International Exchange Rate Movements in Response to FED Central Bank Announcements

Macrofinance Presentation
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Table of Contents

Introduction

Fed Fund Rates

- FOMC sets a target range for the federal funds rate
- The effective fed fund rate (EFFR) is the market-determined rate that fluctuates within this range
- Fed's policy decisions are often anticipated through instruments like Fed Funds Futures
  - Derivative instrument traded on Chicago Mercantile Exchange
  - Value linked to the EFFR

Monetary Policy Surprises

- Difference between actual FOMC action and market-implied expectation
- $Surprise = \mathbb{E}[\Delta r] - \Delta r_{actual}$
- Expected change is derived from futures operator
- Can be measured by using high-frequency data
- Gürkaynak, Sack, and Swanson (2005) decomposed these surprises into two parts: target and path surprises

Effect of monetary policy actions on financial markets

- Markets react to monetary policy surprises, not to expected actions already priced in
- Fed announcements affect asset classes through unexpected rate changes & shifts in expected policy paths
- High-frequency studies show sharp market moves even around brief Fed communications like FOMC statements or minutes
- Hausman and Wongswan (2011) found that different assets respond to different components

Currency Rates Response to FOMC Statement

- Hausman and Wongswan (2011) studied the global financial effects of FOMC announcements
- Exchange rates respond primarily to path surprises
- The country's exchange rate regime is the most important determinant of how its financial markets respond
- Fixed exchange rate countries have virtually no exchange rate response
- Floating exchange rate countries have larger responses

Hypotheses

1. Dovish Fed policy announcements, whether through target or path surprises, tend to weaken the U.S. dollar relative to other major currencies, while hawkish announcements tend to strengthen it

2. The magnitude of currency return reactions to FED Policy Announcements Target & Path Surprises differ significantly across the six major currencies

3. Post-GFC, we anticipate more muted currency movements to FED Policy Announcements, reflecting enhanced transparency and market's improved ability to infer policy intentions

Methodology – Research Design

- To quantify how international exchange rates – specifically the USD/EUR, USD/JPY, USD/GBP, USD/CAD, USD/AUD and USD/CHF – respond to the Fed interest rate announcements, we employed a high-frequency event study methodology
- This approach is particularly effective for isolating monetary policy surprises by using narrow intraday windows around scheduled FOMC announcements, thereby mitigating issues related to endogeneity and anticipation effects

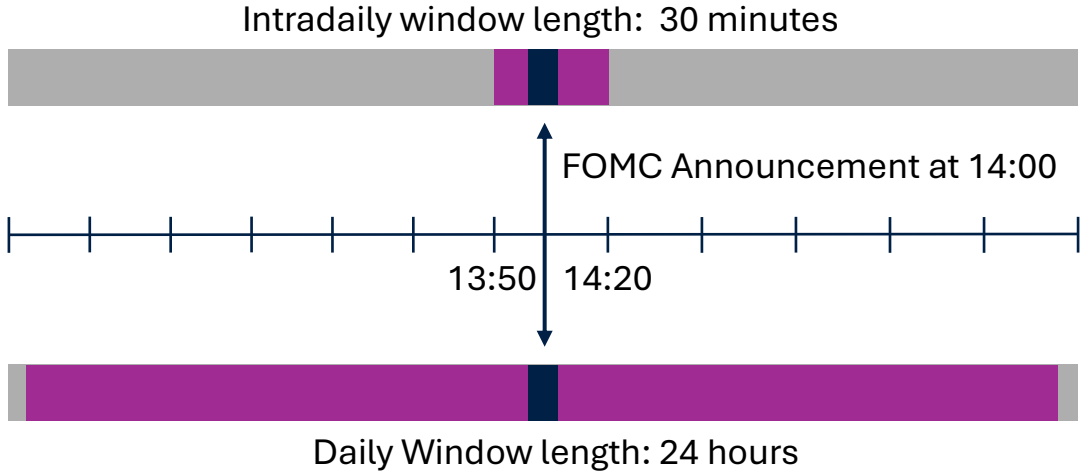
Data Sources

1. Exchange rates: High-frequency intraday FX data for USD pairs were used to capture immediate market reactions
2. Fed policy expectations: Fed Fund Futures were used to derive market-implied expectations prior to each FOMC meeting
3. Monetary policy surprises: Suprises were decomposed into Target and Path surprises

