Everything but the Interest Rate: Measuring Central Bank Interventions

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Abstract

Central banks do far more than set short-term interest rates. They purchase assets, launch lending facilities, open swap lines, and dynamically adjust regulation. We use large language models to classify text from (1) Federal Reserve documents, (2) financial news, (3) mutual fund investor letters, and (4) bank filings, building comprehensive indices that measure non-rate intervention from both sides: what the Fed communicates and what markets expect. Our text-based measures align with observable quantities, including the Fed's bond holdings, swap line balances, emergency borrowing, and discretionary regulatory changes. The indices reveal a large, persistent increase in the Fed's use of non-rate tools since 2008 across all categories. Non-rate announcement days move equities, bank stocks, credit spreads, and long-term yields, but not the 2-year yield, suggesting a risk premium channel distinct from the expected path of short rates. Market participants develop forward-looking, heterogeneous expectations about non-rate tool use, and they expect the Fed to ease non-rate policy when financial conditions tighten. These expectations translate to actions and risk-taking: bond funds that expect future balance sheet easing increase their portfolio duration. Market expectations feed back into policy, as the Fed monitors what markets anticipate to calibrate both the impact and surprise content of its actions. The pattern is not unique to the Fed: central bankers worldwide increasingly discuss non-rate tools.

1. Introduction

The literature on how central bank policy affects the real economy is vast (Taylor, 1993; Woodford, 2003; Christiano et al., 2005), but it focuses overwhelmingly on a single instru-

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ment: the short-term interest rate. Central banks today do far more. The Federal Reserve purchases trillions of dollars of government bonds, creates emergency lending facilities when credit markets freeze, opens dollar swap lines to stabilize international funding markets, and wields regulatory authority over banks through stress tests, leverage requirements, and capital rules. These tools reshape balance sheets, alter risk premia, and change who can borrow on what terms. During the financial crisis and the pandemic, non-rate interventions were arguably the dominant channel through which the Fed affected financial markets. Yet we have no systematic way to measure them. For short-rate policy, we observe both the current rate and market expectations of where it is heading. For balance sheet operations, lending facilities, and regulatory posture, we have neither.

We fill this gap using text data. Using large language models, we classify over half a million documents from both sides of Fed policy: Fed communications (FOMC statements, minutes, transcripts, press releases, and speeches) and market participant text (financial news, mutual fund investor letters, bank filings, and press conference questions). Each paragraph is categorized into four types of non-rate intervention (balance sheet operations, lending and credit facilities, dollar liquidity swap lines, and regulatory actions), classified by direction (easing or tightening), and labeled as describing realized actions or anticipated future ones. The resulting indices correlate strongly with observable quantities — our balance sheet sub-index with total Fed assets, our swap line index with outstanding central bank liquidity swaps, our lending facility index with emergency borrowing, and our regulatory index with known discretionary regulatory changes. But the text captures dimensions that quantities alone cannot: whether the Fed is taking action or signaling future readiness, whether market participants anticipated the intervention, how different types of investors interpret the same policy, and the state-contingent nature of the Fed's commitment to intervene.

We document several facts:

Non-rate tools are now a permanent part of the Fed's toolkit. Discussion of non-rate interventions in Fed documents is essentially zero before 2008. It spikes during the financial crisis and remains elevated thereafter. The quarterly intervention index is three times higher after 2008 than before, and the increase is broad-based across all four categories. The increase persists well beyond the crisis: the 2017–2019 tightening cycle features active discussion of balance sheet normalization (QT), and the 2022–2025 period sustains substantial non-rate activity with rates above 4%. Non-rate tools complement rates rather than substitute for them: balance sheet policy tracks the rate cycle (QE during easing, QT during tightening), while lending facilities and regulatory actions operate independently. The rise of non-rate tools is not unique to the Federal Reserve: central bankers' speeches worldwide, drawn from the BIS archive of over 20,000 speeches since 1996, show the same structural break around 2008.

The Fed manages expectations about non-rate tools as a policy instrument. We classify each Fed paragraph as describing a concrete action or a signal of future intent. The two look very different. Actions cluster in crisis episodes, with sharp spikes in 2008–2009 and 2020 followed by rapid declines. Signals are smoother and more persistent: the Fed continues discussing its readiness to intervene long after the intervention itself has ended. The taper tantrum of 2013 brought this into sharp relief. FOMC transcripts show the Committee treating the market reaction to *discussing* a reduction in purchases as equivalent to an actual policy change. Bernanke concluded that "it is critically important that in our communication we emphasize state contingency." For non-rate tools, communication is policy.

Market participants track non-rate tools and anticipate easing when financial conditions tighten. We construct parallel indices from four independent market sources: financial news, mutual fund investor letters, bank filings, and press conference questions. All show the same structural break around 2008, and market text co-moves closely with Fed text category by category. But market participants do not simply report on Fed ac-

tions after the fact. A large share of market text is speculative, discussing anticipated or conditional future actions. The speculative component is more persistent than factual coverage and leads it in time: speculative discussion this month predicts factual coverage next month, but not vice versa. Financial stress drives these expectations: tightening financial conditions predict a shift toward easing speculation, even after controlling for what the Fed has already done. Markets treat the non-rate toolkit as a state-contingent backstop (Haddad et al., 2023), expecting deployment in bad states much as they expect rate cuts when unemployment rises.

Market expectations are not passive — they predict portfolio repositioning. Mutual funds that increase their discussion of balance sheet easing in shareholder letters subsequently extend portfolio maturity, taking on more duration risk in anticipation of the lower long-term rates that QE is expected to deliver. This is the one place in our data where we can directly link non-rate expectations to portfolio decisions, and the pattern is consistent with anticipated central bank actions affecting risk-taking.

Non-rate tools move asset prices beyond the expected path of short rates. Daily event study regressions show that non-rate content in Fed documents moves the stock market, bank stocks, long-term yields, credit spreads, the dollar, and the yield curve slope. The magnitudes are economically large: on a typical post-2008 FOMC day, non-rate content accounts for over half the total stock market reaction and 80 percent of the bank stock reaction (Table 7). These effects survive controlling for rate-related content from the same documents. The most informative result is the 2-year yield, which responds strongly to FOMC days overall but shows no response to non-rate content in any specification. Non-rate tools steepen the yield curve by moving long rates without affecting the short end. Both slope measures respond significantly, consistent with non-rate tools affecting the term premium. Using the directional classification from financial news coverage, we confirm that balance sheet easing flattens the yield curve while tightening steepens it.

Attention to non-rate tools reflects direct economic exposure. We decompose bank filings by institution type and investor letters by fund asset class. Among banks, the largest US bank holding companies show the steepest increase in non-rate discussion after 2008, driven almost entirely by regulation, consistent with their direct exposure to stress testing and capital surcharges. Among mutual funds, fixed income funds discuss balance sheet operations and lending facilities more than equity funds, consistent with the direct impact of QE and credit facilities on the securities they hold.

Taken together, these results show that non-rate tools are a central part of how the Fed affects financial markets. The Fed actively manages expectations about them, markets anticipate their deployment, investors reposition accordingly, and prices respond through a channel distinct from conventional rate policy. The indices we construct provide the first unified measurement of this phenomenon, opening a path toward the same kind of systematic analysis that has long existed for the federal funds rate.

Related Literature

Unconventional monetary policy and event studies. A large body of work studies QE and related tools through event studies around individual announcements. Bernanke (2020) provides the most comprehensive overview of these tools and argues they are now a permanent part of the toolkit. Gagnon et al. (2011) and Krishnamurthy and Vissing-Jorgensen (2011) estimate interest rate effects of the Fed's asset purchases; Krishnamurthy and Vissing-Jorgensen (2013) decompose the channels through which QE operates. Swanson (2021) separates FOMC surprises into fed funds rate, forward guidance, and LSAP factors using rotated principal components, identifying the LSAP factor from asset price movements alone. Our index complements this approach: we observe the text directly rather than inferring the non-rate component from price reactions, and we capture a broader set of tools beyond LSAPs. Greenwood et al. (2023) develop a quantity-driven theory of term premia in which central bank asset purchases affect long-term yields through

portfolio balance effects; Hanson and Stein (2015) show that Fed policy moves long-term real rates, consistent with a term premium channel. D'Amico and King (2013) distinguish flow and stock effects of Treasury purchases. Gertler and Karadi (2011) provide a theoretical framework in which central bank purchases affect real activity through intermediary balance sheets. Dell'Ariccia et al. (2018) survey unconventional policies across multiple central banks. Most closely related to our work, Haddad et al. (2021) document how the Fed's intervention during COVID restored bond market functioning, Haddad et al. (2023) show that conditional promises have large effects even before implementation, and Haddad et al. (2024) argue that the Fed's asset purchase rules have transformed the bond market. Caballero et al. (2024) show that optimal monetary policy targets financial conditions directly, providing a theoretical foundation for the state-contingent backstop we document empirically. Our contribution is to move beyond studying these tools in isolation and instead measure the full set of non-rate interventions as a unified index.

Central bank lending and liquidity provision. Rochet and Vives (2004) formalize the lender-of-last-resort role; Mehrling (2010) argues the Fed evolved from lender to dealer of last resort during the crisis. Del Negro et al. (2017) evaluate macroeconomic effects of the Fed's emergency facilities. Bahaj and Reis (2022) provide a comprehensive analysis of how swap lines reduce frictions in international dollar funding. Jiang et al. (2021) study the dollar's special role in global finance and how Fed dollar provision affects the global financial cycle. Our index captures all of these instruments in a single framework.

Financial regulation as monetary policy. Hanson et al. (2011) argue that monetary policy and macroprudential regulation are deeply intertwined; Jiménez et al. (2014) provide direct evidence that low rates increase bank risk-taking. Our regulatory sub-index distinguishes between the Fed exercising discretion (relaxing the SLR, adjusting stress test parameters) and implementing congressional mandates (Dodd-Frank rulemaking).

Text as data in economics and finance. Gentzkow et al. (2019) survey the field. Baker et al. (2016) construct an economic policy uncertainty index from newspaper text. Lucca and Trebbi (2009) pioneer computational analysis of FOMC statements. Hansen et al. (2018) apply computational linguistics to FOMC transcripts. Cieslak and Schrimpf (2019) classify Fed communication into monetary and non-monetary components and study their asset price effects. Cieślak and Vissing-Jorgensen (2021) use FOMC text to show the Fed responds to stock market declines. Manela and Moreira (2017) construct a news-implied volatility measure. Recent work demonstrates that large language models match or exceed human annotators for text classification (Gilardi et al., 2023; Korinek, 2023). We differ from prior dictionary and topic model approaches by using LLMs that capture context-dependent meaning, and by building separate Fed and market indices to distinguish actions from expectations.

Monetary policy identification. Romer and Romer (2004) pioneered the narrative approach to identifying monetary policy shocks. Cochrane and Piazzesi (2002) pioneer high-frequency identification around FOMC announcements. Gürkaynak et al. (2005) separate target and path factors. Nakamura and Steinsson (2018) identify an information effect; Bauer and Swanson (2023) challenge this interpretation and refine high-frequency identification of monetary policy. Bu et al. (2021) construct a unified measure spanning conventional and unconventional regimes. Our index complements high-frequency approaches by providing a continuous measure at lower frequency that captures the full non-rate toolkit, including the anticipated component that high-frequency methods difference out.

Financial intermediaries and asset prices. Our work connects to the intermediary asset pricing literature (He and Krishnamurthy, 2013; Adrian et al., 2014; Haddad and Muir, 2021, 2025). Non-rate interventions, particularly emergency lending facilities and regulatory relief, directly reshape intermediary constraints, providing a policy channel through which the Fed affects the intermediary pricing kernel.

