The Effects of Monetary Policy on Macroeconomic Expectations:

High-Frequency Evidence from *Prediction Markets*

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March 4, 2026

Macro Seminar at UC Irvine

Background: How does monetary policy impact the macroeconomy?

Theoretical Predictions from Standard Macroeconomic Models

- Standard macroeconomic models (e.g., *Christiano, Eichenbaum, and Evans, 2005*) outline a clear transmission channel:
    - A contractionary monetary policy shock (an unexpected rate hike) increases borrowing costs, reduces investment and consumption, and slows the economy.

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    - A contractionary monetary policy shock (an unexpected rate hike) increases borrowing costs, reduces investment and consumption, and slows the economy.
- Following this logic, market expectations should react consistently with the standard channel.
    - Fed $\Uparrow$ interest rates (tightening) $\longrightarrow$ Expected CPI, Employment, and GDP $\Downarrow$

Motivation: The "Fed Information Effect" Puzzle

Some empirical evidence contradictory to predictions of standard models

$$\mathrm{BCrev_t} = \alpha + \theta\,\mathrm{mps_t} + \varepsilon_\mathrm{t}$$

- t indexes FOMC announcements
- $\mathrm{BCrev_t}$: one-month change in Blue Chip forecast around FOMC announcement
- $\mathrm{mps_t}$: monetary policy surprise in 30-min window around FOMC announcement

- Standard macro models, VARs predict $\theta < 0$ (for GDP, inflation)
- But empirical work sometimes estimates $\theta > 0$
  - *Romer and Romer (2000), Campbell et al. (2012), Nakamura and Steinsson (2018)*

The "Fed Information Effect"

A dominant explanation for the puzzle

$$\text{Fed} \Uparrow \text{interest rates} \longrightarrow \textit{Fed knows the economy in better shape}$$

$$\longrightarrow \text{Expected CPI, employment and GDP} \Uparrow$$

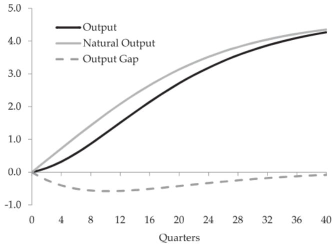


FIGURE VI
Response of Actual and Natural Expected Output

Figure VI from *Nakamura and Steinsson (2018, QJE)*

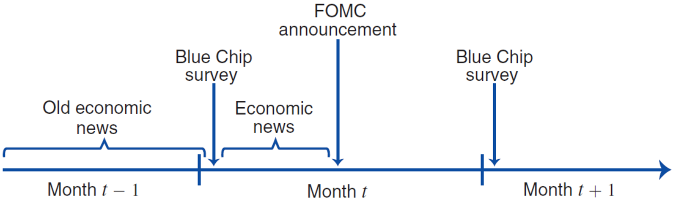
- This positive **information effect** can be so large that it offsets the negative **standard interest rate effect**
- The observed market reaction is the *net* of these two opposing forces $\Rightarrow \theta > 0$ in the regression

Issues with Evidence for the "Fed Information Effect"

The Challenge of Low-Frequency Expectation Data

- Blue Chip forecast is monthly (and SPF is quarterly) vs. Monetary Policy Shocks measured in minutes

- In between monthly Blue Chip forecasts, significant economic news is often released:



- *Bauer and Swanson (2023, AER)* argue this creates an **omitted variable bias**.
  - The Fed's policy decision is partly a *response* to this news.

This Paper: High-Frequency Evidence from Prediction Markets

Kalshi a prediction market for binary event contracts that trades 24/7

Kalshi GDP Contract Prices around June 15, 2022, when Fed raised 75 bps, first time since 1994

Kalshi Q3 2022 US GDP Growth

Our Research Questions

1. How do **high-frequency, market-based** macroeconomic expectations respond to macroeconomic and monetary policy announcements?

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1. How do **high-frequency, market-based** macroeconomic expectations respond to macroeconomic and monetary policy announcements?

2. Do these high-frequency responses support the **standard transmission channel** or a **Fed Information Effect**?

A Brief Literature Review

Two main camps in the debate

The "Fed Information Effect" Camp

- *Romer & Romer (2000)*: Fed has superior info about inflation
- *Campbell et al. (2012)*: Tightening ⇒ *lower* unemployment forecasts ("Delphic forward guidance")
- *Nakamura & Steinsson (2018)*: Tightening ⇒ *higher* GDP forecasts
- *Jarociński & Karadi (2020)*: Decompose shocks into "monetary" vs. "information" using stock prices

The "Fed Response to News" Camp

- *Faust, Swanson & Wright (2004)*: R&R results driven by Volcker disinflation; no info effect otherwise
- *Gürkaynak, Sack & Swanson (2005)*: Far-ahead forward yields *fall* on tightening
- *Bauer & Swanson (2023, AER)*: Prior results due to **omitted variable bias** from low-frequency data; propose "Fed Response to News" channel

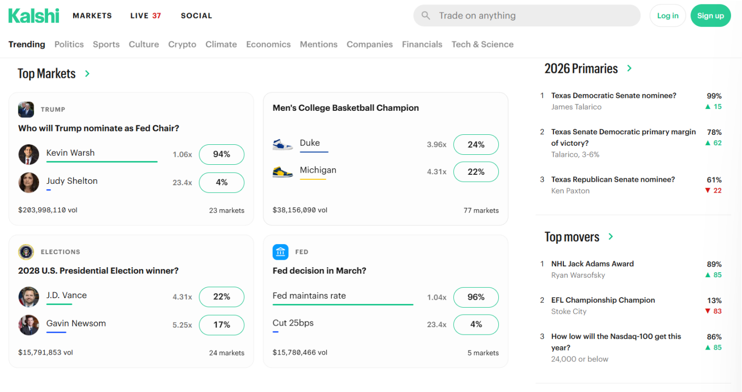
Outline

A roadmap for the talk

- ✓ Motivation and Background: The "Fed Information Effect"
- The Kalshi Prediction Market
- Kalshi Market Trading Volumes
- Kalshi Market-Implied Expectations
- The Response of Kalshi Market-Implied Expectations to FOMC News
- Related Evidence
- Conclusions

What is a Kalshi Prediction Market?

- “Kalshi": Arabic for “everything"
- Prediction markets: Exchange-traded markets where participants buy and sell contracts based on the outcome of future events



A Brief Background of Kalshi

and its key differences with other prediction markets

Kalshi: A Regulated Exchange

- CFTC regulated (DCM license since 2021)

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The New York Times

U.S. and Israel Attack Iran | LIVE Updates 1h ago | What to Know | Photos | Maps | War Expands | Iran's Strategy | Behind Trump's Decision

TheUpshot

How Anonymous Bettors Cashed In on the Iran Strike, Just Hours Before It Happened

Polymarket users placed hundreds of bets of at least $1,000 predicting an imminent American strike, raising concerns about insider trading.

