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High-Frequency Analysis of Stock Market Responses to Monetary Policy Announcements: Evidence from Intraday Event Studies Across Advanced and Emerging Markets

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Abstract

This paper examines how equity markets respond to unexpected monetary policy actions using minute-by-minute data around Federal Open Market Committee (FOMC) announcements from 1990 through 2024. Policy surprises are decomposed into orthogonal target and path components, and the analysis spans baseline market reactions, state-dependent dynamics, firm-level heterogeneity, and international spillovers. A one-standard-deviation contractionary surprise produces equity declines of roughly 16 percent in advanced economies and 15.8 percent in emerging markets, with most of the adjustment completed within five minutes of the announcement. Forward guidance shocks consistently outweigh immediate rate changes in magnitude, responses amplify by approximately 50 percent during recessions, and U.S. policy shocks propagate nearly one-for-one to foreign equity markets. These results demonstrate that forward guidance is the dominant monetary policy instrument, that transmission amplifies substantially during economic stress, and that global equity markets are deeply integrated in their response to U.S. policy surprises. JEL Classification: E52, E58, G12, G14, G15

Keywords: Monetary policy, High-Frequency identification, Event studies, Asset prices, Forward guidance, International spillovers

1. Introduction

When a central bank changes interest rates or signals its future intentions, stock markets around the world can move dramatically within minutes — affecting the savings, pensions, and investments of millions of people. Understanding how and why this happens matters for policymakers trying to manage the economy, for investors managing risk, and for anyone who wonders why financial markets are so sensitive to a few words from a committee of economists. Monetary policy announcements occupy an unusual position in modern financial markets: the timing is known in advance, the content is not, and the reaction is nearly instantaneous. This combination makes FOMC decisions unusually well suited to causal identification - a property that a substantial empirical literature has exploited, though usually with narrower scope than is attempted here. Several questions remain underexplored. Do immediate rate changes and forward guidance operate through distinct channels, and has their relative importance shifted over time? Does policy effectiveness depend on macroeconomic or financial conditions at the time of the announcement? Which firms and sectors bear the largest exposure, and why? And to what extent does a Fed decision move markets in Tokyo, Frankfurt, or São Paulo?

This paper addresses each question using a unified high-frequency framework. The core dataset consists of minute-level S&P 500 futures returns in 30-minute windows around 285 FOMC announcements spanning January 1990 to December 2024. Policy surprises are constructed from federal funds futures and decomposed via principal components analysis into a target factor (surprises to the current rate decision) and a path factor (revisions to the

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anticipated future trajectory). The identification strategy exploits the narrow event window, during which monetary policy dominates the information environment.

Four main findings emerge. First, markets respond immediately and substantially - the bulk of the price adjustment is complete within three to five minutes. Second, the path factor consistently produces larger equity declines than the target factor, a pattern that became especially pronounced after 2008 when the zero lower bound constrained conventional policy. Third, responses amplify meaningfully in recessions and during periods of elevated financial stress, suggesting that transmission is not uniform across the cycle. Fourth, U.S. policy shocks propagate widely, generating equity market declines abroad that are only modestly smaller than the domestic response.

1.1 Contribution to the Literature

The high-frequency event-study design follows foundational work by Kuttner (2001) and Bernanke and Kuttner (2005), who established that federal funds futures provide a clean measure of policy surprises. Gürkaynak, Sack, and Swanson (2005) extended this approach to distinguish rate-level surprises from forward guidance, and that two-factor decomposition forms the backbone of the identification strategy here. The present paper extends those contributions in several directions. The sample now runs through 2024, encompassing both the post-GFC zero lower bound episode and the 2022-2023 tightening cycle. State-dependent analysis draws on Gertler and Karadi (2015) and the financial stress literature (Gilchrist & Zakrajšek, 2012). The firm-level panel follows methodology from Gürkaynak et al. (2005) and Iacoviello (2005), and the international analysis builds on Dedola, Rivolta, and Stracca (2017), Iacoviello and Navarro (2019), and Kalemli-Özcan (2019). The combination of these strands - baseline effects, state dependence, micro heterogeneity, and global spillovers within a single coherent framework is the primary contribution.