2. Data and Methodology

We need text that captures non-rate interventions from two perspectives: what the Fed communicates, and what market participants say about those interventions. No single source is sufficient, because the Fed's own documents reveal what it did but not how markets perceived it, while market text captures perceptions but may miss interventions that received little public attention. We therefore build parallel indices from both sides.

2.1 Data Sources

Federal Reserve documents. We scrape all publicly available documents from `federalreserve.gov`, yielding approximately 9,400 documents from 1996 to 2025 (Table 12 in the appendix provides the full breakdown by document type). These include FOMC policy statements, FOMC minutes, meeting transcripts (available with a five-year lag), press releases, Board speeches, congressional testimony, and monetary policy operation notices. Each document type offers a different window into Fed policymaking: statements announce decisions, minutes and transcripts reveal deliberation, and press releases describe specific facility launches or regulatory actions.

Market participant text. We assemble text from five sources that capture how different market participants discuss and anticipate Fed interventions.

Financial news ($\sim$130,000 articles). We collect all articles from the LSEG/Reuters news archive tagged with the Federal Reserve topic code, then clean for duplicates and foreign central bank coverage. News articles capture real-time market interpretation of Fed actions.

Mutual fund investor letters ($\sim$219,000 filings). We extract shareholder letters from N-CSR, N-CSRS, and N-30D filings on SEC EDGAR, covering 6,700 fund families from 1994 to 2026. These letters reveal how professional fund managers explain Fed policy to their investors, including how they position portfolios in response. Because each filing

is linked to a specific fund, we can decompose attention by fund type (equity vs. fixed income).

Bank filings (∼32,000 filings). We collect 10-K and 10-Q filings from the 50 largest US bank holding companies and the New York Fed's primary dealers, covering both domestic and international institutions. Because each filing is linked to a specific firm, we can decompose attention by institution type (international vs. domestic, by size, and by primary dealer status).

Press conference questions (88 press conferences, ∼2,600 question paragraphs). We isolate the journalist questions from FOMC press conference Q&A transcripts (2011 onward), excluding the Fed Chair's answers. These capture what financial journalists consider most newsworthy about Fed policy in real time.

Central bankers' speeches worldwide (∼20,000 speeches). We download speeches from the BIS Central Bankers' Speeches database. Unlike the other market sources, these capture how central bankers globally discuss non-rate tools, providing an international benchmark.

Table 1 summarizes the sources, scale, and time coverage.

Table 1: Data Sources.

Side	Source	Documents	Period	Unit
Fed	Federal Reserve	∼9,400	1996–2025	Document
Market	Financial news (Reuters)	∼130,000	2004–2025	Paragraph
	Mutual fund letters (SEC)	∼219,000	1994–2025	Paragraph
	Bank filings (10-K/10-Q)	∼131,000	1999–2025	Paragraph
	Press conference Q&A	∼2,600	2011–2025	Paragraph
Central Banks	CB speeches (BIS)	∼20,000	1996–2025	Document

A key design choice is the unit of analysis. Fed documents are classified at the *document* level, because a single Fed release (e.g., a press release announcing a new lending facility) typically covers one coherent set of policy actions. Market text is classified at the *paragraph* level, because a news article or investor letter often mixes Fed policy discussion with unrelated market commentary. Paragraph-level classification isolates the relevant

content.

2.2 Text Classification

We classify text along several dimensions using large language models (Gemini 2.5 Flash-Lite for the main classification battery). The core question for each text unit is: does it discuss a non-rate Fed intervention, and if so, what kind and in what direction?

Step 1: Rate-related vs. non-rate-related. Each text unit is classified as discussing rate-related policy (RR), non-rate-related interventions (NRR), or neither. Rate-related content includes conventional interest rate decisions, forward guidance about the policy rate, and discussions of the federal funds rate target. Everything else involving active Fed policy tools falls into the NRR category. This separation is the foundation of the analysis: it lets us isolate the non-rate component of Fed communication.

Step 2: Intervention categories. NRR text is classified into four categories, each defined by a battery of binary questions:

- **Balance Sheet (BS):** asset purchases (Treasuries, MBS), balance sheet expansion or normalization/runoff. Identified by asking whether the document discusses the Fed expanding or shrinking its securities holdings.
- **Lending Facilities (LF):** emergency lending, discount window, credit facilities (CPFF, PDCF, TALF, Main Street). Identified by asking whether the document discusses the Fed lending to or through financial institutions.
- **Swap Lines (SW):** foreign currency swap arrangements with other central banks, dollar liquidity provision to foreign institutions. Identified by asking whether the document discusses cross-border central bank cooperation on liquidity.
- **Regulatory (REG):** discretionary regulatory actions such as adjusting stress test parameters, relaxing the supplementary leverage ratio, or modifying capital requirements. Identified by asking whether the document discusses the Fed exercising

regulatory discretion, as opposed to implementing congressionally mandated rules. A document can trigger multiple categories. For example, an FOMC statement might discuss both asset purchases and lending facilities.

Step 3: Direction. For each detected category, we classify the direction as easing (+1), tightening (-1), or neutral (0). For balance sheet operations, easing means expansion (purchasing assets) and tightening means shrinkage (runoff or sales). For lending facilities, easing means opening or expanding access and tightening means winding down. For regulatory actions, easing means loosening requirements and tightening means imposing stricter ones.

Current actions versus signals and future actions. We classify two further attributes used in later sections. In Fed documents, we distinguish *current actions* from *signals*. Current actions are interventions the Fed has decided on, is implementing, or has completed ("purchased," "authorized," "will buy $80B per month"). Signals capture the Fed's expectations about its own future tool use and its conditional commitments: expressions of readiness, contingent plans, and forward guidance about non-rate tools ("stands ready," "if conditions warrant," "committed to using its full range of tools"). In market text, we draw a parallel distinction between *factual* and *speculative* content. Factual text reports on realized Fed actions. Speculative text captures investor expectations about whether, when, and under what conditions the Fed will deploy its tools in the future.

Why LLMs? Traditional text-as-data approaches use keyword dictionaries or topic models. These work well for broad sentiment but struggle with the context-dependent meaning of policy language. The phrase "balance sheet" can refer to the Fed's own balance sheet, a bank's balance sheet, or household balance sheets. An LLM can distinguish these uses because it processes the surrounding context. We validate the classifications against observable Fed actions in Section 3.4. The full text of each classification question is reproduced in Section B.2.

2.3 Index Construction

Converting document-level classifications into quarterly time series requires addressing two measurement issues: compositional differences across document types, and time-varying document volume.

Document-type reweighting (Fed documents). The Fed produces different types of documents at different frequencies. FOMC statements, for example, occur only 8 times per year but are where concrete policy actions are announced and where markets pay the closest attention. Without this adjustment, the signal from FOMC announcements would be diluted by other document types. We reweight each document by the inverse of its type's average quarterly frequency, so that each document type contributes equally to the index on average across quarters. Concretely, if a document type averages $\bar{n}$ documents per quarter, each document of that type receives weight $1/\bar{n}$.

Document-count normalization (market text). Market paragraph counts depend on how many articles or filings appear in a given quarter. More news articles in 2020 does not by itself mean more attention to Fed interventions. We normalize by dividing detection counts by the number of source documents in that quarter, yielding detections per article (or per filing). This is analogous to computing a share rather than a level. For investor letter filings, we additionally apply X-13 seasonal adjustment (Census Bureau, ARIMA-SEATS) to remove calendar-driven filing seasonality.

Aggregation. All series are aggregated to quarterly frequency. For the swap line (SW) category, we apply a centered four-quarter moving average to smooth the inherently lumpy nature of swap line activations and expirations. All other categories are reported at quarterly frequency without smoothing.

Interpretation of the index. The resulting Fed index has a natural interpretation: a value of 0.3 for the balance sheet sub-index in a given quarter means that 30% of the

Fed's average quarterly document output (weighted by document type) discussed balance sheet operations. A value of one means that every document, on average across types, contained a discussion of that category. Values above one occur in quarters where the Fed communicates more than usual — holding additional press conferences, issuing extra statements, or giving more speeches. We preserve this variation by design: when the Fed ramps up communication about its balance sheet, the increase in volume is itself a measure of how actively the tool is being used. The index therefore captures both the intensive margin (the share of each document type devoted to a category) and the extensive margin (overall communication volume about that category).

The total non-rate index sums across the four sub-categories, so a value of two means that the average Fed document discusses two of the four non-rate categories. Full details on the reweighting methodology and market text normalization are in Sections B.5 and B.6.

Figure 1 summarizes how the two sides of our index relate. The Fed's interventions and communications shape market beliefs. Market participants form expectations about future Fed actions and reposition their portfolios accordingly, moving asset prices and risk premia. The Fed monitors these market reactions and adjusts its communication in response. The remaining sections document each channel in this loop.

3. The Fed Increasingly Uses Non-Rate Policy Tools

3.1 The Overall Intervention Index

Figure 2a plots our aggregate intervention index over time. Discussion of non-rate tools in Fed documents is essentially zero before 2008, spikes dramatically during the financial crisis, and remains elevated thereafter. The rise represents a structural break in the Fed's communication about its toolkit, one that persists well beyond the crisis episodes that triggered it.

Table 2 quantifies the shift. The average quarterly intervention index is 3.1 times



Figure 1: The Feedback Loop Between Fed Communications and Market Expectations.

Notes: Solid arrows represent direct channels: the Fed's interventions and communications shape market beliefs, and market participants form expectations that drive asset prices and portfolio positioning. Dashed arrows represent feedback: the Fed monitors market text and adjusts communication in response, and market reactions to interventions inform subsequent Fed decisions.

higher after 2008 than before. The increase is broad-based, but the composition changes dramatically. Before 2008, regulatory discussion accounts for nearly all non-rate activity — balance sheet and lending facility mentions are essentially zero. After 2008, all four categories are active. Balance sheet and lending facility discussion each rise by an order of magnitude, and regulatory discussion doubles. Lending facilities are the most crisis-concentrated: their median is near zero (most quarters have no facility activations), but their mean is pulled up by the sharp spikes in 2008–2009 and 2020.

The increase in non-rate tool use is not driven by the zero lower bound. Of the 72 post-2008 quarters, 32 have a federal funds rate above 50 basis points, with rates ranging from 0.51% to 5.33%. In these quarters, the mean intervention index is 3.69 — still roughly three times the pre-2008 level of 1.20. Balance sheet discussion (mean 0.93) and regulatory discussion (mean 1.82) are both significantly elevated relative to pre-2008 levels. The 2017–2019 tightening cycle features active discussion of balance sheet normalization, and

Table 2: Summary Statistics: Quarterly Intervention Index.

	Pre-2008		2008–2025		
	Mean	Median	Mean	Median	Δ Mean
Total non-rate	1.20	1.10	3.76	2.65	2.56***
Regulatory	0.93	0.94	1.97	1.78	1.04***
Lending facilities	0.16	0.00	0.83	0.14	0.67***
Swap lines	0.08	0.05	0.16	0.12	0.08***
Balance sheet	0.03	0.00	0.81	0.80	0.79***

Notes: Quarterly weighted sums of non-rate intervention detections from Federal Reserve documents. Each document is classified for four intervention categories: balance sheet operations, lending and credit facilities, dollar liquidity swap lines, and regulatory actions. Total non-rate is the sum across categories. Document counts are weighted by the inverse of average quarterly frequency per document type, so that a quarter in which all FOMC statements discuss a category contributes the same as a quarter in which all speeches do. Pre-2008 covers 1997Q1–2007Q4 (44 quarters). Post-2008 covers 2008Q1–2025Q4 (72 quarters). Swap line series smoothed with a centered four-quarter moving average. Δ Mean is the increase in the quarterly mean from pre-2008 to 2008–2025. Welch's t-test for unequal variances. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the 2022–2025 period — with rates above 4% — sustains substantial non-rate activity through QT and ongoing regulatory action. The March 2023 banking stress illustrates this clearly: with the federal funds rate at 4.5% and unemployment at 3.4%, the Fed created the Bank Term Funding Program (BTFP), coordinated an international swap line expansion, and eased discount window collateral terms by accepting securities at par value. Non-rate easing tools were deployed in the middle of a rate tightening cycle, during a strong macroeconomy.