Listen to this article · 5:53 min Learn more | Share full article | 281

By Amy Fan

Amy Fan has been covering prediction markets for The Times.

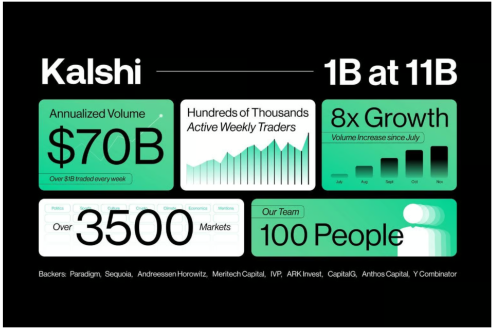
March 3, 2026

Prediction Markets are Exploding

Kalshi has seen rapid growth in volume and valuation

- **$70B** annualized trading volume (over $1B/week)
- **$11B** valuation (Feb 2026)
- **Hundreds of thousands** of active weekly traders
- **3,500+** markets across politics, economics, sports, climate
- **8x** volume growth since July 2025
- Backed by Paradigm, Sequoia, a16z, ARK Invest, Y Combinator

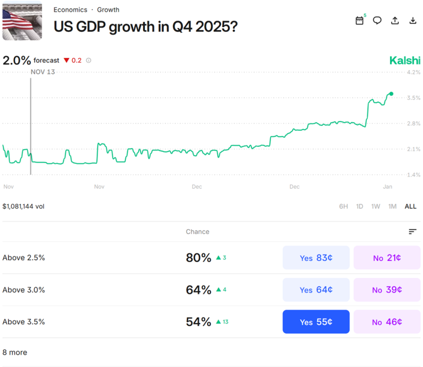
Kalshi Reaches $11 Billion Valuation as App Takes over America

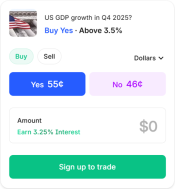


Company raises $1B to accelerate the shift in consumer behavior that it sparked

Event Contract: How It Works?

Example: Kalshi GDP Q4 2025 Contracts





- Contracts are **binary options**
- "Yes" contract pays **$1** if resolves to "yes", **$0** if resolves to "no"
- Price of "yes" contract is **market-implied prob.** of "yes"

Event Contract Settlement: Price Dynamics

Example: Kalshi GDP Q4 2025 “Above 3.5% Contract

- On Feb 20, BEA announced Q4 GDP growth was **2.8%**.
- “Yes" contract for *Above 3.5%* resolved to **No**.
- Price collapsed from ~55c to near zero; “No" holders paid $1.

Event Contract Rules and Timeline

Example: Kalshi GDP Q4 2025 “Above 3.5%" Contract

US GDP growth in Q4 2025?

Rules summary

Above 3.5%

The outcome is 1.4

If real GDP (as measured by the BEA's seasonally adjusted and annualized Advance Estimate) increases by more than 3.5, then the market resolves to Yes. Outcome verified from **Bureau of Economic Analysis**.

The market will close at 8:29 AM on the day of the expected release of the data. The market will expire at the first 10:00 AM following the release of the data for Q4 2025, or 3 months following that expected date of data release. Please note the Expiration Value is the one-decimal value published by the BEA. Note: this event is directional.

View full rules | Help center

Timeline and payout

- Market open
  Oct 24, 2025 · 10:00am EDT
- Market closed
  Feb 20, 2026 · 8:29am EST
- Paid out
  Feb 20, 2026 · 8:34am EST

Series **KXGDP** Event **KXGDP-26JAN30** Market **KXGDP-26JAN30-T3.5**

Determined

Explore Economics

Gov. Shutdown | Iran Leader Market

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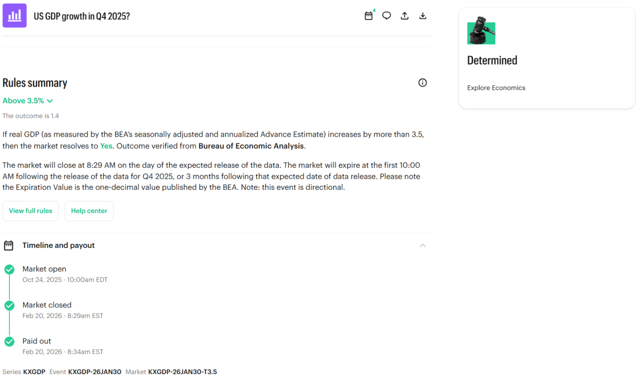

- Based on a specific, verifiable data source (BEA Advance Estimate).
- Clear timeline: open, close, and payout dates are all pre-defined.

Gov. Shutdown | Iran Leader Market

The Key Advantages of the Data: High Frequency and Responds to Events

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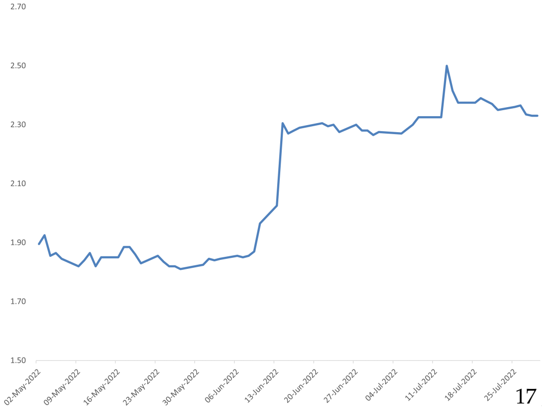
The Key Advantages of the Data: High Frequency and Responds to Events

Kalshi contract prices track high-frequency financial market prices

(A) Kalshi July 2022 Federal Funds Rate

(B) CME Federal Funds Futures Rate

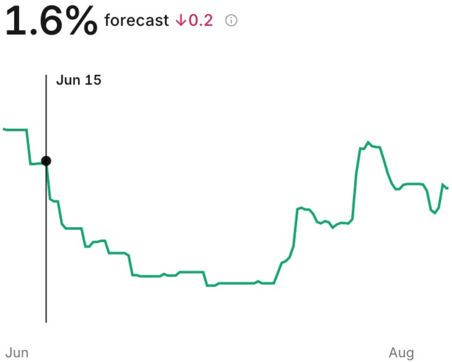


Multiple Contracts Trading Simultaneously For One Event

Increasing the power of our tests

(A) Kalshi Q2 2022 US GDP Growth

(B) Kalshi Q3 2022 US GDP Growth



Data and Sample Selection

Primary data from Kalshi, supplemented with other sources

- **Kalshi Data:** Trade-level data (bid/ask, price, volume) from July 2021 – February 2026.

