Predoctoral Research Assistant Coding Challenge

Finance Group, MIT Sloan School of Management

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ChatGPT queries:

- https://chatgpt.com/share/6995c187-7d88-8000-aa6f-d11360c36e5f
- https://chatgpt.com/share/69964091-6ba4-8000-b23f-845062251de9
- https://chatgpt.com/share/6996409a-c4fc-8000-a022-57cd50cca0bb
- https://chatgpt.com/share/6996993e-e57c-8000-b79c-cb0c888c7fc2

Other research (StackOverflow, papers):

- embedded in ChatGPT queries, Jupyter notebook submission, notes

Part 1: Data Preparation and Surprise Measure Selection

1. Explore the available surprise measures in the USMPD
2. **Choose one primary surprise measure** for your analysis and justify your choice
3. Merge the surprise data with daily asset price data
4. Provide summary statistics

In your writeup, discuss any methodological choices, data issues, or tradeoffs that you think are important.

Primary Surprise Measure

I use the pre-constructed first principal component (PC1) provided in the U.S. Monetary Policy Event-Study Database (USMPD) as my primary monetary policy surprise measure. Per the methodology of Acosta et al. (2025), PC1 is computed from high-frequency changes in MP1, MP2, and ED2-ED4 futures contracts around FOMC announcements.

PC1 is a natural choice because it "summarize(s) changes in the average expected policy rate path... from rate decisions, communication, and other policy actions of the Committee" (UMSPD, 2026). It represents the direction in which selected instruments move together most strongly, providing a single, economically meaningful indicator of monetary policy surprise that reflects both the direction of policy (hawkish vs. dovish surprises captured in MP1) and revisions to the expected path of rates (captured by MP2 and ED2-ED4).

As a methodological choice, I proceed with PC1 as my key surprise measure. It is worth noting that PC1 combines the elements of "direction" and "path" into a single factor; to disentangle these elements, we could develop alternative measures, though for the purposes of this exercise I feel this single factor is sufficient.

Within the PC1 measure, I choose to focus on monetary events (`ME`), which combines statements and press conferences. Because our asset price data is on a daily frequency, we can treat the full communication window (the statement and the following press conference) as a single event:

A limitation of the asset price data I pull from FRED is its granularity. Because we do not observe asset prices beyond the daily level, we are unable to observe intraday effects. I hypothesize these shocks may have greatest effect in a narrow window around the announcement and press conference – e.g., in the hour(s) following information release. Using daily returns introduces additional noise relative to a high-frequency design, as other news within the same trading day may influence prices. Nevertheless, daily data should be enough to capture directional effects of policy surprises.

With the asset price data, I calculate daily log returns for foreign exchange pairs and daily basis point changes for treasury yield and break-even inflation. I use log returns on FX to remove scale dependence.

Summary statistics are in Table 1.

Part 2: Asset Price Responses to Monetary Policy

Estimate the response of each asset to monetary policy surprises:

$$\Delta y_{i,t} = \alpha_i + \beta_i \cdot \text{Surprise}_t + \varepsilon_{i,t} \tag{1}$$

Run this regression separately for:

- Each exchange rate (8+ currencies)
- Each Treasury yield (2Y, 5Y, 10Y)
- Each breakeven inflation rate (5Y, 10Y)

Deliverables:

1. A well-organized regression table summarizing all results
2. Appropriate visualizations

In your writeup, interpret your findings and discuss any patterns, puzzles, or limitations you identify.

Findings and Interpretation

I estimate the response of ten exchange rates, three Treasury yields, and two breakeven inflation rates to monetary policy surprises measured by the USMPD monetary events principal component (`ME`). The results are summarized in Table 2 and Figures 1–2.

Exchange Rates. Under the current data and specification, monetary policy surprises do not have a statistically significant effect on exchange rates. Across ten currencies, including major advanced economy currencies (EUR, GBP, JPY, CHF), commodity-exporter currencies (AUD, CAD, NOK), emerging market currencies (MXN, BRL), and the managed-float Chinese RMB (CNY), none of the estimated coefficients are statistically significant at conventional levels.

While some currencies (e.g., JPY and CHF) have somewhat larger estimates, confidence intervals are wide and include zero. The very low R^2 values indicate that monetary policy surprises explain little of the variation in daily FX returns on FOMC days.

A possible explanation here is that exchange rates reflect global monetary conditions, not just U.S. policy. FX markets are sensitive to global risk sentiment, geopolitics, and macroeconomic news beyond FOMC announcements. Additionally, markets may anticipate foreign central bank responses to U.S. policy shocks (e.g., if the Fed tightens, other central banks may be expected to follow). Lastly, the use of daily data may hide the measured response: intraday exchange rate movements around announcement windows may be substantial, but are diluted by other news within the same trading day.