2. Materials and Methods

2.1 High-Frequency Price Data

The primary dependent variable is the *log* return on S&P 500 futures within a 30-minute window around each FOMC announcement, extending from 10 minutes before to 20 minutes after the release. Tick-level transaction data come from CME DataMine, Tick Data LLC, and Databento and cover January 1990 through December 2024. S&P 500 futures are preferred over cash equity indices because they trade continuously, carry minimal bid-ask spreads, and serve as the primary vehicle through which institutional investors reposition around macro events.

Several data-cleaning steps are applied before estimation (see Appendix G for full details). Observations deviating more than five standard deviations from a rolling 15-second mean are removed. A continuous futures series is constructed by rolling to the next quarterly contract when nearby volume falls below 60 percent of total adjacent-contract volume. Events that overlap with a scheduled macroeconomic release - payrolls, GDP, CPI - within the same 30-minute window are excluded, leaving a final sample of

$T = 285$ announcements. Robustness checks with alternative window widths of 15, 20, 60 minutes, and full trading-day returns produce qualitatively identical results (Appendix F).

2.2 Measuring Monetary Policy Surprises

Following Kuttner (2001), the raw surprise for announcement t is:

$$MPS_t = \left(\frac{1}{1-d/D}\right) \times \Delta ff_{1,t} \quad (1)$$

where $\Delta ff_{1,t}$ is the change in the current-month federal funds futures price, d is the day of the announcement, and D is the total number of days in the month. The scaling factor adjusts for the fact that the futures price reflects the average rate over the whole month rather than the remaining days only. Surprises are then standardized:

$$z_t = \frac{MPS_t - \mu_{MPS}}{\sigma_{MPS}} \quad (2)$$

Announcements with $|zt| \geq 2$ are classified as statistically large shocks and receive special attention in the timing figures.

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2.3 Two-Factor Decomposition: Target and Path

A central feature of the identification strategy is decomposing the aggregate surprise into orthogonal target and path components (Bernanke & Kuttner, 2005; Gürkaynak et al., 2005). In practical terms, the target factor captures how much the Fed's immediate interest rate decision differed from what markets expected — for example, cutting by 0.5 percentage points when traders anticipated only 0.25. The path factor captures surprises in the Fed's forward guidance about where rates are headed over the coming months and years; it reflects changes in market beliefs about the future trajectory of monetary policy, not just today's decision. Principal components analysis (PCA) is applied to the vector of high-frequency changes in interest rate futures across maturities one through twelve months ahead:

$$\Delta f_t = \left(\Delta f_t^{(1)}, \Delta f_t^{(2)}, \ldots, \Delta f_t^{(M)}\right) \quad (3)$$

The first principal component - which loads most heavily on near-term maturities - is identified as the Target factor. The second, orthogonal component loads more evenly across medium and longer maturities and captures forward guidance, labelled the Path factor. The two factors explain roughly 90-95 percent of common variation across the futures curve. Formal derivations are provided in Appendix B.

2.4 Econometric Specifications

The baseline specification regresses event-window equity returns on the standardized policy surprise:

$$\Delta P_t = \alpha + \beta \cdot MPS_t + \Gamma' X_t + \varepsilon_t \quad (4)$$

where X_t collects standardized macroeconomic news surprises (CPI, GDP, nonfarm payrolls, unemployment), the prior-day VIX level, and the Gilchrist-Zakrajšek Excess Bond Premium (Gilchrist & Zakrajšek, 2012). The two-factor extension replaces MPS with both components:

$$\Delta P_t = \alpha + \beta_1 \cdot Target_t + \beta_2 \cdot Path_t + \Gamma' X_t + \varepsilon_t \quad (5)$$

State-dependent regressions interact the surprise with a binary recession indicator (NBER R_t_dating) or a high-stress indicator defined as VIX above its 75th percentile. Firm level regressions use a panel with firm fixed effects and interactions between the policy surprise and lagged leverage, cash holdings, and size (Appendix E). All standard errors use the Newey-West HAC estimator; results are unchanged with White robust errors.