Event Contract	Contracts	Events
Federal Funds Rate	314	36
CPI	317	44
Unemployment Rate	298	43
Nonfarm Payrolls	162	23
GDP	113	15
Total	**1,204**	**161**

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- **Coverage: 1,204** contracts, **161** events, **25,000+** contract-day obs.

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Contract Events and Related Macro News

Target events are supplemented by related high-frequency news

Federal Funds Rate

- *Target:* FOMC Decisions (36)
- *Related:* Chair Speeches (30), FOMC Minutes (30)

CPI

- *Target:* BLS CPI-U MoM (44)
- *Related:* PPI, U-Mich Survey, PCE Core

Unemployment / Payrolls

- *Target:* BLS U-3 (43), Nonfarm Payrolls (23)
- *Related:* Jobless Claims, ADP Employment

GDP

- *Target:* BEA Advance Estimate (15)
- *Related:* Retail Sales Advance MoM

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Trading Volume and Liquidity

Per-contract-per-day statistics (volume > 0); July 2021 – Feb 2026

	Mean Vol.	Med. Vol.	Mean $ Vol.	Contracts	Events	Obs.
Fed Funds Rate	2,336	468	$1,207	314	36	10,621
CPI	872	295	$456	317	44	6,683
Unemployment	427	100	$261	298	43	2,914
Nonfarm Payrolls	918	200	$531	162	23	1,896
GDP	397	106	$208	113	15	3,305

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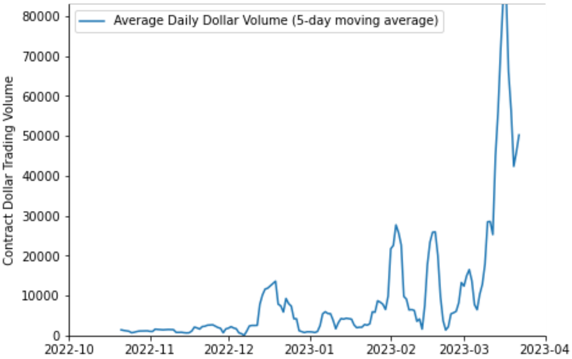
- Volume has grown significantly in macro contracts (CPI, Payrolls, GDP) in the extended sample.
- Volume remains *concentrated around announcement days*, providing a clean window for measuring the impact of news.

Trading Volume Dynamics: Fed Fund Rate Contracts

Higher volume over time, closer to event days and during Fed and Macro events

Trading Volume Patterns for March 2023 FFR Contract



2025 Q1 FFR contract volume: **$30.29 mil.**

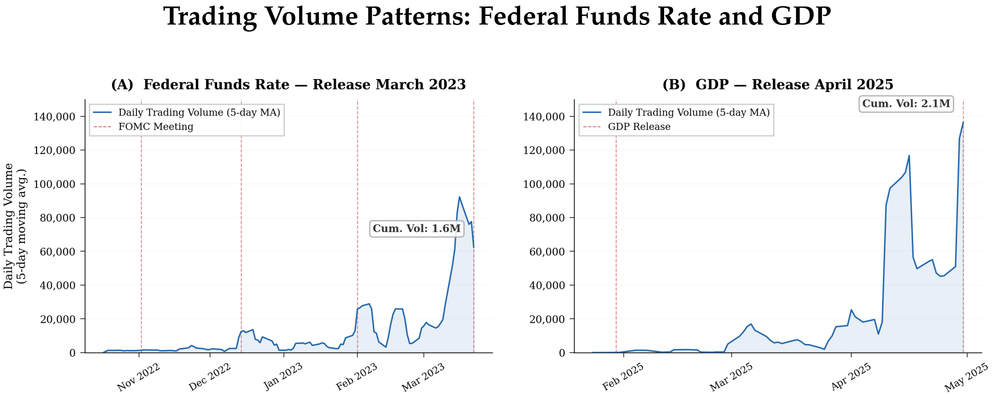
Fed-Related Events

Event Type	**Count**
FOMC Decisions	36
Chair Speeches	30
FOMC Minutes	30
Total	**96**

Volume spikes around FOMC days — 5–18× higher than non-event days.

Trading Volume Dynamics: FFR and GDP Contracts

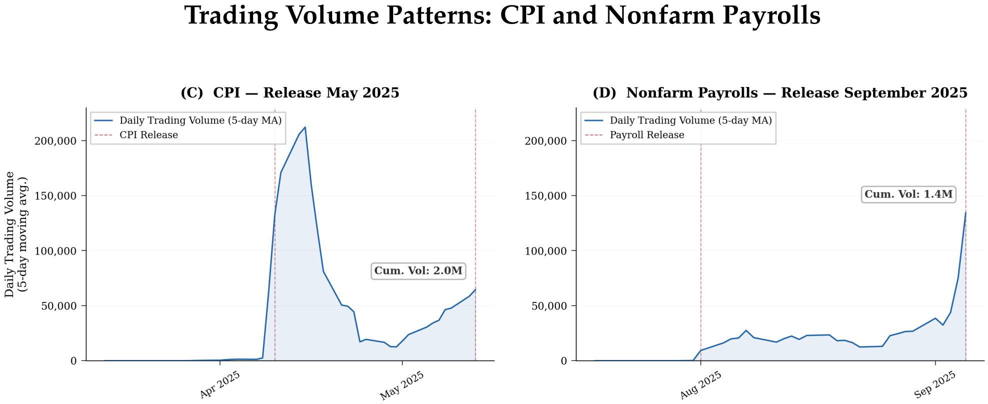
Volume concentrates around announcement days



Note: Each panel plots the 5-day moving average of daily trading volume (summed across all strikes) for a single contract expiration. Vertical dashed lines mark the relevant macro announcement dates. Cumulative trading volume is annotated in each panel.