$$TS_{d_o,t} = \frac{D_0}{D_0 - d_0}\Delta r_{implied}$$

$$PS_t^{(res)} = \varepsilon_t = \Delta i_t^{(1yr)} - (\hat{\alpha} + \hat{\beta} TS_t)$$

Event Window



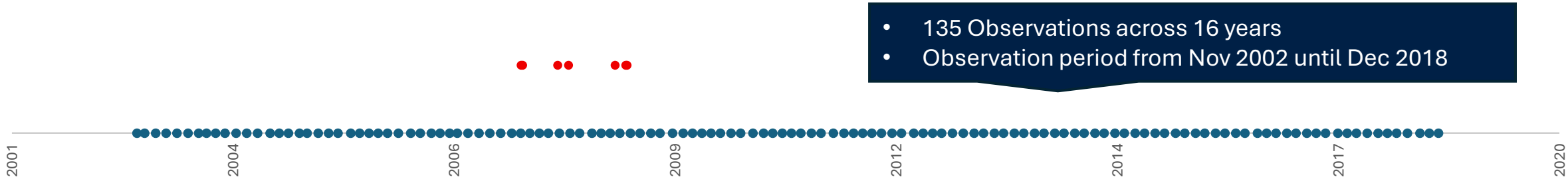
- Focused on a 30-minute window around the official FOMC announcement time (14:00 ET)
- Specifically, we calculated the change in exchange rates between 13:50 and 14:20 ET on announcement days
- Used 10-minute averages ([T-20,T-10] and [T+20,T+30])

Methodology – Data Deep Dive

Data Preparation

- 6 Major Currency Pairs with USD
  - JPY, EUR, GBP, CHF, CAD, AUD
- Computed log returns of exchange rates based on pre- and post announcement levels
- We defined the GFC period as Q3 ‘07 until Q2 ‘09, creating dummy variables for the regression to measure impact for pre- and post periods
- There were missing returns for 3 currencies over one announcement, we excluded this meeting from our dataset
- We removed 7 policy meetings that were **unscheduled** since we want to look at “non-extraordinary” effects

Final Observations



Regression Setup

1

$$R_t = \beta_0 + \beta_1 * Target_t^+ + \beta_2 * Target_t^- + \beta_3 * Path_t^+ + \beta_3 * Path_t^- + \varepsilon_t$$

2

$$R_{it} = \beta_0 + \beta_1 * Target_t + \beta_2 * Path_t + \sum_{i \neq USDCHF} (\gamma_i * target_t * D_i + \delta_i * path_t * D_i) + \varepsilon_t$$