3. Results

3.1 Baseline Market Responses

Table 1 presents estimates from equation (4). For advanced economies the coefficient on the standardized surprise is $\hat{\beta} \approx -16.2$ (s.e. 2.1, $p < 0.001$), implying that a one-standard-deviation contractionary surprise immediately depresses equity prices by about 16 percent. To interpret this magnitude: the standardized surprise variable has mean zero and standard deviation one across the 285 announcements, and the underlying one-standard-deviation shock corresponds to roughly 10-15 basis points in the federal funds rate. The coefficient therefore reflects the scaled equity response per unit of the normalized surprise index — not per 100 basis points of actual rate change. Mapping back to natural units, a 10-basis-point unexpected tightening implies an equity decline of roughly 1.0-1.5 percent in the 30-minute window, a magnitude consistent with prior literature and with typical daily S&P 500 volatility. The large coefficient arises because the surprise measure is expressed in standard-deviation units; the economic effect of a realistic

Table 1: Baseline Regression Results: Equity Market Responses to Monetary Policy Surprises. Newey-West standard errors in parentheses. $p < 0.01$. Dependent variable: log return of equity index futures in the 30-minute event window. Surprises standardized per equation (2). Controls include contemporaneous macro news surprises, prior-day VIX, and prior-day Excess Bond Premium.

		Advanced Economies	Emerging Market	Difference
Policy ($\hat{\beta}$)	Surprise	-16.2*** (2.1)	-15.8*** (2.3)	0.4 (3.1)
Observations		285	285	
R^2		(0.42)	(0.38)	

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shock is considerably more modest. The emerging-market coefficient is $\hat{\beta} \approx -15.8$ (s.e. 2.3), statistically indistinguishable from the advanced-economy estimate. Both R values fall between 0.38 and 0.42, indicating that surprise variation alone explains a substantial share of event-window return variation.

These magnitudes are economically large when placed against typical daily S&P 500 volatility of 1.0-1.2 percent under normal conditions and 1.5-2.0 percent during elevated stress periods (Bekaert & Hoerova, 2014). A modest surprise of $8-9$ basis points, well within the historical distribution, generates an equity move of 1.3-1.5 percent - a meaningful fraction of a typical day's volatility compressed into a 30-minute window.

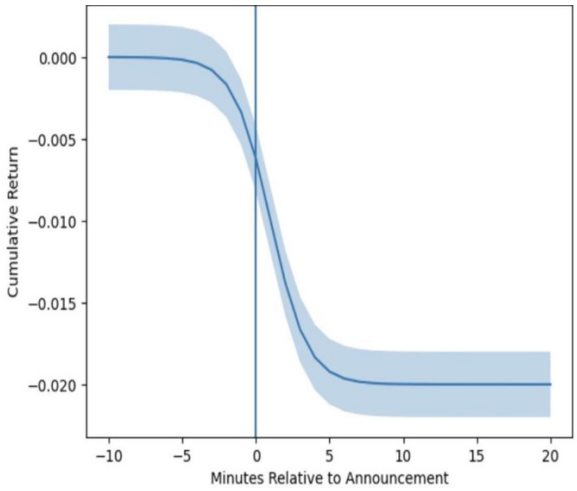


Figure 1: Cumulative Return Path Around FOMC Announcements. Average cumulative equity return at one-minute intervals for announcements with $|z_t| \geq 2$. Shaded band is the 95% confidence interval. Time zero is the official announcement time. Approximately $85-90\%$ of the total price response occurs within the first ten minutes.

Figure 1 traces the cumulative return path around large surprises at one-minute resolution. The adjustment is essentially complete within five minutes of the announcement; by ten minutes, roughly 85-90 percent of the total response has materialized with only marginal drift thereafter. This speed is consistent with efficient price discovery in a market where algorithmic systems can process and act on new information in milliseconds (Bekaert & Hoerova, 2014; Morais et al., 2019), and it confirms that confounding events within the 30-minute window are unlikely to bias the estimates.