Trading Volume Dynamics: CPI and Nonfarm Payrolls

Volume concentrates around announcement days



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Methodology: Trading Volume Regressions

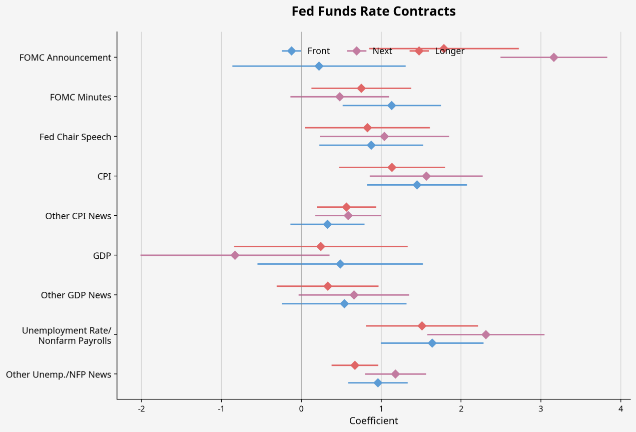
We examine how trading volume responds to news by estimating:

$$\log\left(1 + \mathrm{Vol}_{i,t}\right) = \alpha_i + \sum_k \beta_k \, 1_{\{\mathrm{Event}_k, t\}} + \gamma \, \log(\mathrm{TTM}_{i,t}) + \varepsilon_{i,t}$$

- **LHS:** $\log(1 + \mathrm{Vol}_{i,t})$ — log of 1 plus the total daily trading volume (summed across all strikes) for event contract i on day t
- **RHS:** $1_{\{\mathrm{Event}_k, t\}}$ — indicator dummies for macro/monetary policy announcements on day t (FOMC, CPI, GDP, U3/NFP, Chair Speeches, FOMC Minutes, and related news)
- **Control:** $\log(\mathrm{TTM}_{i,t})$ — log months to maturity (volume declines with time to expiration)
- **Event Fixed Effects:** α_i absorb time-invariant event-level heterogeneity (each i is a unique expiration date, e.g., "Jan 2024 CPI")
- **Interpretation:** $\hat{\beta}_k$ measures the log-point increase in trading volume on event days vs. non-event days
  - e.g., $\hat{\beta} = 2.9 \implies$ volume is $e^{2.9} \approx 18\times$ larger on FOMC days
- **S.E.** two-way clustered by trading date and contract expiration date

Trading Volume Dynamics: Fed Fund Rate Contracts

Higher volume over time, closer to event days and during Fed and Macro events



FFR (log) Trading Volumes and Macro Events:
6 – 24 times higher during FOMC Days

- **Front** (♦): contract nearest to maturity (e.g., next month's CPI release)
- **Longer-term** (●): all contracts beyond the front contract
- **NFP:** front = contracts $\leq$30 days to release (introduced Mar 2023)
- **GDP:** maturities are quarterly; longer-term contracts had very low liquidity (discontinued by Kalshi in 2024)

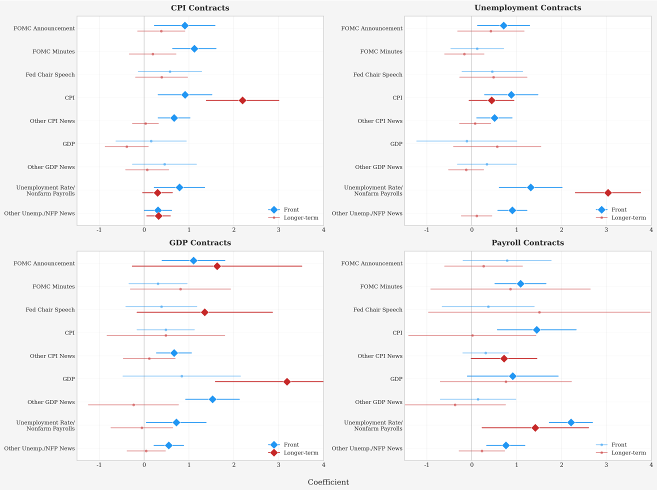
Trading Volumes Dynamics: Macroeconomic Contracts

Regression Analysis (Table 4)

	CPI		Unemployment		Nonfarm Payrolls		GDP	
	Front	L-term	Front	L-term	Front	L-term	Front	L-term
FOMC Day	**0.905*****	0.380	**0.710****	0.425	0.786	0.261	**1.100*****	**1.627***
Fed Chair Speech	0.574	0.389	0.457	0.482	0.366	1.506	0.385	**1.351***
FOMC Minutes	**1.119*****	0.191	0.120	−0.168	**1.085*****	0.863	0.309	0.810
CPI	**0.912*****	**2.195*****	**0.880*****	**0.441***	**1.448*****	0.011	0.481	0.485
Other CPI News	**0.667*****	0.031	**0.504****	0.072	0.306	**0.719***	**0.666*****	0.112
Unemp. Rate/Nonfarm Payrolls	**0.785*****	**0.297***	**1.313*****	**3.036*****	**2.211*****	**1.415****	**0.717****	−0.051
Other Unemp./NFP News	**0.309****	**0.320****	**0.904*****	0.109	**0.758*****	0.226	**0.548*****	0.047
GDP	0.156	−0.388	−0.113	0.566	**0.912***	0.760	0.836	**3.184*****
Other GDP News	0.453	0.069	0.336	−0.127	0.139	−0.376	**1.525*****	−0.238
log Months to Maturity	**−1.969*****	**−1.947*****	**−3.982*****	−0.102	**−4.988*****	**−2.127***	**−1.618*****	**−2.649*****
Exp. Day Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,518	3,245	1,482	1,085	951	701	1,490	367
R^2	0.501	0.379	0.486	0.457	0.449	0.521	0.367	0.449
Adjusted R^2	0.480	0.369	0.465	0.433	0.423	0.493	0.356	0.414

Trading Volume Responses to Macroeconomic News (Table 4)

Higher Volumes During Days of Respective Macroeconomic Event Days



Contract horizon definitions:

Own-event volume multipliers:

- **CPI:** 2.5× to 9× higher
- **Unemployment:** 3.7× to 21×
- **Payrolls:** 4× to 9×
- **GDP:** up to 24× (L-term)

Multipliers: $e^{\hat{\beta}}$ from Table 4.

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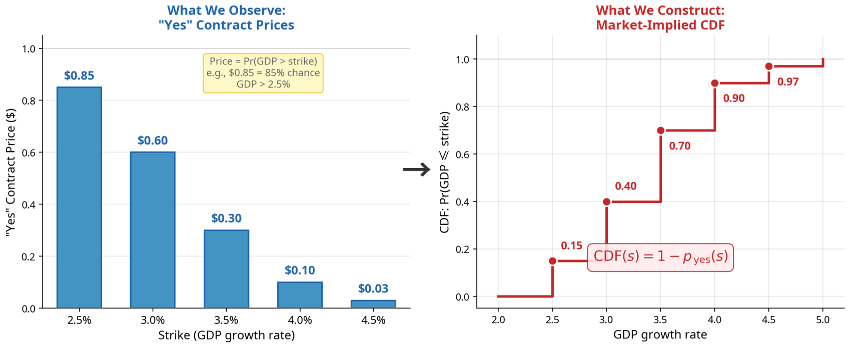
Step 1: From Contract Prices to Market-Implied CDFs