Treasury Yields. The most pronounced and statistically significant effects appear in nominal Treasury yields. A positive monetary policy surprise (e.g., a hawkish shock) increases yields across maturities, with the largest effect at the short end of the curve. The estimated coefficient is ~ 112 basis points for the 2-year yield, 94 basis points for the 5-year yield, and 53 basis points for the 10-year yield, all statistically significant at conventional levels.

The declining magnitude across maturities is consistent with the idea that monetary policy mainly affects short-term interest rates. Longer maturities include expectations about future policy, and carry higher yields due to term premium. In longer-term treasuries, we see smaller but still significant responses. The relatively high R^2 for the 2-year yield (0.38) suggests that monetary policy shocks explain a substantial share of short-term rate variation on FOMC days.

Breakeven Inflation (TIPS Spread). In contrast, breakeven inflation rates respond negatively to monetary policy surprises. A hawkish shock lowers 5-year and 10-year breakevens by $\sim$42 and 30 basis points, respectively, with statistically significant effects. This suggests that tightening surprises reduce inflation expectations and/or inflation risk premium.

Because real yield = nominal yield − inflation, the joint movement in nominal yields and breakevens suggests that real yields rise sharply following a hawkish monetary policy surprise. Hawkish policy shocks increase nominal yields while simultaneously reducing expected inflation, consistent with tighter financial conditions. Conversely, a dovish surprise would lower nominal yields and raise breakeven inflation, leading to a decline in real interest rates and easing financial conditions.

Term Structure Patterns. Figure 2 illustrates a clear term structure pattern. The response of nominal yields declines monotonically with maturity, consistent with policy shocks having the strongest effect on short-term rates. Breakeven inflation responses are negative and somewhat flatter across maturities.

Limitations. Already covered in Part 1 and again above: the analysis uses daily data, and the `ME` measure combines direction and path components of policy surprises. Separating the direction and path components could yield stronger asset responses, especially in FX. As stated above, FX results may reflect omitted global risk, geopolitical, or macroeconomic factors, or simultaneous foreign monetary policy expectations.

Overall, the results align with standard monetary theory: policy surprises affect short-term interest rates and have meaningful but smaller effects at longer maturities, while FX movements do not respond strongly at the daily level.

Part 3: The Role of External Positions

Recent research suggests that countries' external financial positions affect how their currencies respond to U.S. monetary policy shocks (see Antolín-Díaz, Cenedese, Han, and Sarno, 2023).

Your task: Test whether the NFA/GDP ratio moderates exchange rate responses to U.S. monetary policy surprises.

Estimate a panel regression of the form:

$$\Delta e_{i,t} = \alpha_i + \beta_1 \cdot \text{Surprise}_t + \beta_2 \cdot (\text{Surprise}_t \times \text{NFA}_{i,t-1}) + \gamma \cdot \text{NFA}_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

where $\Delta e_{i,t}$ is the change in exchange rate i on FOMC day t, and $\text{NFA}_{i,t-1}$ is the lagged NFA/GDP ratio for country i.

Deliverables:

1. Panel regression results with appropriate standard errors (discuss your choice: clustered by country, by time, or two-way)
2. A visualization showing how the estimated exchange rate response varies with NFA/GDP

In your writeup, explain your methodology, interpret the results economically, and discuss any issues you think are important or challenging.

Methodology

A note on AI usage in this section. This section required much more assistance from AI (ChatGPT) compared to the others, due to a lack of in-depth knowledge around panel regressions: Driscoll-Kraay, marginal effect plotting, the variance–covariance matrix, the delta method, etc. In order to complete this exercise given the time constraint, I relied on AI support for research and reasoning to a larger degree than in other sections. Specifically, the "Build Deliverables" (Regression Table, Visualization) sections of the Jupyter Notebook are largely implemented by AI. Though I read through the code, added formatting, and validated the AI output, I do not feel as comfortable in its correctness as I do other sections.

Data and panel construction. I construct a panel of exchange rate changes (daily log returns) on FOMC monetary event dates, keeping non-FOMC dates (differs from event study, where non-FOMC dates were dropped). The dependent variable is the daily log return for each currency versus USD on event day t, $\Delta e_{i,t}$, where i represents currencies. I merge these outcomes with the USMPD monetary policy surprise measure (PC1, monetary events; `ME`) and with lagged external positions measured by net foreign assets over GDP (NFA/GDP) from the External Wealth of Nations dataset.