3

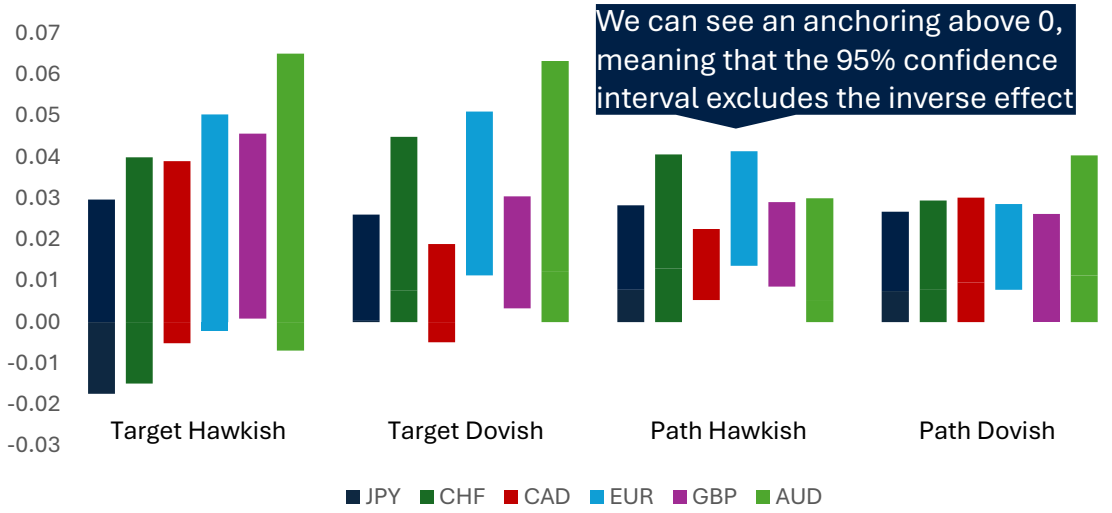
$$R_t = \beta_0 + \beta_1 * \text{Target} + \beta_2 * Path + \beta_3 * Target_{PreGFC} * PreGFC + \beta_6 * Path_{PostGFC} * \text{PostGFC} + \varepsilon_t$$

Findings (1) – Announcements Effects on Currencies

Regression Results

Currency	Target Hawkish	Target Dovish	Path Hawkish	Path Dovish	Adj. R^2
USDJPY	0.0061	0.0130	0.0141	0.0134	0.317
	(0.607)	(**0.046**)	(**0.000**)	(**0.000**)	
USDCHF	0.0125	0.0224	0.0203	0.0147	0.369
	(0.370)	(**0.003**)	(**0.000**)	(**0.000**)	
USDCAD	0.0169	0.0070	0.0113	0.0151	0.336
	(0.132)	(0.249)	(**0.000**)	(**0.000**)	
USDEUR	0.0241	0.0255	0.0207	0.0143	0.407
	(0.071)	(**0.001**)	(**0.000**)	(**0.000**)	
USDGBP	0.0228	0.0152	0.0145	0.0131	0.371
	(**0.042**)	(**0.013**)	(**0.000**)	(**0.000**)	
USDAUD	0.0290	0.0317	0.0150	0.0202	0.302
	(0.113)	(**0.002**)	(**0.003**)	(**0.000**)	

95% Confidence Intervals



Statistical Description

- Path surprises is significant across all currency pairs, but displays slightly lower coefficients than target surprises
- Dovish target is significant across more currency pairs and tends to react slightly stronger by coefficients
- Hawkish target surprises are not significant, except USDGBP, but showcasing less clear return patterns

Economic Hypotheses

- The FX sign reactions are consistent with expectations that hawkish/dovish policy appreciates/depreciates USD
- Hawkish Target surprise may be less significant due to USD as global currency reacts less on interest rate hikes
- We can see the importance of path communication, e.g., forward guidance as critical transmission channel for FED

Findings (2) – Panel-data / Wald Test Currency Effects

Regression Results

Currency Pair	Target	Path	Adj. R^2
USDCHF (Base)	0.0175	0.0130	0.351
	(0.001)	**(0.000)**	
USDJPY	0.0122	0.0137	
	(0.132)	**(0.019)**	
USDCAD	0.0109	0.0133	
	(0.337)	(0.064)	
USDEUR	0.0226	0.0173	
	(0.075)	(0.981)	
USDGBP	0.0168	0.0138	
	(0.887)	**(0.012)**	
USDAUD	0.0319	0.0187	
	(0.085)	(0.887)	

However, a Wald test for equality of Fed target surprise sensitivity across currencies yielded ***a test statistic of*** $\chi^2(4) = 36.33$, $p < 0.001$, *indicating a statistically significant difference in sensitivity across currencies*

Statistical Description

- Base currency reactions are significant for target and path
- Interaction terms are mostly not significant, except for information path surprises with JPY & GBP
- For target rate, the differences are even more muted
- Wald test strongly rejects the null hypothesis that all the currency responses are equal
- Evidence suggests heterogeneous currency responses, even if differences for some pairs are not statistically definitive on their own (potentially sample size issues)