Example: GDP Q4 2025 — five "yes" contracts at different strikes

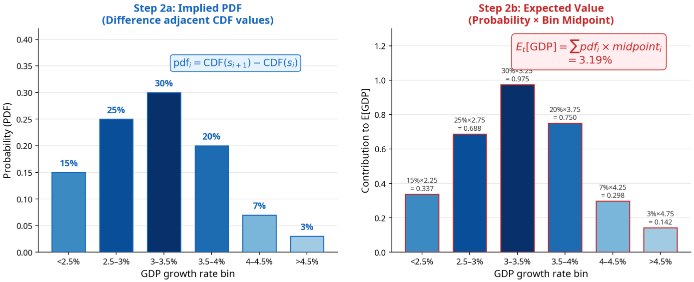


- A "yes" contract at strike s pays \$1 if $\mathrm{r_h} > \mathrm{s} \implies$ its price $\mathrm{p_{ths}} = \Pr(\mathrm{r_h} > \mathrm{s})$
- Flipping: $\boxed{\mathrm{cdf_{th}(s)} = 1 - \mathrm{p_{ths}}}$ gives the market-implied CDF at each strike
- Multiple strikes per event $\rightarrow$ multiple points on the CDF $\rightarrow$ full implied distribution

Step 2: From CDFs to PDFs and Expected Values

Continuing the GDP Q4 2025 example

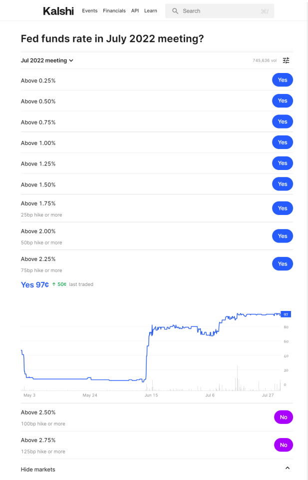
Tail Filtering | Isotonic Regression



- **PDF from CDF:** Difference adjacent CDF values $\Rightarrow$ $\mathrm{pdf_i} \equiv \mathrm{cdf}(s_{i+1}) - \mathrm{cdf}(s_i)$
- **Expected value:** $\boxed{E_t[r_h] = \sum_{i=0}^{K} \mathrm{pdf_i} \cdot \frac{s_i + s_{i+1}}{2}}$ — probability-weighted average of bin midpoints
- In this example: $E_t[\mathrm{GDP}] \approx 3.19\%$

Step 3: Computing Daily Market-Implied Expectations

High-frequency expectations for five macroeconomic variables



Kalshi Fed Funds Rate contracts (Jul 2022):

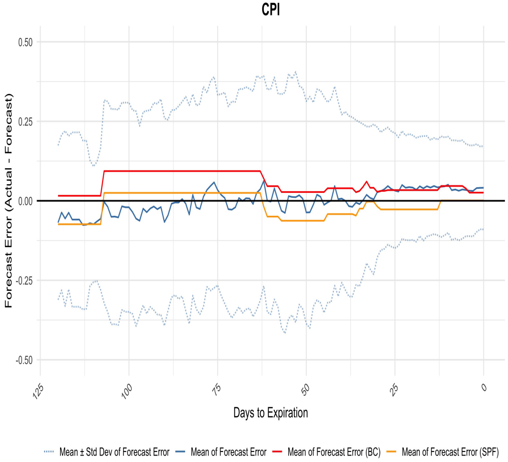
We apply this procedure daily for:

- **Federal Funds Rate** (Jul 2021–)
- **CPI** (Jul 2021–)
- **Unemployment Rate** (Jul 2021–)
- **Nonfarm Payrolls** (Mar 2023–)
- **GDP** (Jul 2021–)

Note: Kalshi also computes and reports an expected value on its contract pages using similar methods.

Accuracy of Kalshi Market Implied Expectations

Validation test: Forecast Errors of Kalshi vs BlueChip and SPF

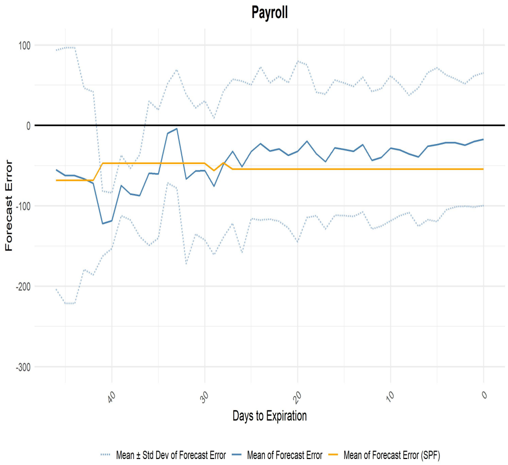


(A) CPI

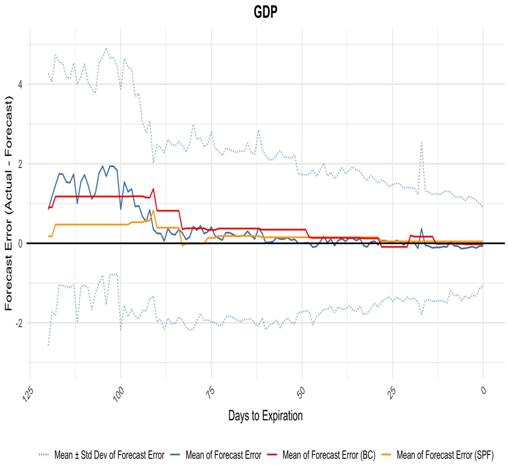
(B) Unemployment Rate

Accuracy of Kalshi Market Implied Expectations

Implied Expectations are as good as traditional measures but available at high-frequency



(A) Nonfarm Payrolls



(B) GDP

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Estimating the Effects of Monetary Policy Announcements on Kalshi Market-implied Macroeconomic Expectations

$$\Delta \mathrm{Y}_{\mathrm{i,t}} = \lambda'_{\mathrm{near}}(\Delta \mathrm{FFR}^{\mathrm{near}}_{\mathrm{t}} \times \mathrm{FedDays}_{\mathrm{t}}) + \lambda'_{\mathrm{far}}(\Delta \mathrm{FFR}^{\mathrm{far}}_{\mathrm{t}} \times \mathrm{FedDays}_{\mathrm{t}}) + \alpha_{\mathrm{i}} + \varepsilon_{\mathrm{i,t}}$$