Standard errors. I choose to cluster standard errors by event date (time clustering). This is because ME_t varies across FOMC dates and is common across currencies on a given date, so residuals may be correlated across currencies within the same event (time). However, I believe the more correct choice would be to two-way cluster on both country and date. Clustering by time handles cross-sectional dependence (if currencies move together on the same shock), while clustering by country handles serial correlation (a currency responds similarly across shocks). Unfortunately, my panel includes only ten countries, which is far below the required/rule-of-thumb 40-50 clusters for reliable estimation. As such, I report time-clustered standard errors as the baseline specification and treat two-way clustering and Driscoll–Kraay[1] standard errors as robustness checks.

Findings and Interpretation

Table 3 reports panel estimates for the time-clustered specification as well as two-way and Driscoll-Kraay. The point estimates are stable across all three columns. The coefficient on the monetary policy surprise is small and statistically insignificant. The interaction between ME_t and lagged NFA/GDP is positive, and statistically insignificant. The coefficient on NFA/GDP is negative and only marginally significant in the two-way clustered specification.

Figure 3 visualizes the interaction term by plotting the implied marginal effect of a policy surprise,

$$\frac{\partial \Delta e_{i,t}}{\partial ME_t} = \beta_1 + \beta_2 \, \mathrm{NFA}_{i,t-1},$$

together with a 95% confidence band computed using the time-clustered variance–covariance matrix (delta method). The estimated marginal effect increases slightly with NFA/GDP, but the confidence interval is wide and includes zero throughout most of the range. I do not find strong evidence to support the hypothesis that external positions moderate exchange rate responses to U.S. monetary policy surprises.

[1] Learned during my research and coding process, see linked ChatGPT queries.

Part 4: Extension

Propose and implement **one extension** that deepens or improves the analysis. This is deliberately open-ended.

We evaluate:

- The quality of your idea (does it address something interesting or important?)
- The quality of execution
- Your interpretation of the results

Proposal

A key limitation of Parts 1–2 is a frequency mismatch: the monetary policy surprise ME_t is measured in a narrow intraday window around FOMC communications, while the asset prices we use are daily moves. We've previously discussed looking at higher frequencies to understand how policy shocks may affect intra-day prices (e.g., within hour(s) after information release), but the other view is looking at a *lower* frequency.

My hypothesis is as follows: if markets only partially incorporate policy news during the daily close-to-close window due to[2] gradual adjustment (over the course of days or weeks), the event study "impact day" regression in Part 2 may understate the response. So, do we see the USD appreciate, treasury yields rise, and/or breakeven inflation fall *more* than what we measured on just day 0 (impact day)?

This is somewhat inspired by Post-earnings-announcement drift. "PEAD is the tendency for a stock's cumulative abnormal returns to drift in the direction of an earnings surprise for several weeks (even several months) following an earnings announcement" (Wikipedia, 2026).

To address this longer term drift, I extend the analysis by estimating local projections (Jordà-style impulse responses)[3] for FX, Treasury yields, and breakeven inflation. Rather than "impact day" response of these various measures, we look at the cumulative response of each asset over horizons $h = 0, 1, \dots, H$ trading days following an FOMC monetary event.

Methodology

Setup. For each asset i, I work with levels $y_{i,t}$ (log exchange rates for FX and basis-point levels for yields and breakevens). For each horizon $h \geq 0$, I define the cumulative change from just before the event to $t + h$ as

$$Y_{i,t}(h) \equiv y_{i,t+h} - y_{i,t-1}. \tag{3}$$

This definition makes $h = 0$ comparable to an event-day move (close-to-close around the event), while $h > 0$ captures post-event drift or persistence.

To avoid contaminating the h-day response with the next policy shock, I restrict the estimation sample to event dates for which the horizon ends before the next meeting. For example, if FOMC meeting at time t is h trading days before the next FOMC meeting at time $t + h$, we analyze the cumulative change for h horizons. This restriction mechanically reduces sample size as h increases – we see a sharp falloff of n after $\sim$40 days, which aligns with FOMC meeting frequency of 8 times a year ($\sim$45 calendar days).

[2] Another rationale for this understating could be that differing local trading hours in FX markets (say, USA vs. Europe vs. Asia) affects the daily close time, meaning FOMC decisions (which are squarely within USA trading days) may not be for the rest of the world. This is a much smaller limitation and has not been vetted/explored further, so we'll leave this for now.