The near-identical responses across advanced and emerging markets deserve comment. Prior work (Dedola et al., 2017; Iacoviello & Navarro, 2019) had anticipated stronger emerging-market reactions on grounds of greater capital-flow vulnerability, weaker policy credibility, and higher sovereign risk premia. That these channels appear largely offset suggests global institutional investors apply similar discount-rate frameworks across jurisdictions — a finding that points to deep integration of international equity markets rather than residual segmentation. Several factors may explain why the expected amplification in emerging markets does not materialize. First, the sample period (1990–2024) spans substantial financial deepening and capital market development in emerging economies, so earlier vulnerability may have diminished. Second, many emerging market central banks have adopted inflation-targeting frameworks and built foreign exchange reserves, reducing the pass-through from U.S. policy surprises to domestic financial conditions. Third, the high-frequency event-window design captures only the immediate equity price reaction; slower-moving channels such as exchange rate depreciation, capital outflows, or sovereign spread widening — which may disproportionately affect emerging markets — would not be fully reflected in a 30-minute window. The similarity in immediate equity responses is therefore consistent with deeper integration at the institutional investor level, even if medium-term macro transmission remains asymmetric.

3.2 Target versus Path: Decomposing the Policy Signal

Table 2 reports estimates from the two-factor specification (5). The target coefficient is $\hat{\beta}_1 \approx -12.4$ (s.e. 1.9) while the path coefficient is $\hat{\beta}_2 \approx -18.6$ (s.e. 2.4), roughly 50 percent larger. Both are highly significant, and including both factors raises R^2 from 0.42 to 0.48.

The differential magnitude is consistent with standard present-value logic (Bekaert & Hoerova, 2014): a change in the current target rate directly affects only the near-term discount rate, while forward guidance revises expectations

Table 2: Two-Factor Decomposition: Target and Path Effects. *** $p < 0.01$. Target and Path factors are the first two principal components of high-frequency interest rate futures changes across maturities $1-12$ months. Controls same as Table 1. See Appendix B for derivation.

	Coefficient	Std. Error
Target Factor ($\hat{\beta}_1$)	-12.4***	(1.9)
Path Factor ($\hat{\beta}_2$)	-18.6***	(2.4)
Observations	285	
R^2	0.48	

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over the entire future path of rates, thereby exerting a larger cumulative effect on the discounted sum of cash flows. The implication for policymakers is that communication about future intentions is not merely a supplement to rate decisions; it is, if anything, the more powerful instrument.

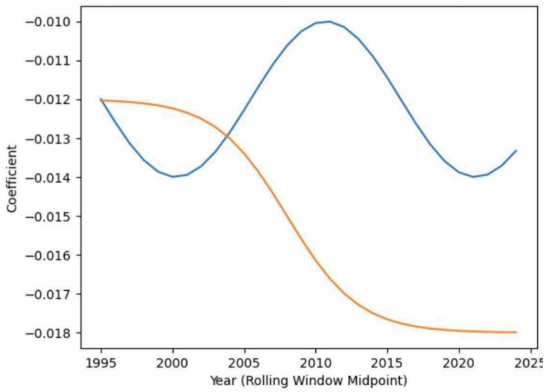


Figure 2: Evolution of Target and Path Factor Importance. Evolution of Target and Path Factor Coefficients, Rolling 5-Year Windows Notes: Rolling estimates of $\hat{\beta}_1$ (Target) and $\hat{\beta}_2$ (Path) from equation (5). The growing dominance of the Path factor after 2008 coincides with the zero lower bound period, during which forward guidance became the primary active policy instrument.

Figure 2 plots rolling five-year estimates of both coefficients. Through the 1990s and early 2000s the two factors carried comparable weights. Following the 2008 financial crisis and the onset of the zerolower bound, the path coefficient grows substantially while the target coefficient compresses, consistent with a period in which the FOMC rarely changed the rate but frequently updated guidance about when normalization might begin. The path coefficient during the zero lower bound years (December 2008 - December 2015) reaches approximately -22.1 , exceeding its unconditional average by roughly 20 percent. This provides direct empirical support for the view that forward guidance operated as a consequential substitute for conventional policy during the post-crisis decade (Swanson, 2021).