Economic Hypotheses

- Findings confirm that US monetary policy has meaningful and different global spillovers but extent depends on different unexplained factors
- Difference in CHF and JPY reaction could be that both are competing safe-haven currency acting as subtitutes
- CHF and GBP difference could be due to market structure, economic activity and global integration but is less clear

Findings (3) – GFC Conditioned Macro Conditions

Regression Results

Currency Pair	Target Pre GFC	Target Post GFC	Path Pre GFC	Path Post GFC	Adj. R^2
USDJPY	0.0237 (0.056)	-0.0001 (0.997)	0.0084 (**0.001**)	0.0162 (**0.000**)	0.390
USDCHF	0.0271 (0.062)	-0.0191 (0.584)	0.0128 (**0.000**)	0.0192 (**0.000**)	0.429
USDCAD	0.0067 (0.561)	0.0314 (0.258)	0.0073 (**0.002**)	0.0173 (**0.000**)	0.415
USDEUR	0.0249 (0.078)	0.0189 (0.577)	0.0136 (**0.000**)	0.0160 (**0.001**)	0.448
USDGBP	0.0208 (0.080)	0.0068 (0.811)	0.0104 (**0.000**)	0.0131 (**0.002**)	0.410
USDAUD	0.0169 (0.382)	0.0488 (0.295)	0.0123 (**0.002**)	0.0199 (**0.003**)	0.348

Statistical Description

- For target surprises, coefficients are mostly in line with our hypothesis, however, they are not statistically significant
- For path surprises, both pre- and post-GFC coefficients are positive and statistically significant across all currencies
- In many cases, post-GFC coefficients are higher

Economic Hypotheses

- Post-GFC, exchange rates became less sensitive to surprise rate hikes or cuts, reflecting improved Fed transparency and market anticipation
- Market reactions to the expected path intensified post-GFC, likely due to the Fed's increased emphasis on forward guidance. However, this effect may also be subject to greater market volatility during the post-crisis period
- The period post-GFC involved not only zero-lower-bound policy, but also asset purchases and detailed communication strategies. These likely substituted traditional policy rate changes, making the "path" signal far more relevant for pricing exchange rates

Conclusion

QUESTION

How do exchange rates react to FED Interest Rate Policy Announcements, focusing on Target and Path Surprises?

HYPOTHESES

Dovish Fed policy announcements, through target or path surprises, tend to weaken the U.S. dollar relative to other major currencies, while hawkish announcements tend to strengthen it	The magnitude of currency return reactions to FED Policy Announcements Target & Path Surprises differ significantly across the six major currencies	Post-GFC, we anticipate more muted currency movements to FED Policy Announcements, reflecting enhanced transparency and market's improved ability to infer policy intentions