[3] I first gained exposure to Jordà and local projections/impulse responses a few weeks ago, through a coding exercise for another MIT Sloan Finance Research Associate predoc role.

Local projection specification. For each asset i and horizon h, I estimate:

$$Y_{i,t}(h) = \alpha_{i,h} + \beta_{i,h} \cdot ME_t + \sum_{j=1}^{2} \gamma_{i,j,h} ME_{t-j} + u_{i,t}(h), \tag{4}$$

where $\alpha_{i,h}$ is an asset-specific intercept (estimated separately for each asset and horizon), and I include two lags of the surprise to absorb residual effects from the prior two FOMC events.

I use Newey-West (HAC) standard errors, with lag length growing with the horizon h.

Findings and Interpretation

Figures 4–5 summarize the estimated $\beta_{i,h}$ across horizons for each asset class, along with the effective sample size at each h.

Exchange rates: heterogeneous, attenuation, low significance. Exchange rate responses are very heterogeneous across currencies, potentially attributable to differences in liquidity, macro/U.S. exposure, and FX regimes. Several currencies exhibit short-run USD appreciation (positive cumulative responses) in the first few days following a hawkish surprise, followed by partial attenuation or mean reversion. At longer horizons, some currencies appear to continue appreciating, while others reverse or display wide confidence intervals.

The apparent "drift" in some currencies could reflect genuine gradual adjustment in international portfolios. Or, if a hawkish surprise shifts expectations about the path of U.S. policy relative to foreign central banks, the rate differential may widen further over subsequent weeks.

That said, FX responses are noisy; they embed global risk sentiment, macroeconomic conditions, geopolitical developments, and other non-FOMC shocks. The wide confidence intervals and cross-currency heterogeneity suggest that some of the longer-horizon drift may reflect noise. As with yields, the shrinking and changing estimation sample at longer horizons may also affect the coefficients.

Treasury yields: strong and persistent. Consistent with Part 2, yields respond strongly to a hawkish surprise. Over the first week (Figure 4), the cumulative response remains positive and sizable at short and intermediate maturities, suggesting persistence rather than a one-day spike. Extending the horizon to 40 trading days reveals that cumulative yield responses continue to drift upward at longer horizons, particularly at short and intermediate maturities.

Again one explanation is gradual adjustment: some market participants may adjust portfolios more slowly, generating additional upward pressure after the initial announcement. Another possibility is that a hawkish surprise may signal further upward revisions to the expected path of policy, and subsequent macroeconomic releases may reinforce that signal, leading to further increases in expected short rates.

Caution is warranted, however, as there may be composition effects: the estimation sample shrinks as the horizon increases due to the restriction that the response window must end before the next FOMC meeting. As a result, longer-horizon coefficients are estimated using a different subset of meetings. Additionally, subsequent macroeconomic news may be correlated with the sign of the original surprise, meaning the longer-horizon coefficients could reflect correlated fundamentals rather than pure persistence of the initial shock.

Breakeven inflation: impact decline, partial reversal. Breakeven inflation rates fall sharply on impact following a hawkish surprise, consistent with tighter policy lowering expected inflation or inflation risk premia. Over the first week, the cumulative decline attenuates somewhat. At longer horizons, breakeven responses remain volatile and imprecision grows, with no clear monotonic pattern.

One interpretation is that the impact-day decline reflects an immediate tightening of financial conditions and downward revision in inflation expectations, while subsequent non-FOMC data releases and risk sentiment partially offset the initial move.

Takeaway. This extension supports the main conclusions from Part 2: U.S. monetary policy surprises transmit most clearly into the term structure of interest rates (and, to a lesser extent, inflation compensation), while FX responses are more heterogeneous and harder to pin down. Longer-horizon responses must be interpreted carefully given changing sample composition and the possibility of correlated subsequent news. In theory, the local-projection exercise is a useful diagnostic for persistence versus purely on-impact responses.

Tables

Table 1: *

Summary Statistics (FOMC Event Days Only)

Yield and breakeven changes are in basis points; FX variables are daily log returns.