Non-rate tools do move directionally with the federal funds rate, but they are not redundant with it. Table 3 splits the post-2008 sample into easing and tightening cycles based on cumulative changes in the federal funds rate. Balance sheet policy tracks the rate cycle most closely — QE dominates during easing, QT during tightening. Lending facilities and swap lines are asymmetric: they ease during easing cycles but do not tighten symmetrically. Regulatory actions are present in both regimes at similar levels, largely independent of the rate cycle.

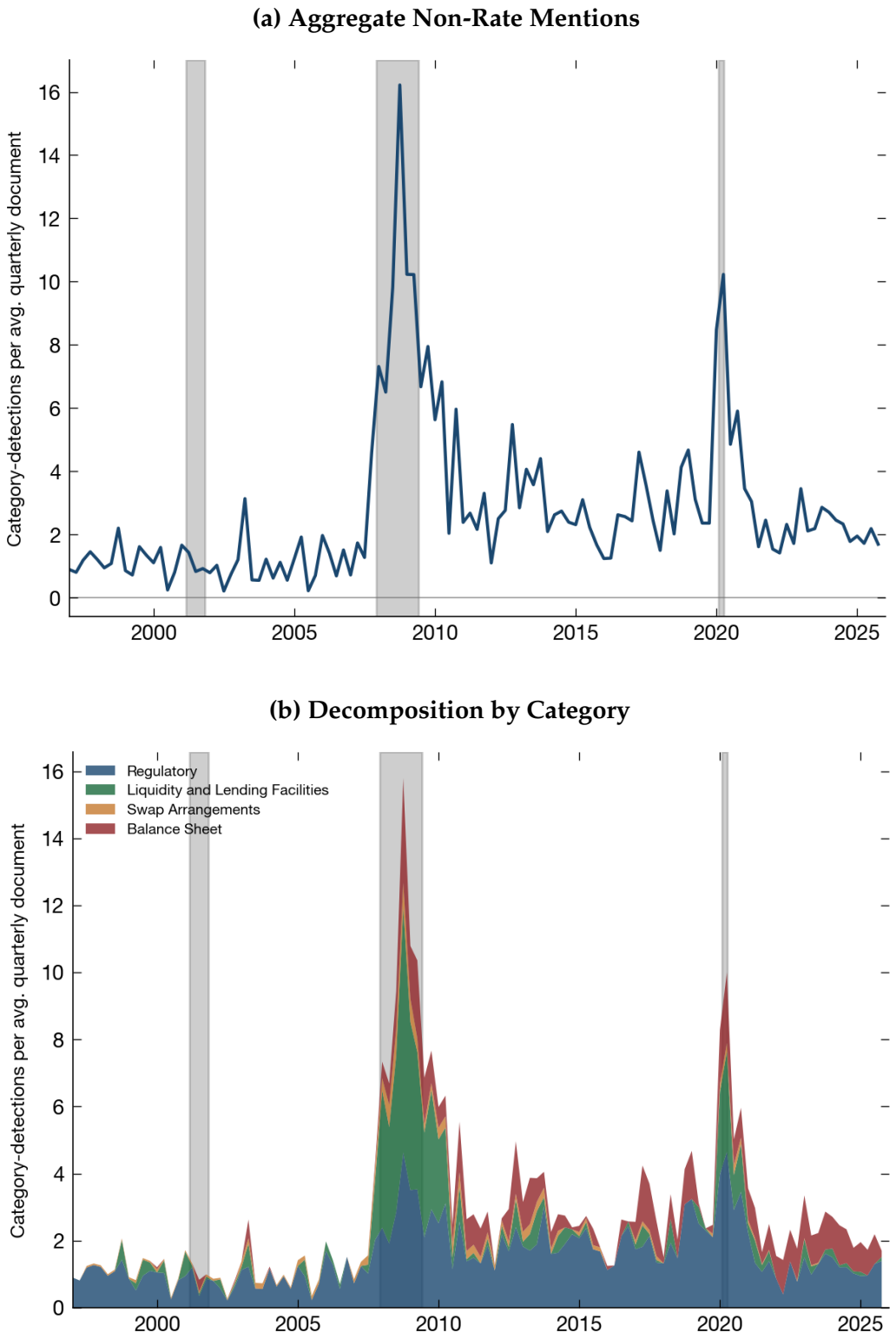


Figure 2: Aggregate Non-Rate Intervention Index.

Notes: Panel (a) plots the aggregate Fed intervention index, constructed from all Federal Reserve document types (FOMC statements, minutes, transcripts, press releases, speeches, testimony, and monetary policy operation notices). Each document is classified as rate-related (RR), non-rate-related (NRR), or other. The index is the quarterly sum of non-rate detections, normalized by average quarterly document count per document type. Panel (b) decomposes the aggregate into four intervention categories: balance sheet operations, lending and credit facilities, dollar liquidity swap lines, and regulatory actions. The sample covers 1997–2025.

Table 3: Non-Rate Tool Use by Federal Funds Rate Cycle.

	Fed Funds Easing Cycle		Fed Funds Tightening Cycle	
	Non-rate easing	Non-rate tightening	Non-rate easing	Non-rate tightening
Total non-rate	1.42	0.52	0.34	1.04
Regulatory	0.32	0.26	0.28	0.19
Lending facilities	0.34	0.04	0.02	0.02
Swap lines	0.17	0.00	0.01	0.00
Balance sheet	0.60	0.22	0.03	0.83

Notes: Mean quarterly weighted NRR detections classified by easing or tightening direction, split by federal funds rate cycle. A quarter belongs to the easing (tightening) cycle if, looking back from the current quarter, the cumulative change in the federal funds rate since the last quarter where the rate was more than 25 basis points away is negative (positive). The 25 basis point threshold accounts for the Fed's target range convention. Sample: 2008Q1–2025Q4 (50 easing-cycle quarters, 22 tightening-cycle quarters). NRR easing and NRR tightening are the weighted quarterly sums of documents classified as easing or tightening within each intervention category. Weighting and smoothing follow Table 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.2 Decomposition by Intervention Type

Figure 2b decomposes the aggregate index into four intervention categories: balance sheet operations, lending and credit facilities, dollar liquidity swap lines, and regulatory actions. All four categories show sharp increases beginning in 2008, consistent with the summary statistics in Table 2. Balance sheet operations dominate in level, reflecting the scale and persistence of QE programs, but the other categories are far from negligible — lending facilities spike during acute stress episodes (2008–2009, 2020), swap lines activate during dollar funding crises, and regulatory discussion rises steadily through the post-crisis period as the Fed builds out its macroprudential toolkit.

3.3 Central Bank Interventions Around the World

The rise of non-rate interventions is not unique to the Federal Reserve. Figure 3 plots the quarterly count of non-rate paragraphs in speeches by central bankers worldwide, drawn from the BIS archive of over 20,000 speeches since 1996. The archive covers all major central banks — the ECB (13% of speeches), the Bank of Japan, Bank of England, Bundesbank, Reserve Bank of India, Bank of Canada, Reserve Bank of Australia, Riksbank,

Banque de France, Swiss National Bank, and People's Bank of China, among others. We exclude Federal Reserve speeches, which enter our analysis through the Fed Documents pipeline. The pattern mirrors the Fed: minimal discussion of non-rate tools before 2008, a sharp increase during the financial crisis, and sustained elevated levels thereafter. Central banks globally have expanded their toolkits in parallel — deploying asset purchases, lending facilities, macroprudential regulation, and swap arrangements that were rare or nonexistent before the crisis. This suggests that the shift toward interventionism reflects structural changes in the global financial system, not idiosyncratic choices by any single central bank.

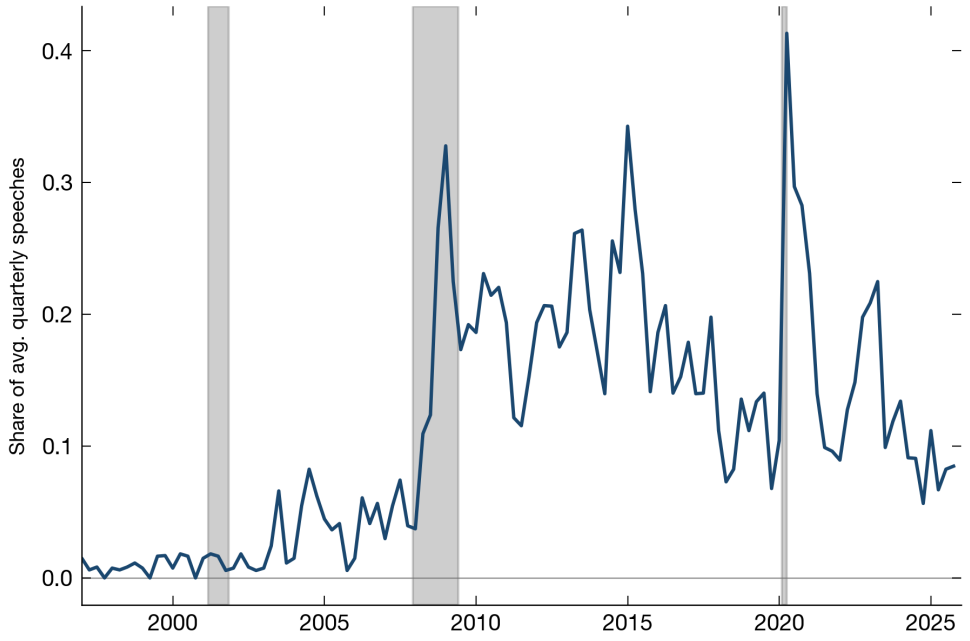


Figure 3: Non-Rate Intervention Discussion in Central Bankers' Speeches Worldwide.

Notes: Quarterly document-adjusted NRR detections from the BIS central bankers' speeches archive (20,000 speeches, 1996–2025). Federal Reserve speeches are excluded (they enter through the Fed Documents pipeline). Each speech is classified using generic central bank prompts (Gemini 2.5 Flash-Lite) rather than the Fed-specific questions applied elsewhere, since other central banks use different institutional language and operate different intervention programs. Weighting follows the same approach as the Fed index: each document is weighted by the inverse of the average calendar-quarter document count. The vertical line marks the onset of the global financial crisis.

3.4 Validation Against Quantities

A natural question is whether these text-based indices actually track what the Fed did. We validate each sub-index against the corresponding observable quantity from FRED. Figure 4 plots each text-based sub-index (blue, left axis) against its FRED counterpart (red dashed, right axis). Panel (a) overlays the net balance sheet framing index — the difference between paragraphs framing the balance sheet as expanding versus shrinking — against year-over-year changes in Fed assets relative to GDP (WALCL/GFDEBTN). Panel (b) plots lending facility detections against total borrowings from the Fed (BORROW). Panel (c) shows discretionary regulatory actions identified in Fed communications, with annotations marking known regulatory events. Panel (d) compares dollar liquidity swap line detections against outstanding central bank liquidity swaps (SWPT).