- $\Delta \mathrm{Y}_{\mathrm{i,t}}$: Daily changes in macroeconomic expectations of different contracts (e.g. current, next)
- $\Delta \mathrm{FFR}_{\mathrm{t}}$: Daily changes in market-based measures
    - $\mathrm{FFR}^{\mathrm{near}}_{\mathrm{t}}$: current-month fed-fund futures (“FF-2")
    - $\mathrm{FFR}^{\mathrm{far}}_{\mathrm{t}}$: Secured Overnight Financing Rate expiring 4 quarters ahead (SOFR4")
    - During Fed event days, replaced daily measure with high-frequency PC from Swanson and Jayawickrema (2024)
- $\mathrm{FedDays}_{\mathrm{t}}$: FOMC, Fed Chair Speeches, FOMC Minutes
- Contract-level fixed effects

Transmission Channels: Standard vs. Fed Information Effects

Empirical Evidence Shows Standard Transmission Channel Dominates

		Daily Changes in Macroeconomic Expectations							
		CPI		Unemployment Rate		Nonfarm Payrolls		GDP	
Daily Interest Rate Delta Contract Horizon	**x Policy Event**	Front	Long-term	Front	Long-term	Front	Long-term	Front	Long-term
Near	FOMC Announcement	0.076	**−1.063*****	0.067	−1.702	**−0.392****	−0.079	0.200	**−9.488***
		(0.128)	(0.309)	(0.271)	(1.382)	(0.169)	(0.193)	(1.758)	(4.832)
	Fed Chair Speech	−1.000	**0.647****	0.192	−0.211	−0.285	0.159	**−12.187*****	23.741
		(0.781)	(0.270)	(0.615)	(0.603)	(1.019)	(0.260)	(3.915)	(21.163)
	FOMC Minutes	**0.129****	**0.216*****	−0.169	0.982	**−1.404***	8.336	0.065	0.713
		(0.060)	(0.066)	(0.153)	(0.866)	(0.762)	(6.143)	(0.530)	(0.868)
Far	FOMC Announcement	−0.014	**−0.439*****	0.109	−1.281	**−0.339****	0.023	−0.459	−1.239
		(0.088)	(0.141)	(0.132)	(1.010)	(0.161)	(0.068)	(0.723)	(1.870)
	Fed Chair Speech	0.264	**−0.411*****	−0.003	0.133	−0.115	−0.047	0.649	**−7.753****
		(0.353)	(0.123)	(0.206)	(0.131)	(0.188)	(0.062)	(1.215)	(3.417)
	FOMC Minutes	0.007	0.267	0.445	−0.357	**0.611****	−7.830	0.261	−1.904
		(0.101)	(0.167)	(0.286)	(0.279)	(0.302)	(5.737)	(1.146)	(2.548)
Contract FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,519	3,253	1,484	1,095	955	709	1,493	372

Bid-Ask Price Stats (Table A.6)

Backup: Transmission Channels — Using Bid-Ask Implied Expectations

Table A.6: Including contracts with zero volume but available bid-ask quotes

Go Back

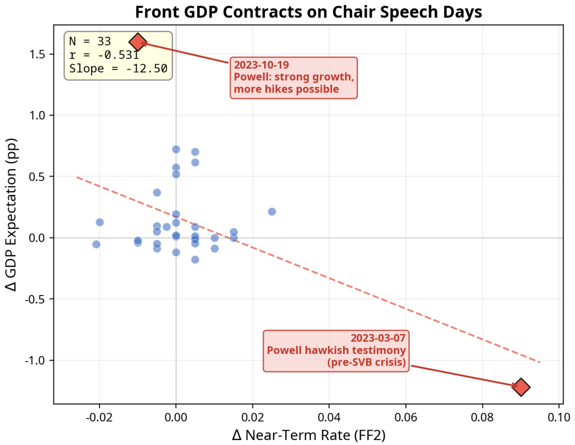
		Daily Changes in Macroeconomic Expectations							
		CPI		Unemployment Rate		Nonfarm Payrolls		GDP	
Daily Interest Rate Delta Contract Horizon	**x Policy Event**	Front	Long-term	Front	Long-term	Front	Long-term	Front	Long-term
Near	FOMC Announcement	0.076	**−0.885*****	0.051	−2.010	**−0.404****	0.007	0.192	**−8.344****
		(0.128)	(0.304)	(0.279)	(1.312)	(0.172)	(0.092)	(1.755)	(3.739)
	Fed Chair Speech	−1.000	0.444	0.146	2.092	−0.246	0.953	**−12.198*****	**15.560*****
		(0.781)	(0.271)	(0.682)	(2.523)	(0.982)	(0.938)	(3.919)	(5.853)
	FOMC Minutes	**0.129****	**0.211*****	−0.160	**1.588*****	−1.082	0.048	0.064	1.715
		(0.060)	(0.063)	(0.152)	(0.173)	(0.667)	(0.080)	(0.530)	(1.292)
Far	FOMC Announcement	−0.014	**−0.362****	0.096	−1.369	**−0.343****	−0.005	−0.461	−1.282
		(0.088)	(0.146)	(0.137)	(0.948)	(0.163)	(0.029)	(0.723)	(1.713)
	Fed Chair Speech	0.264	**−0.312****	−0.001	−0.933	−0.099	**−0.453***	0.645	**−7.770*****
		(0.353)	(0.124)	(0.219)	(1.221)	(0.182)	(0.272)	(1.217)	(2.884)
	FOMC Minutes	0.007	**0.266***	0.421	−0.238	**0.439****	−0.044	0.265	−5.034
		(0.101)	(0.153)	(0.286)	(0.149)	(0.213)	(0.073)	(1.146)	(3.706)
Contract FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,519	3,952	1,488	2,404	985	1,579	1,493	583

Unpacking the Large GDP Coefficients

Front Contracts on Chair Speech Days

- The large GDP $\hat{\lambda}$ (-12.50) is driven by a few observations.
- **Key Outliers:**
  - **2023-03-07**: Powell hawkish testimony pre-SVB. +9bp rate $\rightarrow$ -1.22pp GDP.
  - **2023-10-19**: Powell signals more hikes. -1bp rate $\rightarrow$ $+1.60$pp GDP.

Backup: Longer-Run Contracts



What Happened on Those Two Days?

News coverage of the GDP outlier dates

March 7, 2023

Powell's hawkish Senate testimony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Dow Falls More Than 550 Points as Powell Warns of Faster Rate Increases

Investors are beginning to price in higher interest rates throughout the year

By David Uberti Follow *and Joe Wallace* Follow

- Warned Fed may accelerate rate hikes
- 50bp March hike odds surged
- Dow fell 575 pts (−1.7%)
- 3 days before SVB collapse

October 19, 2023

Powell at Economic Club of New York


FT PROFESSIONAL

Federal Reserve

Federal Reserve chair pledges to move carefully on rates amid 'range of uncertainties'

Jay Powell points to elevated geopolitical tensions posing 'important risks' to the global economy

- "Proceeding carefully" on rates
- Strong growth could warrant more hikes
- Markets read it as dovish pivot
- Q3 GDP came in at 4.9% (1 week later)

Sources: *The Wall Street Journal*, March 7, 2023; *Financial Times*, October 19, 2023.