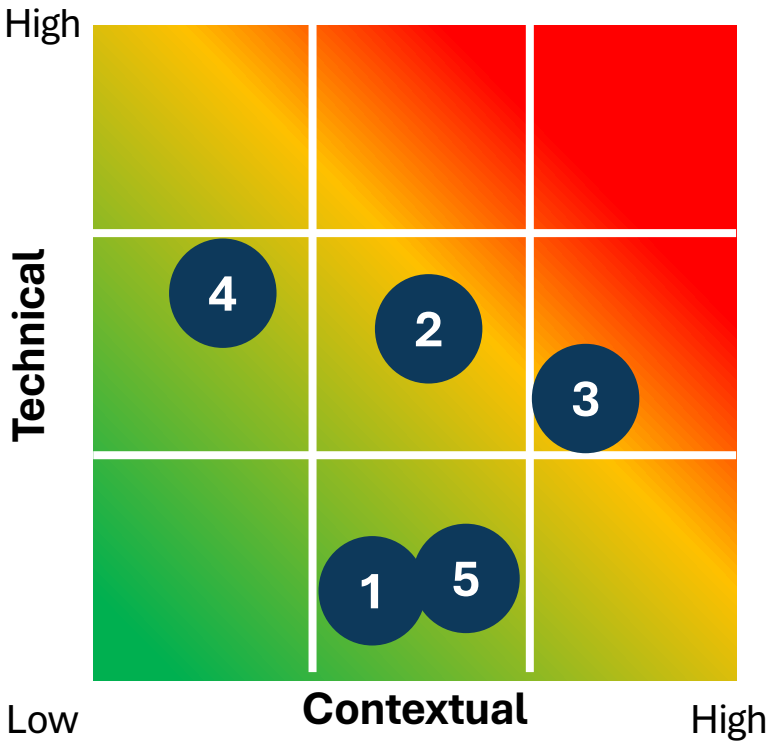
RESULTS

• Hypothesis is supported by the data • Findings show stronger support for dovish surprises	• Partially supported: Monetary policy has meaningful and differing global spillovers, however, we find limited significance for individual pairs	• Hypothesis is partially supported • For target surprise, some currencies show more muted movements • This does not hold for path surprises

ANSWER

Exchange rates do react to FED announcements, with path surprises having a clearer and more consistent impact than target surprises. However, the asymmetric and sometimes insignificant effects of hawkish surprises highlight that market reactions depend not only on the surprise itself but also on broader factors. This suggests that while monetary policy communication is powerful, predicting exchange rate movements remains difficult due to complex, evolving market conditions and expectations.

Research Limitations



1. **Dummy variables of GFC assumes sharp regime shift at a fixed date both with bank communication and economic conditions**
2. **Robustness to conditioned market conditions that can affect the environment with which the FED policy announcements interact**
3. **Limited Capture of Dynamic Interactions between currencies and and/or central banks that could help explain the FX movements**
4. **Assuming a linear relationship might be too simplistic for FX data with potential upper bounds and thresholds** (e.g. crisis reactions)
5. **Currency exchange rates could change over time (e.g. Safe-haven currencies could become more risky) over such long periods**

Potential Further Research Areas

1. **How would the results change, conditioned on differing market conditions such as higher Volatility or bullish/bearish Financial markets affect the results?** How robust are our results changing environments?

2. **Do changes in Fed policy lead to asymmetric effects on emerging market currencies versus developed market currencies?** Are emerging markets more vulnerable to Fed tightening?

3. **Are there any reversal effect in the currency exchange rates either in the short term (hours) or near term within the next days/week?** Are there any potential overreactions in the currency market?

4. **Extend the framework to include ECB, BoE, BoJ and other central branks to contrast FX market reactions across different monetary policy regimes and communications strategies.** What is the role of other banks?

5. **Capture the strategic interdependence of global financial market systems by modelling Vector Autoregression with Central Bank reactions and the differing rate regimes.** How are the markets integrated?

Sources

- Bauer, Michael D., and Eric T. Swanson. (2023). “A Reassessment of Monetary Policy Surprises and High-Frequency Identification.” *NBER Macroeconomic Annual* 23.
- Gürkaynak, R. S., Sack, B., & Swanson, E. T. (2005). Do actions speak louder than words? The response of asset prices to monetary policy actions and statements. International Journal of Central Banking, 1(1), 55-93.
- Hausman, J., & Wongswan, J. (2011). Global asset prices and FOMC announcements. Journal of International Money and Finance, 30(3), 547-571.
- HistData.com. (n.d.). *Free Forex historical data*. Retrieved May 15, 2025, from https://www.histdata.com/
- Kansoy, F. (2025). Macro-Finance Lecture 2 (Lecture Slides), University of Oxford.
- Kansoy, F. (2025). Macro-Finance Lecture 3 (Lecture Slides), University of Oxford.
- Swanson, Eric T., and Vishuddhi Jayawickrema. (2024). “Speeches by the Fed Chair Are More Important Than FOMC Announcements: An Improved High-Frequency Measure of U.S. Monetary Policy Shocks.” *Working Paper*.