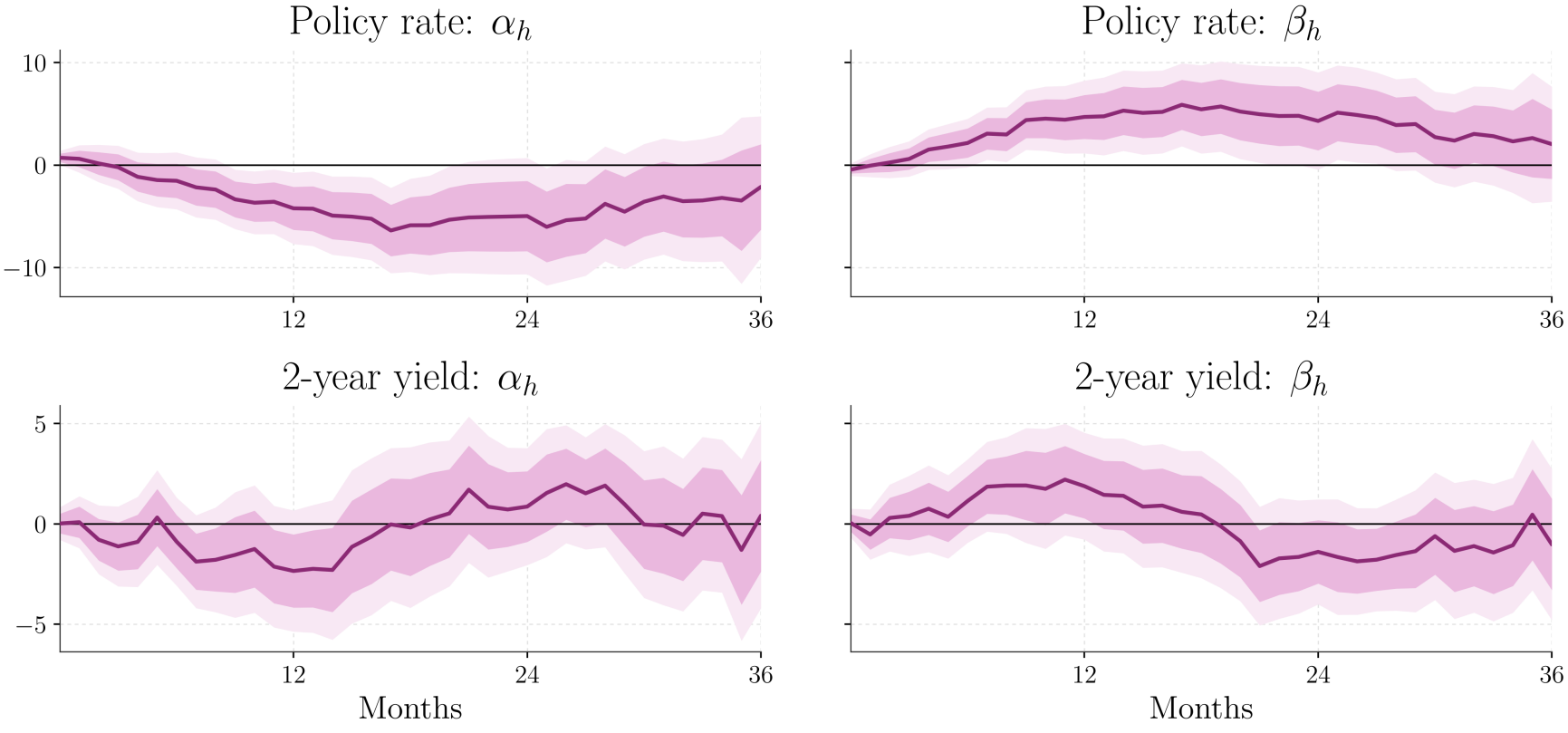
Would a smaller rate move explain the attenuation?



Policy rate: shadow rate at the ZLB; 2-year yield: Bauer–Swanson system

Rates move at least as much at high disagreement

Lead-Lag Analysis: $\mathbf{Corr}(s_t,\ D_{t+h})$

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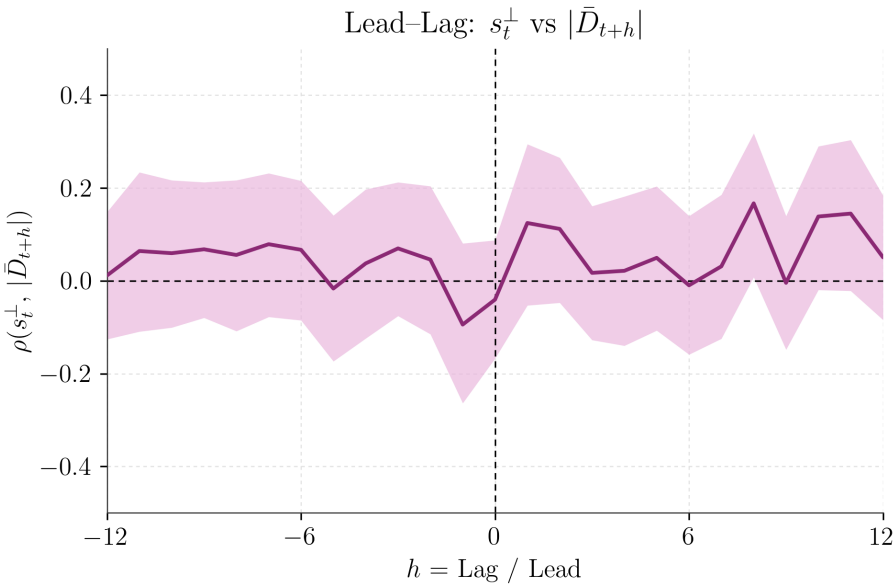
Specification: $[CPI, IP, 1Y]$

$$\mathbf{y}_{t+h} = \mathbf{c}_h + \sum_{l=1}^{L} \mathbf{\Phi}_h^l \, \mathbf{y}_{t-l} + \boldsymbol{\alpha}_h \, s_t + \boldsymbol{\beta}_h \, s_t |\bar{D}_t| + \sum_{l=1}^{L} \boldsymbol{\gamma}_h^l \, s_{t-l} + \sum_{l=0}^{L} \boldsymbol{\delta}_h^l \, |\bar{D}_{t-l}| + \boldsymbol{\varepsilon}_{t+h}$$

Identification Concern: *Even if s_t is exogenous, it may shift D_t, violating orthogonality and thus undermining causal identification*

Response:

$\mathbf{Corr}(s_t^{BS,A}, |\bar{D}_{t+h}|)$



$\mathbf{Corr}(s_t^{BS,A}, \bar{D}_{t+h})$