Pooled Regression: Motivation

Why pool across macroeconomic contracts?

Weights Table

Goal: Summarize how monetary policy affects macroeconomic expectations *overall*

Challenge: Different macro variables have very different scales

Macro Variable	S.D. (Front)	S.D. (Longer-term)
CPI	0.53%	0.79%
Unemployment	1.51%	1.80%
GDP	4.98%	5.42%
Payroll	0.46%	0.21%

- GDP daily changes are $\sim 10\times$ larger than CPI $\Rightarrow$ **standardization is essential**

Pooled Regression Results (Table 6)

Standardized daily changes in macroeconomic expectations

Motivation Methodology Weights

Daily Interest Rate Delta Contract Horizon	x Policy Event	Standardized Daily Changes in Macroeconomic Expectations					
		All Horizons		**Front**		**Longer-term**	
		(1)	(2)	(3)	(4)	(5)	(6)
Near	FOMC Announcement	**−6.520****	**−6.539****	0.543	0.550	**−12.722*****	**−12.784*****
		(2.666)	(2.679)	(1.491)	(1.487)	(3.422)	(3.427)
	Fed Chair Speech		−1.080		**−11.291****		**7.714*****
			(4.101)		(4.650)		(2.954)
	FOMC Minutes		**2.346*****		−0.250		**2.679*****
			(0.517)		(0.778)		(0.678)
Far	FOMC Announcement	**−2.911***	**−2.934***	−0.049	−0.048	**−5.122*****	**−5.171*****
		(1.545)	(1.553)	(0.739)	(0.741)	(1.684)	(1.690)
	Fed Chair Speech		−1.377		1.212		**−4.866*****
			(1.940)		(1.999)		(1.320)
	FOMC Minutes		1.472		2.050		2.447
			(0.998)		(1.624)		(1.656)
Contract FE		Yes	Yes	Yes	Yes	Yes	Yes
Observations		10,880	10,880	5,451	5,451	5,429	5,429
R^2		0.003	0.005	0.004	0.005	0.014	0.019
Adjusted R^2		−0.012	−0.010	−0.024	−0.024	−0.011	−0.007

- Tighter policy → **downward** revisions in macro expectations on FOMC days (standard channel)
- Effects stronger for **longer-term** contracts; FOMC Minutes also significant
- *Example:* Col. (5): a 0.1% Near rate ↑ on FOMC day ⇒ longer-term expectations fall by 1.27 S.D.

Outline

A roadmap for the talk

- ✓ Motivation and Background: The "Fed Information Effect"
- ✓ The Kalshi Prediction Market
- ✓ Kalshi Market Trading Volumes
- ✓ Kalshi Market-Implied Expectations
- ✓ The Response of Kalshi Market-Implied Expectations to FOMC News
- Related Evidence
- Conclusions

Discussion: Standard Channels Dominate

Consistent with Jarociński & Karadi (2020 AEJ:Macro)

- Standard channel dominates for FOMC announcements
- Information effect is *occasional*, not ubiquitous
- Possible info effects only in FOMC Minutes (CPI) and Fed Chair Speeches
- Bauer-Swanson (2023) consistent

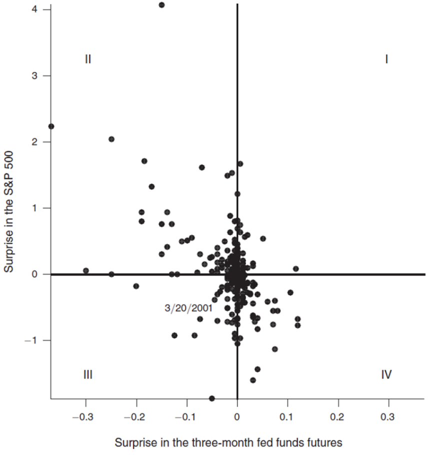

Figure 1. Scatterplot of Interest Rate and Stock Price Surprises

Jarociński & Karadi (2020), Figure 1: Interest Rate vs. Stock

Discussion: Heterogeneity Across Horizons

Prices vs. employment adjust at different speeds

	Front-horizon	Longer-term
CPI	Insignificant	**Negative, significant**
Nonfarm Payrolls	**Negative, significant**	Insignificant

CPI — slow adjustment:

- Sticky prices $\rightarrow$ disinflationary pressure builds over time
- Consistent with NK Phillips Curve

NFP — fast adjustment:

- Firms cut employment quickly
- Long-term anchored by natural rate

$\Rightarrow$ Market-based confirmation of different adjustment dynamics of prices vs. quantities

Conclusions

- Prediction markets offer high-frequency macroeconomic forecast data
- Kalshi forecasts compare favorably to Blue Chip, SPF but are available at much higher frequency
- Kalshi trading volumes increase around a variety of macroeconomic events
- Kalshi markets respond to FOMC announcements and Fed Chair speeches consistent with standard macro models, VARs
- Kalshi markets respond to FOMC minutes with an opposite coefficient, potentially consistent with a “Fed Information Effect”

Thank you

Backup Materials

Backup: Data Contingencies (2025 Gov. Shutdown)

- The Oct 2025 government shutdown lasted 43 days, the longest in U.S. history.
- The Bureau of Labor Statistics (BLS) could not collect data for the October 2025 reference period.
- As a result, the October jobs report (unemployment rate) and CPI report were **canceled** for the first time ever.
- This created a real-world stress test for prediction markets.

Go Back

Backup: Data Contingencies (2025 Gov. Shutdown)

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- The Bureau of Labor Statistics (BLS) could not collect data for the October 2025 reference period.
- As a result, the October jobs report (unemployment rate) and CPI report were **canceled** for the first time ever.
- This created a real-world stress test for prediction markets.
- For **canceled** data (Oct 2025 CPI), Kalshi invoked Rule 6.3(c) to settle at the *last traded price*.
- For **delayed** data (Sept 2025 Jobs), contracts simply settled later.
- This highlights the importance of robust contract design and clear rules for data contingencies.