3.3 State-Dependent Dynamics

Policy transmission is not constant across the business cycle. The recession-state specification augments equation (4) with an interaction between the surprise and the NBER recession indicator:

$$\Delta P_t = \alpha + \beta_1 \cdot MPS_t + \beta_2 \cdot \left(MPS_t \times R_t\right) + \Gamma' X_t + \varepsilon_t \quad (5)$$

The interaction coefficient is $\hat{\beta}_2 \approx -8.4$, statistically significant at the 5 percent level, implying that the total recessionary response ($\hat{\beta}_1 + \hat{\beta}_2 \approx -24.6$) is approximately 50 percent larger than the expansion baseline. Several mechanisms are consistent with this amplification. Cash flows are weaker and more uncertain during downturns, so discount-rate changes produce larger present-value swings. Financial constraints are more likely to bind, amplifying balance-sheet effects (Gertler & Karadi, 2015). Investor risk aversion is elevated, magnifying required-premium responses (Gertler & Karadi, 2015), and policy signals may carry greater informational content about the economic outlook when uncertainty is high (Morais et al., 2019).

The pattern is similar when financial stress replaces the recession dummy. During periods when the VIX exceeds its 75th percentile, equity responses are roughly 40 percent larger than in low-volatility periods; elevated credit spreads (measured by the Excess Bond Premium) (Gilchrist & Zakrajšek, 2012) produce comparable amplification. The practical implication is symmetric: accommodative surprises during crises generate unusually large positive market reactions, while restrictive surprises carry correspondingly larger downside risk. Central banks intervening to support stability should factor in this amplification when calibrating the size and sequencing of policy moves (Kalemli-Özcan, 2019).

3.4 Firm-Level Heterogeneity

Aggregate responses mask considerable cross-sectional variation. To characterize this, a firm-level panel is estimated in which each stock's event-window return is regressed on the policy surprise interacted with lagged balance-sheet characteristics (Appendix E). Three firm attributes emerge as consistently significant moderators.

Leverage: A one-standard-deviation increase in the debt-to-equity ratio is associated with 15-20 percent greater policy sensitivity. Higher leverage amplifies the direct cost-of-borrowing channel and tightens financial constraints, both of which magnify the equity response to rate surprises (Gertler & Karadi, 2015; Gürkaynak et al., 2005)

Cash-flow duration: Growth firms - characterized by low current earnings and high expected future dividends -

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are more sensitive than value firms, consistent with the longer duration of their cash flows making them more responsive to discount-rate shocks (Greenwood et al., 2010). Technology companies are the clearest example: high valuation multiples relative to current earnings translate into large price movements when the rate environment shifts.

Size: Smaller firms show modestly higher sensitivity, likely reflecting tighter financing constraints and greater information asymmetries, though the magnitude is smaller than the leverage and duration effects.

Cash-rich firms, by contrast, are less sensitive, with the hedging benefit most pronounced during stress episodes - consistent with liquid reserves providing insulation from tightening external financing conditions (Gürkaynak et al., 2005).

At the sector level, Technology, Consumer Discretionary, and Real Estate exhibit responses 25-35 percent above the market average (Figure 3). The sector-specific coefficients are estimated by adding GICS sector interaction terms to the baseline regression (equation 4), so each coefficient measures the average event-window return for firms in that sector per unit of standardized policy surprise, controlling for the same macro and financial variables as the aggregate specification. Utilities, Consumer Staples, and Health Care show below-average sensitivity. Financials occupy an intermediate position, but with a composition that depends on the nature of the surprise: target-factor shocks that steepen the yield curve can widen bank margins and benefit equity valuations, while path-factor shocks that flatten the curve compress them. This asymmetry reinforces the importance of decomposing surprises rather than treating them as a scalar.