The co-movement is striking. In each case, the text-based measure closely tracks the corresponding quantity, despite being constructed entirely from language in Fed documents with no direct input from balance sheet or flow data. Formal correlations confirm the visual impression: Pearson correlations range from 0.57 (swap lines vs. SWPT) to 0.82 (balance sheet vs. WALCL/GFDEBTN), all significant at the 1% level (Table 5).

Regulation has no single observable quantity series, so Panel (c) instead annotates known discretionary regulatory actions. The index spikes align with concrete events: the SCAP stress tests in 2009, the introduction of CCAR in 2011, Basel III rulemaking in 2012–2013, the Volcker Rule review in 2017, capital buffer relief and temporary relaxation of the supplementary leverage ratio during COVID market stress, and the Basel III endgame proposal in 2023. Because these actions are discretionary and cannot be summarized in a single time series, the event-by-event alignment provides the closest available validation.

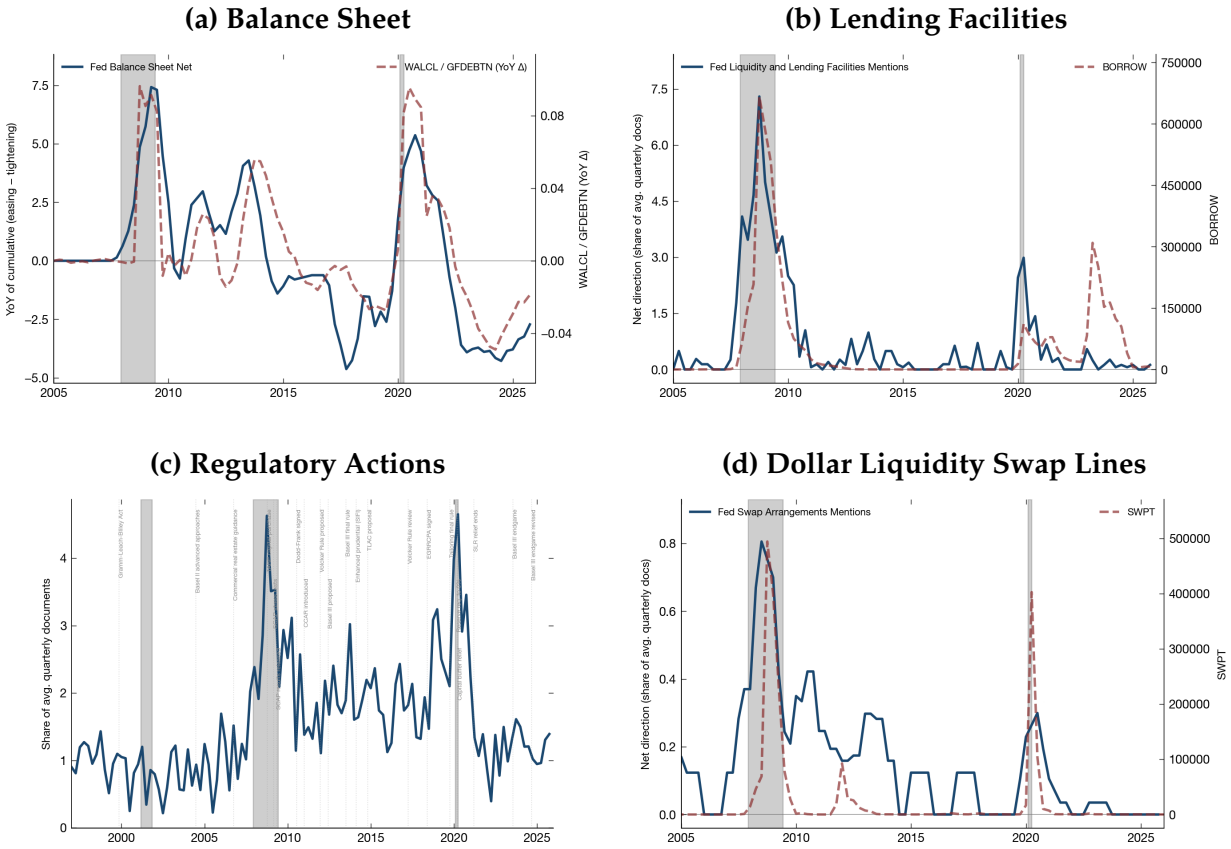


Figure 4: Validation: Text-Based Sub-Indices vs. FRED Quantities.

Notes: Each panel plots a text-based sub-index (blue solid, left axis) against the corresponding FRED series (red dashed, right axis). Panel (a): net balance sheet framing (expand minus shrink) vs. YoY change in WALCL/GFDEBTN. Panel (b): lending facility detections vs. BORROW ($ millions). Panel (c): discretionary regulatory action detections with known event annotations. Panel (d): dollar liquidity swap line detections (semi-annual, seasonally adjusted) vs. SWPT ($ millions). All text indices are reweighted by document type and calendar quarter. Vertical lines mark major policy episodes.

4. Market Participants Pay Attention to Non-Rate Tools

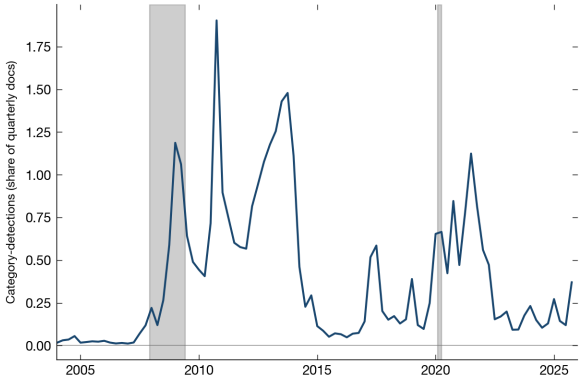
4.1 Evidence Across Sources

If non-rate interventions matter for markets, we should see market participants discussing them. We examine four independent text sources that capture different audiences and incentives. First, financial news (Reuters, 130,000 articles, 2004–2025) reflects the real-time information environment available to investors. Second, mutual fund investor letters

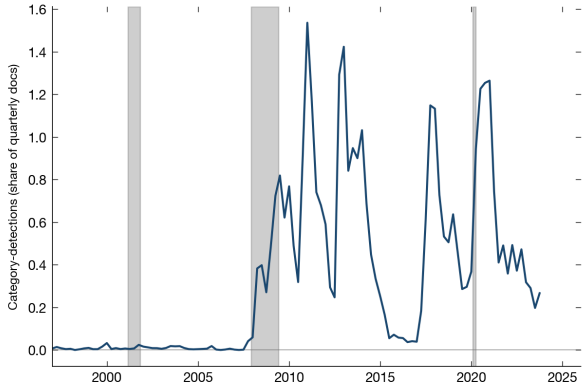
(219,000 N-SAR/N-CSR filings from SEC EDGAR, 1994–2025) reveal how portfolio managers communicate about Fed policy to their shareholders. Third, bank 10-K and 10-Q filings (131,000 paragraphs, 1999–2025) capture how the institutions most directly affected by Fed policy describe non-rate tools to their own shareholders. Fourth, FOMC press conference questions (2,600 paragraphs, 2011–2025) capture what financial journalists consider important enough to ask the Fed Chair about. For each source, we apply the same non-rate classification pipeline used on Fed documents. Figure 5 plots the quarterly count of non-rate paragraphs for each source. The pattern is consistent across all four. News coverage shows negligible non-rate discussion before 2008, spikes sharply during the crisis, and remains elevated through QE2, the taper tantrum, and COVID — with volume adjustment ensuring that the rise reflects increased *share* of Fed coverage devoted to non-rate tools, not just more articles overall. Investor letters show a delayed but persistent rise, peaking around 2012–2014 as fund managers grappled with the portfolio implications of prolonged QE. Press conference questions, adjusted for the doubling of press conference frequency after 2018, show journalists consistently pressing the Fed on non-rate tools. Bank filings show the same pattern, with one important difference in composition: regulation rather than balance sheet operations is the dominant category, consistent with banks being the direct targets of post-crisis stress testing and capital rules (Figure 6). Across all four sources, 2008 marks a regime change in how much market participants discuss non-rate Fed actions.

Composition of market attention. Table 4 decomposes market attention by intervention category, paralleling the Fed-side summary in Table 2. Both financial news and investor letters show large, statistically significant increases in non-rate discussion after 2008, but the composition of that attention is revealing. Balance sheet operations dominate overwhelmingly: they account for 89% of all non-rate detections in financial news and investor letters alike. Swap lines, by contrast, receive almost no attention from either source. The balance sheet's outsized share likely reflects both its persistence (QE pro-

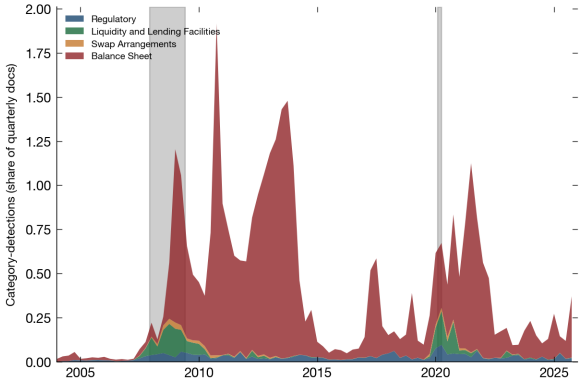
(a) Financial News: Aggregate Non-Rate Mentions



(b) Mutual Funds: Aggregate Non-Rate Mentions



(c) Financial News: Decomposition by Category



(d) Mutual Funds: Decomposition by Category

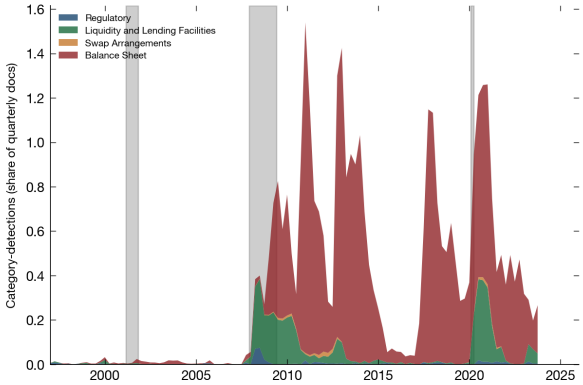


Figure 5: Non-Rate Intervention Attention Across Market Sources.

Notes: Quarterly non-rate paragraph detections, normalized by unique documents per quarter, for two independent market text sources. Panels (a)–(b): financial news (Reuters, 466,000 paragraphs from 120,000 articles, 2004–2025), volume-adjusted for changes in output over time. Panels (c)–(d): mutual fund investor letters (364,000 paragraphs from 97,000 filings, 1994–2025), seasonally adjusted via X-13 ARIMA-SEATS. Left panels show aggregate non-rate detections; right panels decompose into four intervention categories.

grams run for years, generating continuous commentary) and the possibility that balance sheet operations simply matter most for the asset prices and portfolio decisions these sources care about. Swap line activations, by contrast, are brief, technical, and aimed at foreign institutions.