Go Back

Backup: Tail Filtering (Excluding Extreme Strikes)

Go Back

Problem: Extreme-strike contracts are illiquid $\Rightarrow$ stale prices $\Rightarrow$ excess volatility in $\mathrm{E_t}[\mathrm{r_h}]$

Procedure:

- If ≥ 5 strikes available: drop the smallest and largest, rescale PDFs to sum to 1
- If < 5 strikes: use all strikes
- Robustness: full-range results reported in the Appendix

Backup: Isotonic Regression (Ensuring CDF Monotonicity)

Go Back

Problem: Higher-strike contract sometimes trades at a *higher* price $\Rightarrow$ negative implied PDF

Solution: Volume-weighted isotonic regression

$$\min_{\hat{p}} \sum_{s} w_{ths}\left(p_{ths} - \hat{p}_{ths}\right)^2 \quad \text{s.t.} \quad \hat{p}_{s_1} \geq \hat{p}_{s_2} \geq \cdots \geq \hat{p}_{s_K}$$

- Weights w_{ths} = trading volume (more liquid contracts $\Rightarrow$ more influence)
- Ensures: prices $\downarrow$ in strike $\Rightarrow$ CDF monotone $\Rightarrow$ PDFs ≥ 0

Backup: Ambiguous Contracts (Iran Leader Market)

- Kalshi had a market on whether Iran's Supreme Leader, Ali Khamenei, would be "out" of power.
- Khamenei was killed in a military strike, so he was clearly "out."
- However, Kalshi's rules explicitly state that markets do not resolve based on death.
- Kalshi invoked Rule 6.3(c), settling at the *last traded price* (26c for Yes), not $1 for "Yes" holders.
- This led to a user backlash and a potential class-action lawsuit.

Go Back

Backup: Pooled Regression Motivation

Go Back

Goal: Summarize how monetary policy affects macroeconomic expectations *overall*

Challenge: Different macro variables have very different scales

Macro Variable	S.D. (Front)	S.D. (Longer-term)
CPI	0.53%	0.79%
Unemployment	1.51%	1.80%
GDP	4.98%	5.42%
Payroll	0.46%	0.21%

- GDP daily changes are $\sim 10\times$ larger than CPI $\Rightarrow$ **standardization is essential**
- Different average sensitivities to interest rates $\Rightarrow$ **weighting is needed**

Backup: Pooled Regression Methodology

Go Back

Step 1: Standardize daily changes by their S.D.:

$$\Delta\widetilde{\mathrm{Y}}^{\mathrm{m}}_{\mathrm{i,t}} = \Delta\mathrm{Y}^{\mathrm{m}}_{\mathrm{i,t}} \,/\, \mathrm{SD}(\Delta\mathrm{Y}^{\mathrm{m}})$$

Step 2: Estimate average sensitivity for each macro variable m:

$$\Delta\mathrm{Y}^{\mathrm{m}}_{\mathrm{i,t}} = \alpha^{\mathrm{m}}_{\mathrm{i}} + \beta^{\mathrm{m}}_{\mathrm{near}}\Delta\mathrm{FFR}^{\mathrm{near}}_{\mathrm{t}} + \beta^{\mathrm{m}}_{\mathrm{far}}\Delta\mathrm{FFR}^{\mathrm{far}}_{\mathrm{t}} + \varepsilon^{\mathrm{m}}_{\mathrm{i,t}}$$

Step 3: Construct weights (inverse sensitivity — down-weight more responsive variables):

$$\omega^{\mathrm{m}} = \frac{1}{|\beta^{\mathrm{m}}_{\mathrm{near}} + \beta^{\mathrm{m}}_{\mathrm{far}}|}$$

Step 4: Run weighted pooled regression:

$$\Delta\widetilde{\mathrm{Y}}^{\mathrm{m}}_{\mathrm{i,t}} = \lambda^{\mathrm{pool}}_{\mathrm{near}}(\Delta\mathrm{FFR}^{\mathrm{near}}_{\mathrm{t}} \times \mathrm{FedDays}_{\mathrm{t}}) + \lambda^{\mathrm{pool}}_{\mathrm{far}}(\Delta\mathrm{FFR}^{\mathrm{far}}_{\mathrm{t}} \times \mathrm{FedDays}_{\mathrm{t}}) + \alpha_{\mathrm{i}} + \varepsilon^{\mathrm{m}}_{\mathrm{i,t}}$$

$\Rightarrow \lambda^{\mathrm{pool}}$: # of S.D. of *additional* change on Fed days, per 1% Δ interest rate

Backup: Pooled Regression Weights (Appendix)

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		Near-Term Rate (FF2)		Longer-Term Rate (SOFR4)			
Macro Series	**Horizon**	Sensitivity	Weight	Sensitivity	Weight	**N**	**Adj. R^2**
CPI	Front	0.503	8.0%	0.013	91.2%	1,519	−0.001
		(0.362)		(0.221)			
	Longer-term	0.329	39.9%	−0.130	38.3%	3,257	−0.000
		(0.240)		(0.143)			
Unemployment	Front	0.063	63.4%	−0.260	4.6%	1,484	−0.001
		(0.390)		(0.180)			
	Longer-term	**1.269*****	10.3%	−0.136	36.8%	1,095	0.001
		(0.396)		(0.289)			
GDP	Front	−0.146	27.4%	**0.405****	2.9%	1,494	−0.000
		(0.180)		(0.180)			
	Longer-term	0.279	47.0%	0.222	22.5%	400	−0.004
		(0.436)		(0.437)			
Payroll	Front	**3.436****	1.2%	−**0.968*****	1.2%	955	0.006
		(1.587)		(0.348)			
	Longer-term	−**4.893***	2.7%	**2.072*****	2.4%	709	0.013
		(2.901)		(0.783)			

Note: This table reports OLS estimates of the average sensitivity of standardized daily changes in contract-implied macro expectations to the near-term interest rate (FF2) and the longer-term interest rate (SOFR4). The dependent variable is $\Delta \tilde{y}_{i,t}/SD_i$, where SD_i is the unconditional standard deviation of daily changes for series i. Standard errors (in parentheses) are two-way

Backup: Longer-Run GDP Contracts on Fed Event Days

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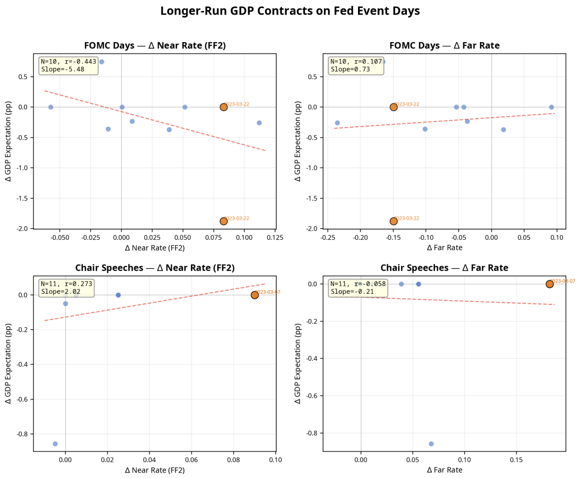

With very small N (5–11), correlations are unstable and driven by single points (e.g., 2023-03-22 SVB outlier).