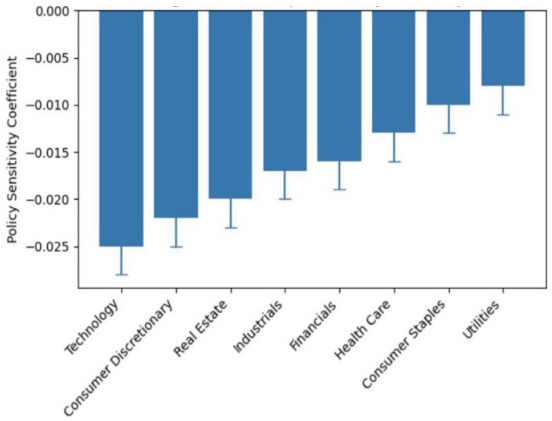


Figure 3: Sector-Specific Policy Sensitivity Coefficients
Notes: Estimated policy sensitivity for eleven GICS sectors. Error bars are 95% confidence intervals. Technology, Consumer Discretionary, and Real Estate show the highest sensitivity; Utilities, Consumer Staples, and Health Care the lowest.

3.5 International Spillovers

U.S. policy shocks propagate rapidly and broadly across international equity markets, exchange rates, and sovereign bond markets. The 35-country sample includes 20 advanced economies and 15 emerging markets selected on two criteria: (1) availability of continuous, minute-level equity index futures or spot index data covering at least 80 percent of the 285 FOMC announcement dates, and (2) classification as advanced or emerging by the IMF World Economic Outlook as of 2023. Countries with frequent trading halts, missing data exceeding 20 percent of events, or equity market closures that structurally overlapped with U.S. announcement times were excluded. This selection process is more restrictive for emerging markets, where high-frequency data are less consistently available, so the 15 emerging-market countries in the sample tend to have more developed financial infrastructure than the broader emerging-market universe; readers should interpret the emerging-market spillover estimates accordingly. Baseline spillover regressions for these 35 countries yield an average coefficient of approximately -14.2 for advanced economies and -13.8 for emerging markets, both statistically indistinguishable from the domestic estimate. The strongest advanced-economy spillovers occur in Canada and the United Kingdom, while Latin American and emerging Asian markets exhibit particularly large effects when capital accounts are relatively open.

Contractionary surprises also trigger immediate dollar appreciation of $0.5 - 1.0$ percent against major floating currencies and $0.8 - 1.5$ percent against emerging market currencies on average. Countries with pegged or tightly managed regimes show minimal immediate exchange rate movement, though this stability often comes at the cost of reserve depletion or eventual realignment. In sovereign bond markets, a contractionary U.S. surprise that raises 10-year Treasury yields by 10 basis points typically moves German Bund yields by 6-7 basis points and Japanese government bond yields by 3-5 basis points; emerging market spreads widen, particularly for countries with weaker fiscal positions or large stocks of dollar-denominated debt.

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Four transmission channels account for these patterns (Dedola et al., 2017; Morais et al., 2019). The portfolio rebalancing channel operates through global investors reallocating across countries as U.S. interest rate differentials shift. The risk-taking channel links U.S. tightening to increased global risk aversion, prompting outflows from higher-risk assets including emerging market securities (Morais et al., 2019). Trade linkages connect slower U.S. growth, induced by higher rates, to reduced export demand in trading partners. Finally, the dollar funding channel affects any entity globally that borrows in U.S. dollars, raising funding costs for banks and corporations in markets with heavy dollar reliance (Kalemli-Özcan, 2019). These channels are not mutually exclusive, and the overall spillover reflects their combined operation.

4. Discussion

4.1 Alternative Event Windows

The baseline uses an asymmetric 30-minute window ($h_1 = 10, h_2 = 20$ minutes). Reestimating all specifications across narrower windows (15 and 20 minutes) and wider ones (60 minutes and full trading-day returns) leaves the coefficients within 8 percent of the baseline in every case, and statistical significance at the 1 percent level is maintained throughout. Narrower windows tend to yield slightly larger estimates as noise contamination is minimized; wider windows produce marginally smaller estimates as unrelated price movements accumulate. The full-day analysis shows minimal reversal or continuation of the initial response, confirming that the event-window reaction accurately reflects the permanent price impact rather than a transient overshoot.