Variable	N	Mean	Std	P10	P25	P50	P75	P90	Min	Max	Missing	Start
Monetary policy surprise (PC1, Monetary Events)	229	0.0004	0.0404	-0.0438	-0.0110	0.0058	0.0171	0.0398	-0.2819	0.0970	0	1999-02-03
2Y Treasury yield change (bp)	229	-0.8079	7.3519	-9.2000	-5.0000	0.0000	3.0000	7.2000	-27.0000	27.0000	0	1999-02-03
5Y Treasury yield change (bp)	229	-0.9825	8.4214	-10.2000	-6.0000	0.0000	3.0000	8.2000	-46.0000	25.0000	0	1999-02-03
10Y Treasury yield change (bp)	229	-0.7380	7.4133	-8.0000	-5.0000	0.0000	3.0000	7.0000	-51.0000	22.0000	0	1999-02-03
5Y breakeven inflation change (bp)	194	0.2113	4.8970	-4.7000	-2.0000	1.0000	2.0000	5.0000	-20.0000	29.0000	35	2003-01-29
10Y breakeven inflation change (bp)	194	0.2371	3.7188	-4.0000	-2.0000	0.0000	2.0000	5.0000	-15.0000	11.0000	35	2003-01-29
EUR/USD (daily log return)	229	-0.0009	0.0047	-0.0056	-0.0024	-0.0004	0.0013	0.0033	-0.0296	0.0124	0	1999-02-03
GBP/USD (daily log return)	229	-0.0007	0.0057	-0.0063	-0.0035	-0.0006	0.0022	0.0055	-0.0443	0.0216	0	1999-02-03
JPY/USD (daily log return)	229	0.0003	0.0056	-0.0065	-0.0025	0.0006	0.0036	0.0063	-0.0254	0.0186	0	1999-02-03
CHF/USD (daily log return)	229	-0.0008	0.0056	-0.0070	-0.0031	-0.0001	0.0023	0.0047	-0.0323	0.0125	0	1999-02-03
AUD/USD (daily log return)	229	-0.0006	0.0096	-0.0079	-0.0048	-0.0010	0.0026	0.0078	-0.0667	0.0757	0	1999-02-03
CAD/USD (daily log return)	229	-0.0007	0.0056	-0.0052	-0.0030	-0.0005	0.0013	0.0044	-0.0507	0.0184	0	1999-02-03
MXN/USD (daily log return)	229	-0.0005	0.0091	-0.0075	-0.0044	-0.0010	0.0020	0.0073	-0.0342	0.0811	0	1999-02-03
NOK/USD (daily log return)	229	-0.0011	0.0072	-0.0090	-0.0039	-0.0003	0.0029	0.0060	-0.0338	0.0155	0	1999-02-03
BRL/USD (daily log return)	229	-0.0002	0.0104	-0.0106	-0.0048	-0.0004	0.0041	0.0106	-0.0353	0.0755	0	1999-02-03
CNY/USD (daily log return)	229	-0.0002	0.0014	-0.0015	-0.0005	0.0000	0.0001	0.0007	-0.0072	0.0085	0	1999-02-03

This table reports summary statistics for the variables used in the event-study analysis. issingness due to series start dates (breakevens begin later).

Table 2: *

Asset Price Responses to Monetary Policy Surprises (FOMC Event Days)

Regression: $\Delta y_{i,t} = \alpha_i + \beta_i \cdot ME_t + \varepsilon_{i,t}$; HC1 robust standard errors.

Class	Asset	Beta	SE	t-stat	N	R^2
FX	EUR/USD	0.0048	0.0068	0.7057	229	0.0017
FX	GBP/USD	0.0008	0.0077	0.1031	229	0.0000
FX	JPY/USD	0.0123	0.0096	1.2806	229	0.0078
FX	CHF/USD	0.0089	0.0099	0.9058	229	0.0042
FX	AUD/USD	0.0014	0.0173	0.0830	229	0.0000
FX	CAD/USD	0.0056	0.0116	0.4798	229	0.0016
FX	MXN/USD	0.0039	0.0124	0.3148	229	0.0003
FX	NOK/USD	0.0041	0.0105	0.3916	229	0.0005
FX	BRL/USD	0.0048	0.0142	0.3351	229	0.0003
FX	CNY/USD	0.0014	0.0015	0.9659	229	0.0017
Yield	2Y Treasury (bp)	111.6526***	17.8236	6.2643	229	0.3772
Yield	5Y Treasury (bp)	94.2903***	18.5077	5.0946	229	0.2050
Yield	10Y Treasury (bp)	52.6808***	14.7533	3.5708	229	0.0826
TIPS	5Y Breakeven (bp)	-42.4791**	19.8502	-2.1400	194	0.0859
TIPS	10Y Breakeven (bp)	-29.6446***	8.6325	-3.4341	194	0.0726

Entries report the coefficient on ME_t. Significance: *** p¡0.01, ** p¡0.05, * p¡0.10.

Table 3: *

External Positions and Exchange Rate Responses to U.S. Monetary Policy Surprises

$\Delta e_{i,t} = \alpha_i + \beta_1 ME_t + \beta_2(ME_t \times NFA_{i,t-1}) + \gamma NFA_{i,t-1} + \varepsilon_{i,t}$; country fixed effects.