Lending facility attention differs across sources: investor letters devote roughly triple

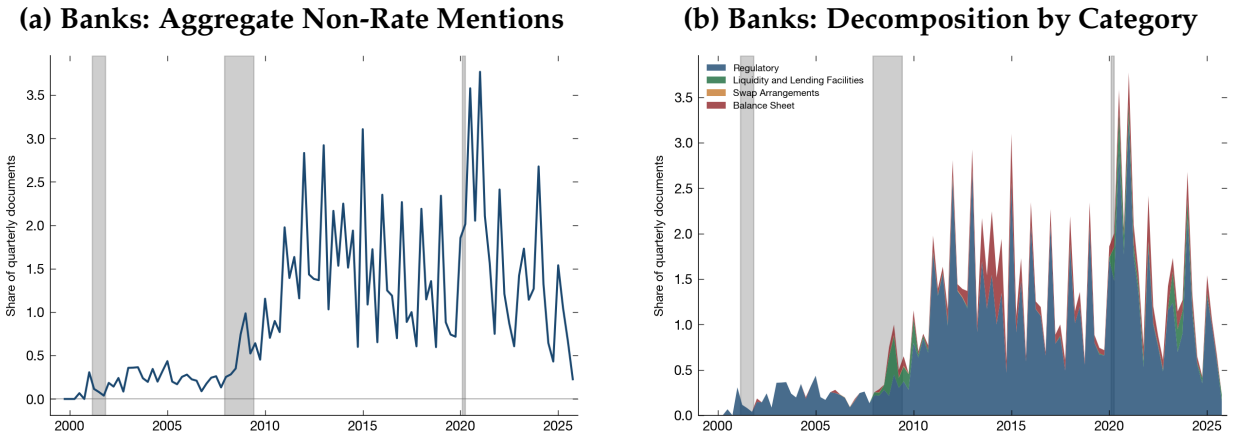


Figure 6: Non-Rate Intervention Attention in Bank Filings.

Notes: Quarterly non-rate paragraph detections from bank 10-K and 10-Q filings (131,000 Fed-keyword-filtered paragraphs from 32,000 filings, 1999–2025), normalized by unique filings per quarter. Panel (a) shows aggregate non-rate detections; Panel (b) decomposes into four intervention categories. Unlike news and investor letter sources where balance sheet operations dominate, regulation is the largest category in bank filings.

the share to lending facilities compared to news, possibly because fund managers are more attuned to credit facilities that can directly affect the securities in their portfolios. Regulatory attention is small in both news and fund letters — about 6% of total non-rate detections in financial news and under 2% in investor letters. This makes sense: stress tests, leverage requirements, and capital rules are aimed at banks, not at the equity and fixed income funds writing these letters. Bank filings tell the opposite story. Regulation is their dominant category, accounting for over 80% of all non-rate detections. Banks also stand out in lending facility discussion: bank filings show a sharp spike in 2023 coinciding with the Bank Term Funding Program launched after the Silicon Valley Bank failure. Because the BTFP was designed specifically for banks, it generated extensive discussion in bank filings while barely registering in sources oriented toward investors or financial markets.

Table 4: Market Attention to Non-Rate Interventions by Category.

Panel A: News & Investors

	Financial News (Reuters)			Investors (Fund Letters)		
	Pre-2008	2008–2025	Δ Mean	Pre-2008	2008–2025	Δ Mean
Total NRR	0.03	0.47	0.44***	0.01	0.48	0.47***
Regulatory	0.01	0.03	0.02***	0.00	0.01	0.01***
Lending facilities	0.00	0.02	0.02***	0.00	0.07	0.06***
Swap lines	0.00	0.01	0.01***	0.00	0.00	0.00***
Balance sheet	0.02	0.42	0.40***	0.00	0.43	0.43***

Panel B: Banks

	Banks (10-K/10-Q Filings)		
	Pre-2008	2008–2025	Δ Mean
Total NRR	0.19	1.35	1.16***
Regulatory	0.19	1.14	0.95***
Lending facilities	0.00	0.07	0.07***
Swap lines	0.00	0.00	0.00***
Balance sheet	0.00	0.16	0.16***

Notes: Mean quarterly detecting paragraphs per document. Each paragraph is independently classified for four intervention categories; a paragraph can trigger multiple categories. Total NRR is the average detecting paragraphs per document triggering at least one category. Financial news (Reuters) covers ∼465,190 Fed-keyword-filtered paragraphs (2004–2025, 16 pre-2008 quarters, 72 post-2008 quarters). Mutual fund investor letters covers ∼363,463 Fed-keyword-filtered paragraphs (1994–2025, 56 pre-2008 quarters, 72 post-2008 quarters). Bank filings (10-K/10-Q) covers ∼131,431 Fed-keyword-filtered paragraphs (1999–2025, 33 pre-2008 quarters, 72 post-2008 quarters). Δ Mean is the change in the quarterly mean from pre-2008 to 2008–2025. Welch's t-test for unequal variances. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.2 Investors Track the Fed

Table 5 reports pairwise correlations between the Fed index and each market source, category by category, along with the corresponding FRED observable quantity where one exists. Across all four intervention categories, market attention tracks the Fed's own communications closely. Balance sheet and lending facility indices are strongly correlated across all sources (0.62–0.86), with bank filings showing the highest agreement with both the Fed index and FRED quantities for these categories. Swap line correlations are strong between Fed and financial news (0.78) but weaker for investor letters (0.30), con-

sistent with fund managers paying less attention to dollar funding operations that do not directly affect their portfolios. Regulation shows the weakest cross-source agreement (0.16–0.66), likely because regulatory language means different things to different audiences — a bank CFO discussing stress test compliance faces different incentives than a journalist covering Dodd-Frank rulemaking.

5. Communication and Expectations

As Bernanke (2013) put it: "The public's expectations about future monetary policy actions matter today because those expectations have important effects on current financial conditions." This logic, developed for the federal funds rate, applies with equal force to non-rate tools. If the Fed's balance sheet policy, lending facilities, and regulatory posture affect asset prices (as we show in Section 6), then expectations about their future use should matter too. This section documents that both sides manage these expectations actively: the Fed signals its intent, market participants form forward-looking views, and the Fed monitors how those views evolve.

5.1 The Fed Signals Expectations of Future Use

We classify each Fed non-rate paragraph as describing a concrete policy *action* ("purchased," "established," "launched") or a *signal* of future intent ("prepared to," "stands ready," "will if conditions warrant"). Figure 7 plots the stacked category decomposition separately for actions and signals. The two panels reveal a striking asymmetry. Actions are concentrated in crisis episodes: sharp spikes in 2008–2009 and 2020, dominated by lending facilities and balance sheet operations, with rapid declines once the acute phase passes. Signals, by contrast, are smoother and more persistent. Two examples make the distinction concrete. On March 23, 2020, the Fed announced it "will establish new programs that, taken together, will provide up to $300 billion in new financing," a concrete action creating the PMCCF and SMCCF. On February 10, 2009, the Fed announced it was

Table 5: Cross-Source Correlations by Intervention Category.

Panel A: Balance Sheet

	Fed	Funds	Fin News	Banks	Quantity
Fed	1.00				
Funds	0.71***	1.00			
Fin News	0.65***	0.70***	1.00		
Banks	0.86***	0.84***	0.67***	1.00	
Quantity	0.82***	0.44***	0.28**	0.67***	1.00

Panel B: Lending Facilities

	Fed	Funds	Fin News	Banks	Quantity
Fed	1.00				
Funds	0.73***	1.00			
Fin News	0.85***	0.71***	1.00		
Banks	0.65***	0.62***	0.64***	1.00	
Quantity	0.78***	0.67***	0.66***	0.81***	1.00

Panel C: Regulation

	Fed	Funds	Fin News	Banks
Fed	1.00			
Funds	0.16*	1.00		
Fin News	0.66***	0.19*	1.00	
Banks	0.37***	0.21**	0.29***	1.00

Panel D: Swap Lines

	Fed	Funds	Fin News	Banks	Quantity
Fed	1.00				
Funds	0.30***	1.00			
Fin News	0.78***	0.42***	1.00		
Banks	0.44***	0.22**	0.49***	1.00	
Quantity	0.57***	0.18*	0.72***	0.49***	1.00

Notes: Pearson correlations between quarterly text-based indices across sources, by intervention category. Fed: Federal Reserve documents. Funds: mutual fund investor letters. Fin News: financial news (Reuters). Banks: 10-K/10-Q filings. Quantity: observable FRED series — WALCL/GFDEBTN year-over-year change (BS), borrowings from the Fed (LF), central bank liquidity swaps (SW). No observable quantity series exists for regulation. Balance sheet uses year-over-year changes in cumulative net direction; other categories use detection-weighted mentions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

"prepared to undertake a substantial expansion" of the TALF that "could increase the size to as much as $1 trillion." No facility was expanded that day. The signal itself was the policy.

This pattern is systematic (Figure 7). The Fed continues discussing its readiness to intervene long after the intervention has ended, because managing expectations about non-rate tools is itself a policy instrument.

5.2 Market Participants Build Expectations

The Fed is not the only side forming expectations. Market participants actively anticipate non-rate interventions and position around them. We classify each market non-rate paragraph as *factual* (reporting on Fed actions that have already occurred) or *speculative* (discussing anticipated, conditional, or forward-looking Fed actions).

The speculative paragraphs reveal the expectations channel at work. In December 2008, weeks before the first QE announcement, financial news (Reuters) reported that "the Fed is widely expected to use so-called quantitative measures to pump up financial market liquidity." The expectations channel ran in both directions: by mid-2013, "investors [had] largely positioned for the Fed to start tapering its $85 billion per month of bond purchases." And in June 2020, the same anticipatory dynamic played out again: "Fund managers had turned increasingly bullish, driven by a confidence that the Fed would do whatever it takes." In situations where the Fed did act, the factual coverage captured the scale: "The Fed stunned financial markets by announcing that it was buying $300 billion in Treasury debt" (Table 13 in the appendix provides examples spanning each stage of the QE cycle).

Mutual fund investor letters show how these expectations translate into portfolio decisions. In mid-2009, one manager wrote to shareholders that the fund had "tactically extended duration…as we expect mortgages to continue to respond well to the Fed's quantitative easing program, whereby they have targeted purchases of up to $1.25 trillion in agency mortgages." Over a decade later, a different manager took the opposite side:

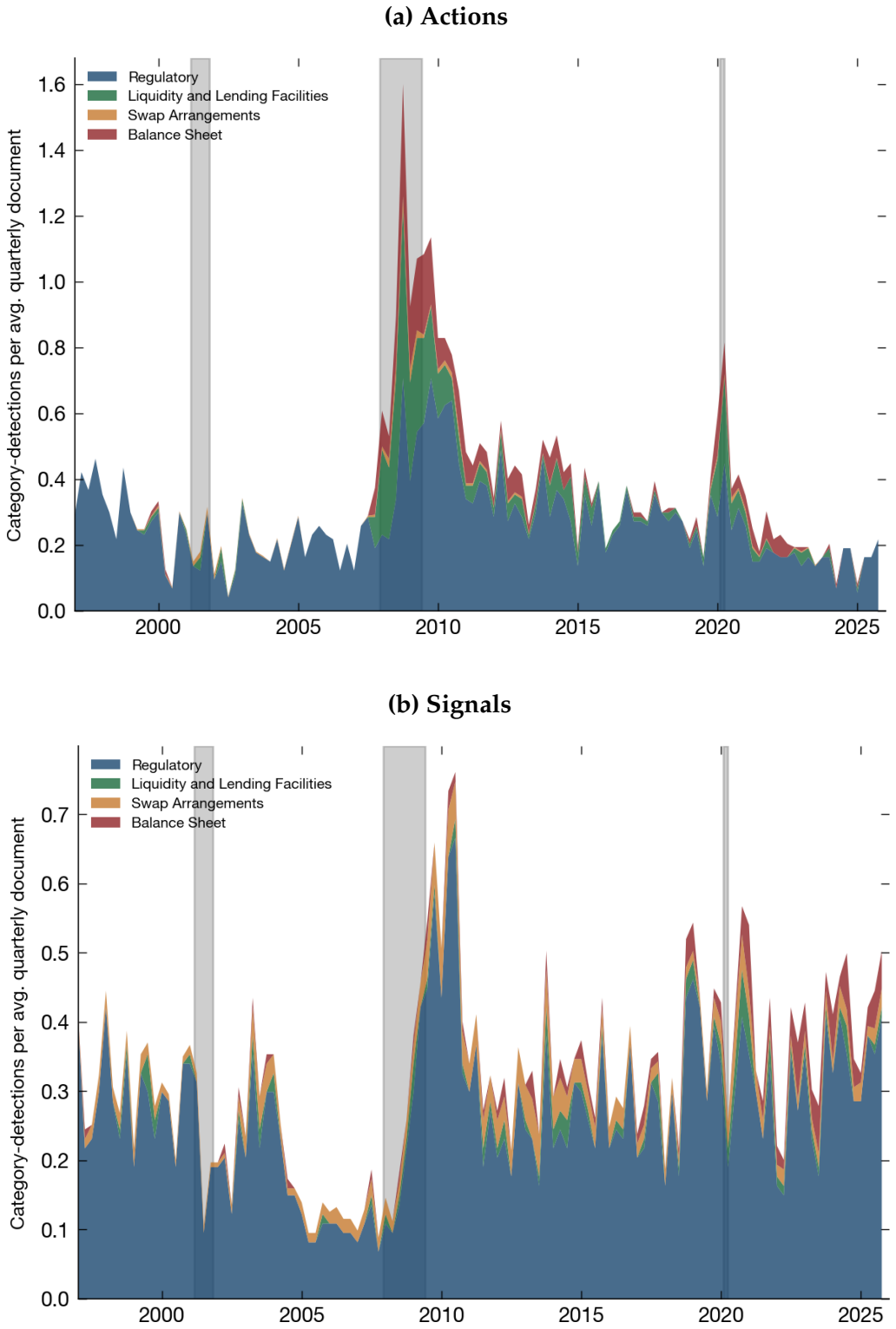


Figure 7: Fed Non-Rate Interventions: Actions vs. Signals.

Notes: Each panel decomposes Fed non-rate paragraphs into four intervention categories (stacked areas). Panel (a) includes only paragraphs classified as describing concrete policy actions already taken or decided. Panel (b) includes only paragraphs classified as signals — commitments, forward guidance, or expressions of readiness to act. Both panels use the same normalization (detections per average quarterly document).

"We remain underweight the agency MBS sector…MBS valuations are expensive given relentless purchases under the fourth phase of quantitative easing. The Fed's tapering of MBS purchases will end balance sheet expansion by March 2022." These are not passive descriptions of past Fed actions. They are forward-looking assessments that directly shape portfolio decisions — fund managers explicitly adjusting duration in response to expected QE. In Section 8, we test whether this talk translates into action by linking letter text to actual portfolio holdings (Table 14 provides additional examples spanning QE1 through QT2).

Figure 8 plots the aggregate factual and speculative non-rate series for financial news and investor letters. Three patterns stand out. First, a large share of market discussion is speculative: 85% of news non-rate paragraphs and 47% of investor letter paragraphs discuss anticipated rather than realized Fed actions. Second, the speculative share is higher in calm periods (90% in news, 53% in investor letters) than during crises (75% and 31%), when factual reporting on actual Fed interventions naturally spikes. Third, speculative coverage is more persistent than factual coverage. The lag-one autocorrelation of monthly speculative news paragraphs is 0.62, compared to 0.39 for factual paragraphs. Investor letters show the same pattern at quarterly frequency (0.50 vs. 0.28). Speculative coverage also leads factual coverage: the correlation of speculative paragraphs at month t with factual paragraphs at month $t+1$ is 0.51, while the reverse correlation is only 0.18. Markets speculate first, the Fed acts, and then reporters describe what happened.

Figure 9 decomposes each into intervention categories.

5.3 The Fed Monitors Market Expectations

The feedback runs in both directions. The Fed does not simply broadcast policy and move on. It watches how markets interpret its non-rate actions and adjusts communication in response. The taper tantrum of 2013 is the clearest example, and FOMC transcripts from that episode read like an after-action review of a communication failure.

In June 2013, after markets sold off sharply on suggestions that the Fed might re-

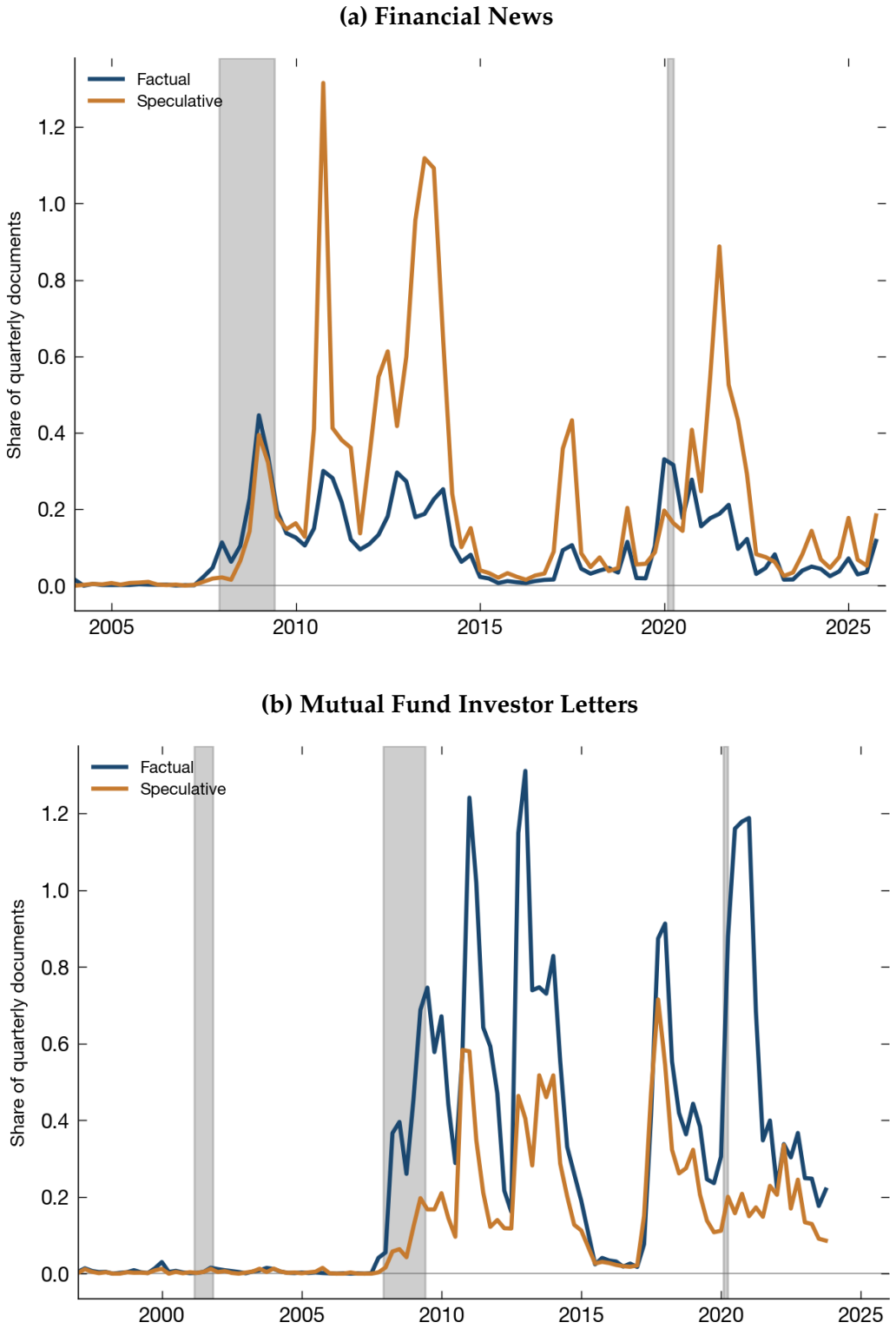


Figure 8: Factual vs. Speculative Non-Rate Discussion in Market Sources.

Notes: Quarterly non-rate paragraph detections, split by whether the paragraph discusses realized Fed actions (factual) or anticipated/conditional actions (speculative). Panel (a): financial news (Reuters), volume-adjusted. Panel (b): mutual fund investor letters (SEC filings), seasonally adjusted. Both use the same normalization as prior figures (detections per document per quarter).

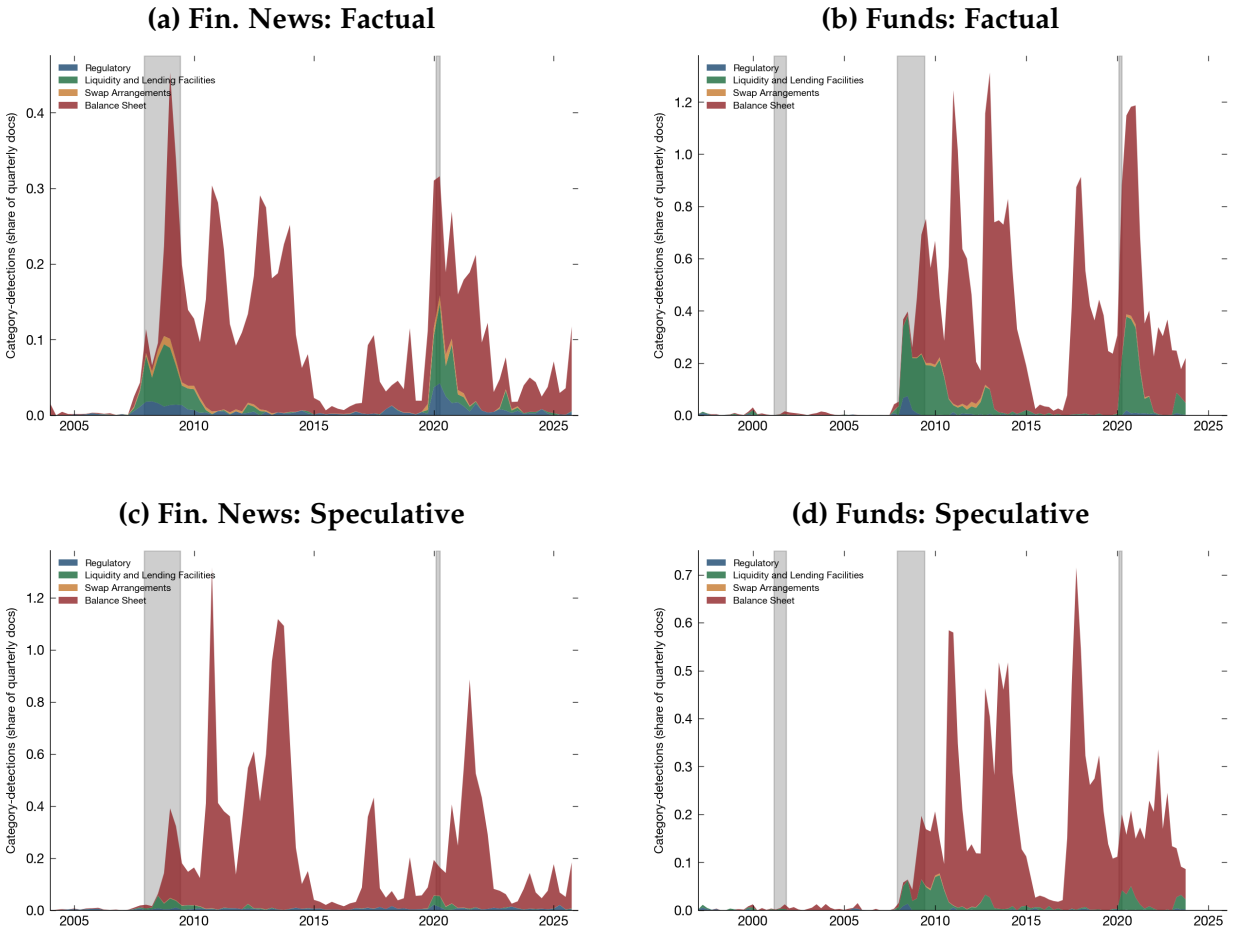


Figure 9: Factual vs. Speculative Non-Rate Discussion by Intervention Category.