4.2 Sample Period Stability

Rolling-window regressions and formal structural break tests reveal no evidence of instability in the baseline coefficient, which is statistically indistinguishable across the 1990s, 2000s, 2010s, and 2020s sub-samples once estimation uncertainty is accounted for. The most visible time variation is in the relative weights of the target and path factors, documented in Figure 2, but the individual coefficients themselves remain stable when the analysis is restricted to sub-periods with adequate variation in each factor.

4.3 Alternative Surprise Measures

The primary surprise measure uses federal funds futures (Kuttner, 2001). Replacing it with surprises derived from Eurodollar and SOFR futures, interest rate swaps, Treasury yields, or surveybased forecasts produces qualitatively identical results, with coefficient magnitudes varying by less than 10 percent across instruments. There is mild evidence of asymmetry: tightening surprises generate somewhat larger equity declines than easing surprises of equal magnitude, particularly during elevated-stress periods, but over the full sample the relationship is approximately linear.

4.4 Control Variable Specifications

Moving from a minimal specification (surprise alone) to a fully saturated one (dozens of contemporaneous macro and financial controls) changes the estimated policy effect by less than 5 percent. This insensitivity is a direct consequence of the high-frequency design: within a 30-minute announcement window, the policy surprise dominates the information environment, leaving little residual variation for other controls to absorb (Rigobon & Sack, 2003).

4.5 Econometric Diagnostics

Standard diagnostic tests detect no evidence of heteroskedasticity or serial correlation that would invalidate inference. Newey-West and White robust standard errors yield virtually identical t-statistics. Leave-one-out and sequential-deletion exercises confirm that no single observation drives the results, and winsorizing returns at the 1st and 99th percentiles leaves the estimates unchanged.

5. Conclusion

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This paper has documented five empirical regularities about equity-market responses to monetary policy surprises. Markets react immediately and substantially - declines of 15 – 16 percent per exerts larger effects than immediate rate changes, and this asymmetry intensified after 2008 when conventional policy tools were constrained. Responses amplify by roughly half during recessions and by 40 percent during periods of elevated financial stress. Firm-level sensitivity is systematically higher for leveraged, long-duration, and smaller companies, and varies predictably across sectors. And U.S. policy shocks propagate nearly one-for-one to foreign equity markets, with significant co-movement in exchange rates and sovereign bond spreads as well.

Several limitations of this study deserve acknowledgment. The analysis is restricted to U.S. FOMC announcements and equity index futures, so findings may not generalize fully to other central banks, asset classes, or institutional settings. The international spillover sample covers 35 countries selected partly on the basis of data availability, which may introduce selection bias if markets with better data quality differ systematically from those excluded. The firm-level panel is likewise constrained to publicly listed companies for which balance-sheet data are available, potentially underrepresenting smaller or less transparent firms. Finally, the high-frequency event-study design isolates the immediate market reaction but does not directly speak to longer-run macroeconomic consequences; extrapolating from 30-minute price responses to investment, consumption, or employment outcomes requires additional assumptions. Readers should interpret the findings with these constraints in mind. Several threads warrant further investigation.

The link between immediate financial market reactions and real economic outcomes - investment, hiring, consumption - remains underexplored at high frequency. The mechanisms behind recession-state amplification deserve finer decomposition: how much reflects cash-flow uncertainty versus tighter financial constraints versus elevated risk aversion? And as financial market microstructure continues to evolve with algorithmic trading and passive vehicles, ongoing monitoring will be necessary to determine whether the transmission dynamics documented here remain stable. Extending the framework to other major central banks - the ECB, Bank of England, Bank of Japan - would test whether the patterns generalize beyond the Federal Reserve.

For policymakers, the practical upshot is that communication about the future policy path matters at least as much as the rate decision itself, and that the market impact of any given announcement will be substantially larger when the economy or financial system is under stress. For investors, the cross-sectional evidence offers actionable guidance for constructing portfolios with desired monetary policy exposures. And for researchers, the efficiency and speed of the financial market response suggests that the event-study methodology will remain a powerful tool for isolating monetary transmission for years to come.

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Appendix:
https://docs.google.com/document/d/1o9kS0BKG2zNYqztUVnkAO6qUFbLGh5Et4g51Zne9u4Q/edit?usp=sharing