	Dependent variable: $\Delta e_{i,t}$		
	Time-clustered	Two-way clustered	Driscoll–Kraay
Monetary policy surprise (ME)	0.00344	0.00344	0.00344
	(0.00692)	(0.00573)	(0.00573)
NFA/GDP (t-1)	-0.00041	-0.00041*	-0.00041
	(0.00045)	(0.00023)	(0.00050)
ME × NFA/GDP (t-1)	0.00192	0.00192	0.00192
	(0.00633)	(0.00373)	(0.00508)
N	2167	2167	2167
R^2	0.00426	0.00086	0.00086

Standard errors in parentheses. Two-way clustering clusters by time and by country. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Figures

Figure 1: **Asset Price Responses to Monetary Policy Surprises**
This figure shows the estimated responses of asset prices to monetary policy surprises (ME) on FOMC announcement days. Points represent regression coefficients, and horizontal lines show 95% confidence intervals based on robust standard errors. Treasury yields respond strongly and significantly, breakeven inflation rates decline, and exchange rate responses are generally small and statistically insignificant.

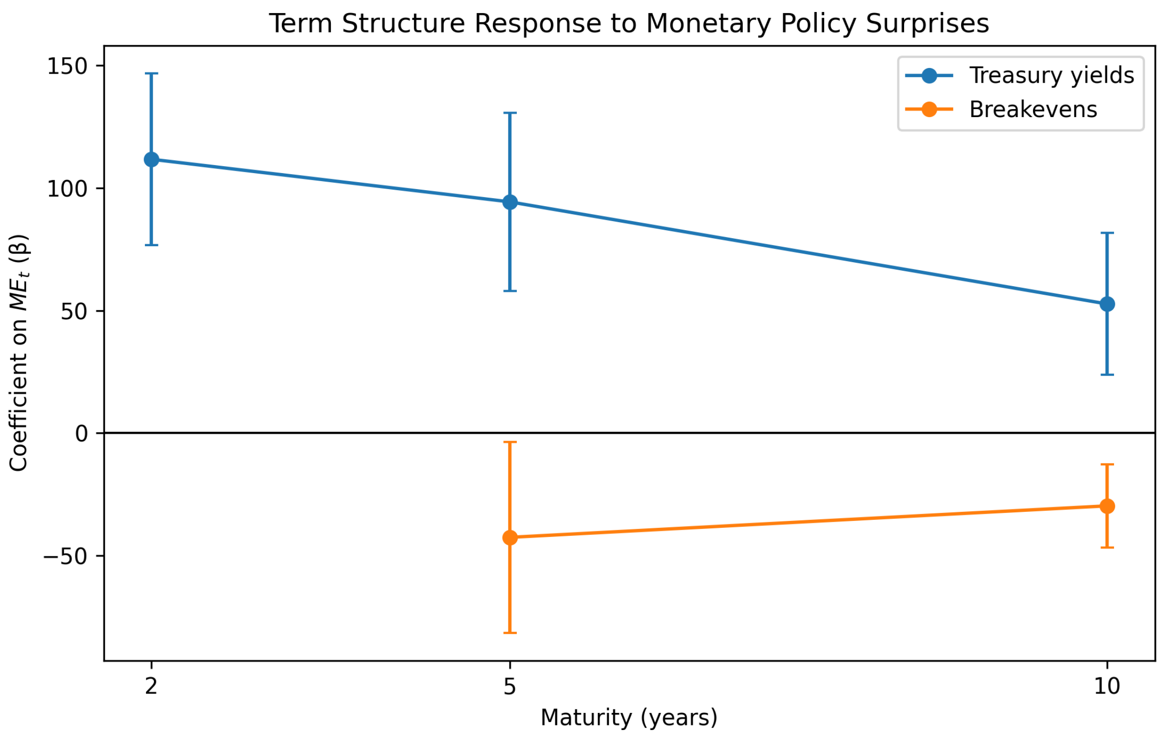

Figure 2: **Term Structure of Yield and Breakeven Responses**
This figure plots the estimated responses of Treasury yields (2Y, 5Y, 10Y) and breakeven inflation rates (5Y, 10Y) to monetary policy surprises. Points show coefficient estimates, and vertical bars indicate 95% confidence intervals. The effects are largest at the short end of the yield curve and decline with maturity, while breakeven inflation rates respond negatively.