Notes: Stacked area decomposition of non-rate paragraphs by intervention category, split by factual (top row) and speculative (bottom row). Left column: financial news (Reuters). Right column: mutual fund investor letters (SEC filings). Same normalization as prior figures.

duce asset purchases, Governor Stein told the Committee: "The market is not ready, and we have to solve our communication problems before we can move." President Bullard warned that the Committee risked being "interpreted as having effectively ended its asset purchase program." The Market Desk reported that "dealers are unsure about whether purchases could be reduced at the September meeting," reflecting confusion about Fed intent. By the July meeting, Fed staff summarized the damage: market participants had "interpreted [Fed communications] as pointing to a less accommodative stance of monetary policy," triggering "a substantial and abrupt pullback across many global markets

from trading strategies that had been predicated on a low and stable interest rate environment."

The lesson the Fed drew was not that tapering was wrong, but that the signal had moved ahead of the policy. Bernanke concluded: "It is critically important that in our communication we emphasize state contingency." The taper tantrum taught the Fed that for non-rate tools, communication *is* policy. The market reaction to discussing a reduction in purchases was as large as the reaction to actual reductions. This feedback loop between the supply and demand sides of our index is the mechanism through which non-rate tools affect the economy.[1]

5.4 What Drives Market Expectations?

When do market participants expect the Fed to ease via balance sheet operations? To answer this, we regress the monthly easing share of speculative news BS paragraphs on financial and macroeconomic variables, controlling for the contemporaneous factual easing share (what the Fed has actually done). Table 6 reports the results with all regressors standardized to unit variance for comparability.

Financial conditions are the dominant driver. The Chicago Fed National Financial Conditions Index (NFCI), a weighted average of 105 financial indicators spanning money markets, credit conditions, and leverage, explains nearly as much variation as the individual components combined ($R^2 = 0.63$ vs. 0.65). When we decompose it, credit spreads carry most of the predictive power; VIX and trailing stock returns add little once spreads are controlled for. The real economy adds little: the change in unemployment is insignificant in every specification. Markets treat the non-rate toolkit as a financial stability backstop that is separate from macroeconomic conditions alone.

Columns (3)–(4) add the fed funds rate and the 2-year Treasury yield. The fed funds

[1]The same feedback loop appeared in March 2020. As markets seized up, Lori Logan reported to the Committee that "liquidity remains severely impaired and markets are increasingly fragile," while President Bullard argued that "expectations will play a crucial role in how this develops." The Fed responded with open-ended asset purchases explicitly designed to stabilize expectations, not just provide liquidity.

rate enters with a positive coefficient and the 2-year yield with an equal and opposite negative coefficient. The 2-year yield minus the fed funds rate is a standard measure of the expected path of short rates: it is low when the market prices in rate cuts. The mirror-image signs therefore imply that expectations of non-rate easing move with expectations of rate easing. When markets expect the Fed to cut rates, they also expect more balance sheet intervention. But this adds modestly in R^2 terms (0.63 to 0.67). Financial conditions remain the main story. The pattern is consistent with markets treating the non-rate toolkit as a state-contingent backstop (Haddad et al., 2023): they expect the Fed to deploy these tools when financial conditions deteriorate.

6. Non-Rate Announcements Move Asset Prices

6.1 Markets Move on Non-Rate News

We test whether non-rate interventions move asset prices using a daily event study design. For each trading day, we count the number of NRR detections across the four intervention categories (balance sheet, lending facilities, swap lines, regulatory) in Fed announcement documents released that day. We then regress the absolute value of two-day $[0, +1]$ cumulative asset price changes on this NRR count, controlling for the change in the 3-month T-bill rate, an FOMC dummy, and day-of-week fixed effects. The two-day window captures both the announcement day and the following day, allowing for information that arrives after market close.

Table 7 presents the results. Panel A shows the baseline specification. NRR announcements significantly increase absolute price movements across equities, bank stocks, long-term yields, credit spreads, the dollar, and the yield curve slope. The effects are large: bank stocks move 60 basis points more per NRR detection, the broad stock market 26 basis points, and the yield curve slope steepens by 1.4 basis points. The one notable non-result is the 2-year yield, which does not respond — suggesting that non-rate tools steepen the curve by moving long rates without affecting the short end, the signature of

Table 6: What Drives Speculative Easing Expectations?

	(1)	(2)	(3)	(4)
Financial conditions	0.058***		0.091***	
	(0.018)		(0.024)	
VIX		0.039		0.044*
		(0.031)		(0.027)
Credit spread		0.093**		0.101***
		(0.040)		(0.035)
Trailing 6M stock return		0.034		0.015
		(0.025)		(0.020)
Δ Unemployment			0.009	0.001
			(0.008)	(0.007)
Fed funds rate			0.314***	0.314***
			(0.110)	(0.099)
2-year Treasury yield			−0.354***	−0.317***
			(0.121)	(0.102)
Factual easing share	Yes	Yes	Yes	Yes
N	205	205	204	204
R^2	0.628	0.652	0.670	0.690

Notes: Each column is an OLS regression of the speculative balance sheet easing share on the indicated variables, with Newey-West HAC standard errors (6 lags) in parentheses. The dependent variable is the monthly share of speculative financial news paragraphs about balance sheet operations that discuss easing (as opposed to tightening). All regressors are standardized to unit variance, so coefficients represent the effect of a one-standard-deviation increase. All columns control for the factual easing share (the share of factual paragraphs discussing easing). Financial conditions is the Chicago Fed National Financial Conditions Index (NFCI), a weighted average of 105 financial indicators. Columns (1)–(2) compare the NFCI against individual financial stress measures. Columns (3)–(4) add the change in unemployment, the fed funds rate, and the 2-year Treasury yield. The opposite signs on the fed funds rate and the 2-year yield imply that expectations of non-rate easing rise when the yield curve signals future rate cuts. Sample: monthly, 2008–2025, restricted to months with at least 5 speculative balance sheet paragraphs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

a term premium channel rather than rate expectations.

Economic magnitudes. Because the FOMC dummy and NRR count enter the same regression, we can decompose a typical FOMC day into rate and non-rate components. Before 2008, the average NRR count on FOMC days is just 0.25 — meetings were almost entirely about rates. After 2008, the average jumps to 0.93. Using the full-sample co-

efficients, the stock market reaction on a typical post-2008 FOMC day decomposes into $26 \times 0.93 \approx 24$ basis points from non-rate content and 20 basis points from the FOMC residual. Non-rate content accounts for over half the total.

For bank stocks the split is more dramatic: $60 \times 0.93 = 56$ basis points from non-rate content versus 14 from the FOMC residual, meaning non-rate tools drive 80 percent of the bank stock reaction on a typical post-2008 FOMC day. For credit spreads, non-rate content accounts for 77 percent of the total ($0.81 \times 0.93 = 0.76$ bps versus the 0.22 FOMC residual). For the yield curve slope, NRR accounts for about a third ($1.42 \times 0.93 = 1.32$ bps versus 2.32 from the FOMC residual). The NRR share is smaller for the slope because rate decisions also steepen or flatten the curve, but it is still substantial. Before 2008, these shares were all small — the FOMC day effect was almost entirely about rates.

The 2-year yield sharpens the interpretation. The FOMC dummy moves 2-year yields by 1.37 basis points ($p < 0.01$), reflecting the expected rate path, but NRR adds essentially nothing. The FOMC day effect on short rates is entirely rate-related, before and after 2008. So NRR steepens the curve by moving the long end without moving the short end — exactly the signature of a term premium channel.

Panel B adds a rate-related (RR) detection count as a horse-race control. The NRR coefficients are virtually unchanged, and the RR coefficients are mostly insignificant — the asset price responses are driven by non-rate content, not rate-related language in the same documents. The FOMC dummy becomes insignificant across the board once both NRR and RR are controlled for, indicating that the text-based measures fully account for the "FOMC day effect."

Panel C provides the toughest robustness test: controlling for each outcome's own 22-day realized volatility lagged 5 trading days. This absorbs variation from high-volatility regimes in which both NRR activity and market moves tend to be elevated. The NRR coefficients attenuate — roughly by half for equities — but survive across all key assets. The FOMC dummy remains significant and strengthens slightly, consistent with FOMC meetings generating genuine news beyond what realized volatility would predict.

Table 7: Asset Price Responses to Non-Rate Fed Interventions.

	(1) |Stocks|	(2) |Banks|	(3) |10Y|	(4) |2Y|	(5) |Slope|	(6) |Credit|	(7) |Dollar|
Panel A: Non-Rate Only							
Non-rate	26.03***	60.36***	0.84***	0.04	1.42***	0.81**	8.53***
	(4.93)	(9.69)	(0.31)	(0.22)	(0.46)	(0.35)	(2.68)
FOMC day	20.44**	14.02	1.50***	1.37***	2.32***	0.22	14.36***
	(8.07)	(14.36)	(0.42)	(0.41)	(0.65)	(0.32)	(3.80)
N	7,026	6,414	5,121	5,121	6,956	5,119	4,288
R^2	0.023	0.031	0.018	0.016	0.029	0.025	0.023
Panel B: Non-Rate + Rate-Related Horse Race							
Non-rate	25.26***	59.98***	0.80***	0.04	1.36***	0.80**	7.71***
	(4.90)	(9.72)	(0.31)	(0.22)	(0.46)	(0.36)	(2.57)
Rate-related	21.58*	10.88	0.91	0.22	1.56*	0.30	15.57**
	(12.07)	(18.94)	(0.62)	(0.59)	(0.86)	(0.30)	(6.49)
FOMC day	−3.86	1.77	0.48	1.12	0.57	−0.12	−3.38
	(14.61)	(22.88)	(0.75)	(0.82)	(1.03)	(0.37)	(7.59)
N	7,026	6,414	5,121	5,121	6,956	5,119	4,288
R^2	0.024	0.031	0.019	0.016	0.031	0.025	0.027
Panel C: Non-Rate + Realized Volatility Control							
Non-rate	6.23*	17.51***	0.56**	0.06	0.92**	0.59*	6.04**
	(3.46)	(6.71)	(0.29)	(0.20)	(0.45)	(0.35)	(2.55)
FOMC day	24.04***	27.98**	1.63***	1.64***	2.46***	0.51	15.45***
	(7.26)	(12.95)	(0.40)	(0.39)	(0.63)	(0.31)	(3.93)
RVol control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7,012	6,398	5,031	5,031	6,941	5,029	4,175
R^2	0.181	0.237	0.069	0.153	0.106	0.107	0.082

Notes: Each column is a separate OLS regression of absolute two-day $[0, +1]$ cumulative outcomes on NRR detection counts and controls. Returns in basis points ($\times$10,000); yield, spread, and slope changes in basis points ($\times$100). *NRR total* = number of intervention categories detected (0–4: balance sheet, lending facilities, swap lines, regulatory) summed across all Fed announcement documents on each date. *RR count* = number of documents classified as discussing rate-related policy. *FOMC day* = indicator for scheduled FOMC meeting dates. Both NRR and RR are zero on non-event days. Slope = 10-year minus 3-month yield. Controls in all panels: Δ(3-month T-bill), day-of-week fixed effects. Panel C additionally controls for each outcome's own 22-day rolling realized volatility lagged 5 trading days. The standard deviation of NRR total is 0.52 (mean 0.17); mean NRR on FOMC days is 0.66. Sample: 1996–2026, all trading days. Newey-West HAC standard errors (5 lags) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6.2 The Return Signature of Non-Rate vs Rate News

The horse-race specification in Panel B sharpens the distinction between non-rate and rate channels. NRR is significant for equities, bank stocks, the 10-year yield, credit spreads, the dollar, and the yield curve slope. RR is mostly insignificant, entering significantly only for the dollar and marginally for equities and the slope. The assets that respond to NRR — long-term yields, credit spreads, the slope, bank stocks — are prices that reflect term premia, intermediary health, and broad financial conditions. The 2-year yield, which reflects the expected path of the policy rate, does not respond in any specification. For long yields, the interpretation is clean: the 2-year yield is flat, so the long end moves without a change in expected short rates. For equities and credit spreads, the evidence points to a risk premium channel, though separating it from cash flow effects is harder.