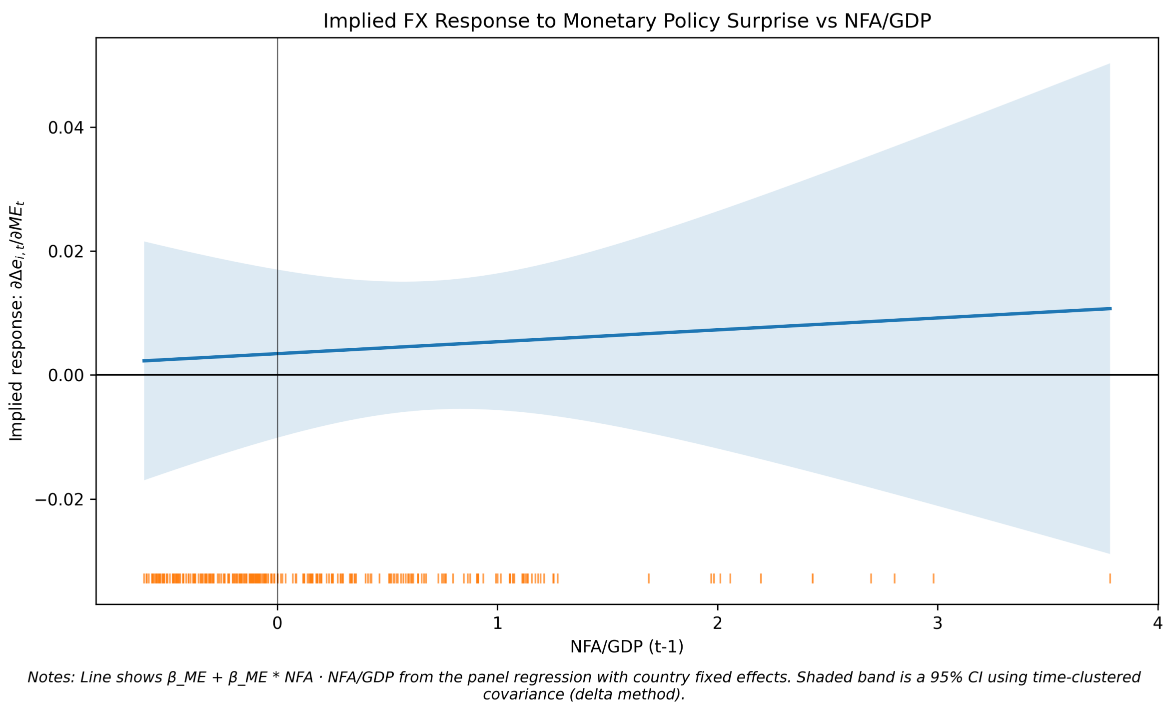

Figure 3: **Implied Exchange Rate Response vs. NFA/GDP**
This figure plots the implied marginal effect of a U.S. monetary policy surprise on exchange rate changes as a function of lagged (t-1) foreign positions. The solid line shows $\hat{\beta}_1 + \hat{\beta}_2 \cdot \text{NFA}_{i,t-1}$ from the panel regression, with country fixed effects. The shaded region is a 95% confidence interval constructed using the time-clustered variance–covariance matrix (delta method). Rug marks indicate the distribution of NFA/GDP values in the estimation sample.

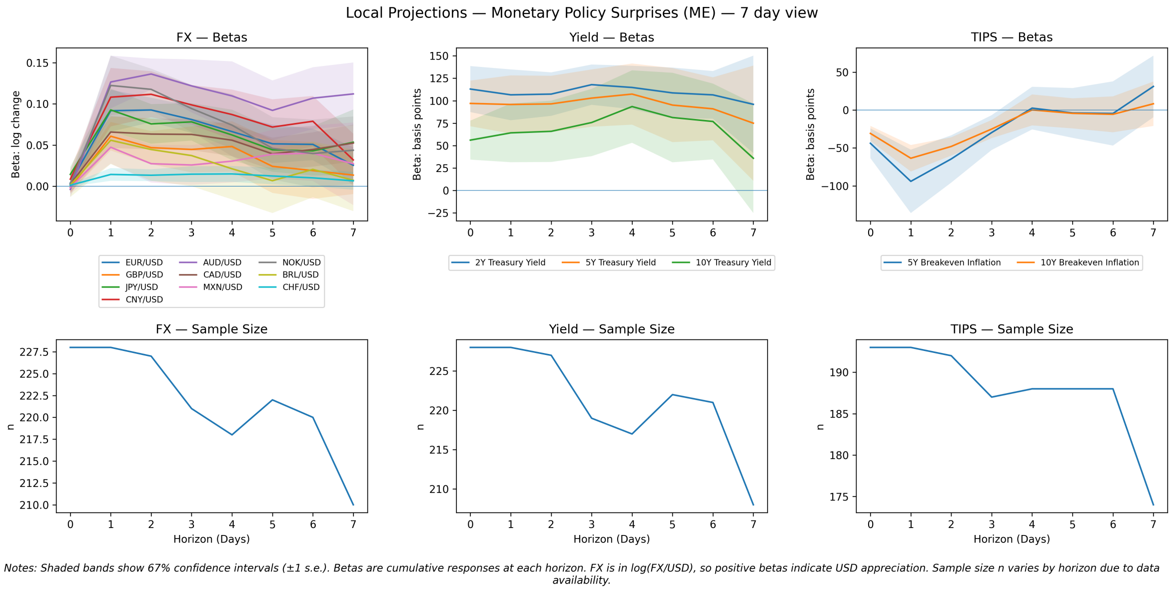

Figure 4: **Local Projections (0–7 Trading Days): Dynamic Responses to Monetary Policy Surprises**
This figure plots local-projection estimates of the cumulative response to a U.S. monetary policy surprise (ME) over horizons $h = 0, \ldots, 7$ trading days. Top row: estimated coefficients $\hat{\beta}_{i,h}$ from regressions of cumulative changes on the event-day surprise ME_t (including two lags of ME). Shaded bands denote ± 1 standard error (67% confidence) intervals. FX outcomes are in log(FX/USD), so positive coefficients indicate USD appreciation; yields and breakevens are in basis points. Bottom row: effective sample size at each horizon after restricting to event dates where $t + h$ occurs before the next scheduled FOMC meeting.

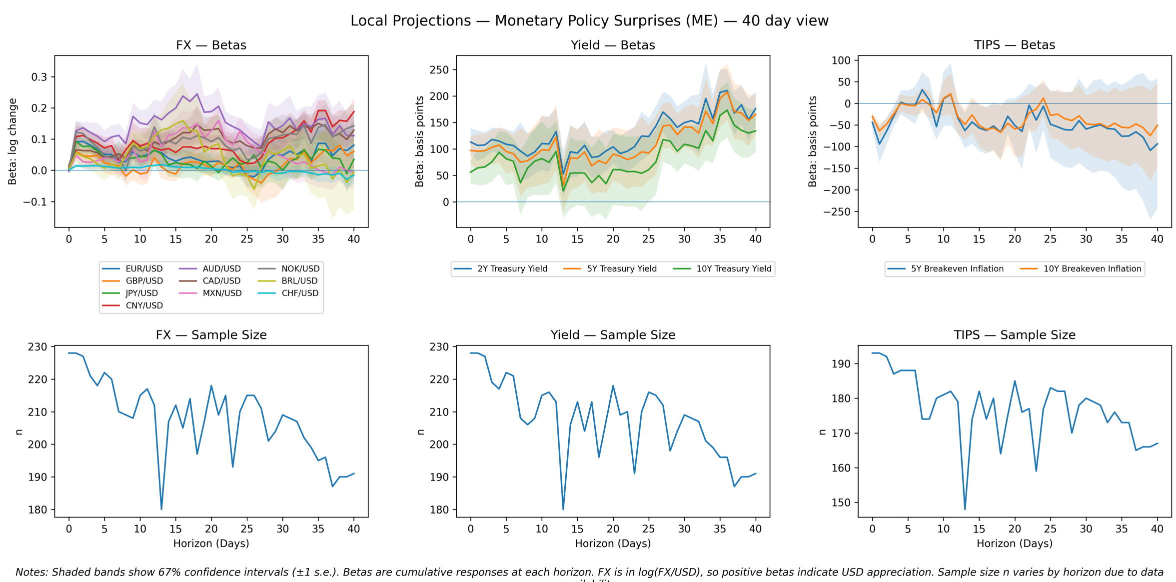

Figure 5: **Local Projections (0–40 Trading Days): Persistence and Longer-Run Dynamics**
This figure extends Figure 4 to horizons $h = 0, \ldots, 40$ trading days, showing how cumulative responses evolve beyond the first week. As the horizon increases, the estimation sample shrinks because the analysis restricts to event dates where the horizon occurs before the next FOMC meeting. Treasury yields display the clearest and most persistent positive response to a hawkish surprise, while breakeven inflation responses are negative on impact and become more variable over longer horizons. FX responses are heterogeneous and imprecisely estimated, consistent with non-policy noise and other hypothesized factors.