6.3 Do Non-Rate Announcements Move Prices in the Right Direction?

The unsigned regressions in Table 7 establish that markets move more on NRR days, but not whether they move in the right direction. Table 8 provides a systematic test. For each Fed announcement on date t, we count financial news (Reuters) paragraphs appearing in the contemporaneous $[t, t+1]$ window that discuss each intervention category, classifying each paragraph as easing or tightening. The directional signal is the net count of easing minus tightening paragraphs.[2] We scale each category's signal by its standard deviation on news days (days with any coverage of that category), so that coefficients represent the asset price response to a one-standard-deviation move in directional coverage.

The balance sheet signal drives the results. A one-standard-deviation BS easing signal raises stock returns (with the largest effects on bank stocks), flattens the yield curve slope, tightens credit spreads, and weakens the dollar — all in the expected direction. The swap line signal also enters significantly for equities and 10-year yields, consistent

[2]Because the news signal and the asset price change share the same $[t, t+1]$ window, this is a contemporaneous association rather than a predictive test. It tells us whether the direction of news coverage lines up with the direction of price moves around Fed announcements.

with dollar liquidity provision supporting risk assets. Lending facility and regulatory signals are mostly insignificant, unsurprising given that these categories have far fewer large directional events than balance sheet operations.

Verification using key QE dates. The signed signal lines up with well-known episodes. On March 18, 2009 — the largest QE1 expansion — the balance sheet signal registers nearly 16 standard deviations of easing coverage, and the yield curve slope flattens by 37 basis points. The initial QE1 announcement on November 25, 2008 generates a 3-standard-deviation easing signal and 28 basis points of flattening. On the other side, the June 19, 2013 taper tantrum FOMC meeting produces a 4-standard-deviation tightening signal and the slope steepens by 21 basis points. The December 2013 taper announcement (an 11-standard-deviation tightening signal, the largest in our sample) steepens the slope by 10 basis points. The one notable misfire is January 28, 2009, where an easing signal is accompanied by slope steepening — consistent with markets interpreting the FOMC statement as disappointing relative to expectations.

More broadly, across 24 canonical QE announcement dates, the average yield curve slope change on easing-signal days is -11.7 basis points, versus $+6.0$ basis points on tightening-signal days — a difference of 17.7 basis points ($t = 2.83$, $p = 0.013$; see Figure 12). The directional signal picks up exactly the pattern we would expect from balance sheet policy operating through term premia.

7. Heterogeneous Reactions to Non-Rate Interventions

The preceding sections already reveal that different market participants view non-rate interventions through different lenses: banks, mutual funds, and financial journalists all track the same broad increase in non-rate discussion after 2008, but with strikingly different category mixes (Section 4). Financial news (Reuters) tilts toward balance sheet operations; bank filings emphasize regulation; investor letters sit in between. These dif-

Table 8: Directional Asset Price Responses to Non-Rate Signals.

	(1) Stocks	(2) Banks	(3) 10Y	(4) 2Y	(5) Slope	(6) Credit	(7) Dollar
BS net	7.26^{**}	16.34^{**}	-0.43^{*}	-0.21	-0.60^{**}	0.42^{***}	-6.45^{**}
	(3.38)	(6.76)	(0.24)	(0.15)	(0.28)	(0.15)	(2.72)
LF net	-24.60	-40.81	-0.85	0.26	0.64	0.90	-0.84
	(21.49)	(39.60)	(1.09)	(0.70)	(1.32)	(0.62)	(7.85)
SW net	60.84^{***}	39.07	2.75^{**}	1.25	1.33	-1.07	-12.51
	(20.04)	(36.27)	(1.21)	(0.95)	(1.70)	(0.83)	(11.16)
REG net	4.51	8.91	0.30	0.10	0.43	-0.03	-1.63
	(5.48)	(11.37)	(0.32)	(0.27)	(0.40)	(0.23)	(3.58)
N	7,026	6,414	5,121	5,121	6,956	5,119	4,288
R^2	0.007	0.004	0.037	0.093	0.136	0.040	0.012

Notes: Each column regresses signed two-day $[0, +1]$ cumulative outcomes on financial news directional signals. All four per-category net signals (easing minus tightening paragraph counts) enter simultaneously, measured in event-day standard deviations. Returns in basis points; yield, spread, and slope changes in basis points. Slope = 10-year minus 3-month yield. Controls: Δ(3-month T-bill), FOMC dummy, day-of-week fixed effects. Sample: 2006–2026, all trading days. Newey-West HAC standard errors (5 lags) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

ferences reflect the fact that a financial journalist, a fixed income portfolio manager, and a bank CFO face different incentives and regulatory constraints.

We now go further by decomposing attention *within* each source. Banks are the direct targets of post-crisis regulation, so regulatory content should matter most to the largest, most-regulated institutions. Fixed income funds hold the securities that QE purchases and lending facilities support, so balance sheet and lending content should matter most to them relative to equity funds. International banks depend on dollar funding markets, so swap lines should matter most to them. We test these predictions using the two sources that allow clean cross-sectional splits: bank filings (by institution type) and investor letters (by fund asset class).

7.1 Bank Types

Bank filings allow us to decompose non-rate attention by institution type. We split banks into four (overlapping) groups: international banks, NY Fed primary dealers, the ten largest US bank holding companies by peak total assets, and US BHCs ranked 11–50.

Table 9 reports non-rate detections per filing by category for each group.

The largest US banks show the most dramatic increase in non-rate discussion: the top 10 US BHCs average nearly 3 non-rate paragraphs per filing after 2008, roughly double the rate for BHCs 11–50 or international banks. Regulatory content drives most of this gap, consistent with these banks being the primary targets of post-crisis stress testing, CCAR, and G-SIB capital surcharges. Swap lines, by contrast, are discussed almost exclusively by international banks and primary dealers — the institutions with direct exposure to dollar funding markets — and not at all by domestic BHCs.

Table 9: Bank Attention to Non-Rate Interventions by Institution Type.

Panel A: International & Primary Dealers

	International			Primary Dealers		
	Pre-2008	2008–2025	Δ Mean	Pre-2008	2008–2025	Δ Mean
Total NRR	0.18	0.97	0.79***	0.18	1.19	1.01***
Regulatory	0.18	0.83	0.65***	0.18	1.00	0.82***
Lending facilities	0.00	0.04	0.04***	0.00	0.03	0.03***
Swap lines	0.00	0.00	0.00***	0.00	0.01	0.01***
Balance sheet	0.00	0.10	0.10***	0.00	0.16	0.16***

Panel B: US Bank Holding Companies

	Top 10 US BHCs			US BHCs 11–50		
	Pre-2008	2008–2025	Δ Mean	Pre-2008	2008–2025	Δ Mean
Total NRR	0.17	2.87	2.71***	0.20	1.62	1.42***
Regulatory	0.17	2.46	2.29***	0.19	1.33	1.13***
Lending facilities	0.00	0.13	0.13***	0.00	0.10	0.10***
Swap lines	0.00	0.00	0.00	0.00	0.00	0.00
Balance sheet	0.00	0.30	0.30***	0.01	0.23	0.22***

Notes: Mean quarterly detecting paragraphs per filing in bank 10-K and 10-Q filings classified as discussing each non-rate intervention category. Groups are not mutually exclusive. International: 26 firms, 65,045 paragraphs (30 pre-2008 quarters, 72 post-2008 quarters). Primary Dealers: 10 firms, 18,999 paragraphs (32 pre-2008 quarters, 72 post-2008 quarters). Top 10 US BHCs: 9 firms, 11,297 paragraphs (32 pre-2008 quarters, 72 post-2008 quarters). US BHCs 11–50: 21 firms, 45,045 paragraphs (33 pre-2008 quarters, 72 post-2008 quarters). Overall bank sample: 64 firms, 131,431 paragraphs. Domestic BHC rankings are based on peak total assets in the Compustat Bank annual panel. Δ Mean is the change in the quarterly mean from pre-2008 to 2008–2025. Welch's t-test for unequal variances. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7.2 Fixed Income vs. Equity Funds

Investor letters allow us to split non-rate discussion by fund type, since each filing is associated with a specific fund. We classify funds as equity or fixed income based on their CIK filings. Figure 10 plots aggregate non-rate mentions separately for each fund type. Figure 11 in the appendix provides the per-category breakdown. Table 10 reports the pre/post comparison by category.

Fixed income funds discuss non-rate interventions slightly more than equity funds across every category, with the largest gap in lending facilities (0.08 vs. 0.06 detections per filing). This makes sense given the direct impact channel: QE purchases Treasuries and MBS, and lending facilities affect credit spreads, so fixed income managers have the most to say. But the differences are small. Equity funds show nearly identical balance sheet discussion (0.42 vs. 0.43), suggesting that fund managers view QE as affecting equity valuations too. This is consistent with reaching-for-yield dynamics pushing investors into riskier assets and with the effect of lower long-term discount rates on equity prices.

Table 10: Investor Attention to Non-Rate Interventions by Fund Type.

Panel A: By Fund Asset Class

	Equity Funds			Fixed Income Funds		
	Pre-2008	2008–2025	Δ Mean	Pre-2008	2008–2025	Δ Mean
Total NRR	0.01	0.46	0.45***	0.01	0.48	0.47***
Regulatory	0.00	0.01	0.00***	0.00	0.01	0.01***
Lending facilities	0.00	0.06	0.05***	0.00	0.08	0.07***
Swap lines	0.00	0.00	0.00***	0.00	0.00	0.00***
Balance sheet	0.01	0.42	0.42***	0.00	0.43	0.42***

Notes: Mean quarterly detecting paragraphs per filing in mutual fund investor letters classified as discussing each non-rate intervention category. Fund asset class (equity vs. fixed income) is classified at the CIK level using Gemini 2.5 Flash-Lite based on a sample of each fund's filings. Equity Funds: 3,036 fund CIKs, 231,608 paragraphs (56 pre-2008 quarters, 72 post-2008 quarters). Fixed Income Funds: 1,654 fund CIKs, 104,589 paragraphs (56 pre-2008 quarters, 72 post-2008 quarters). Overall investor letter sample: ∼363,463 paragraphs. Δ Mean is the change in the quarterly mean from pre-2008 to 2008–2025. Welch's t-test for unequal variances. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

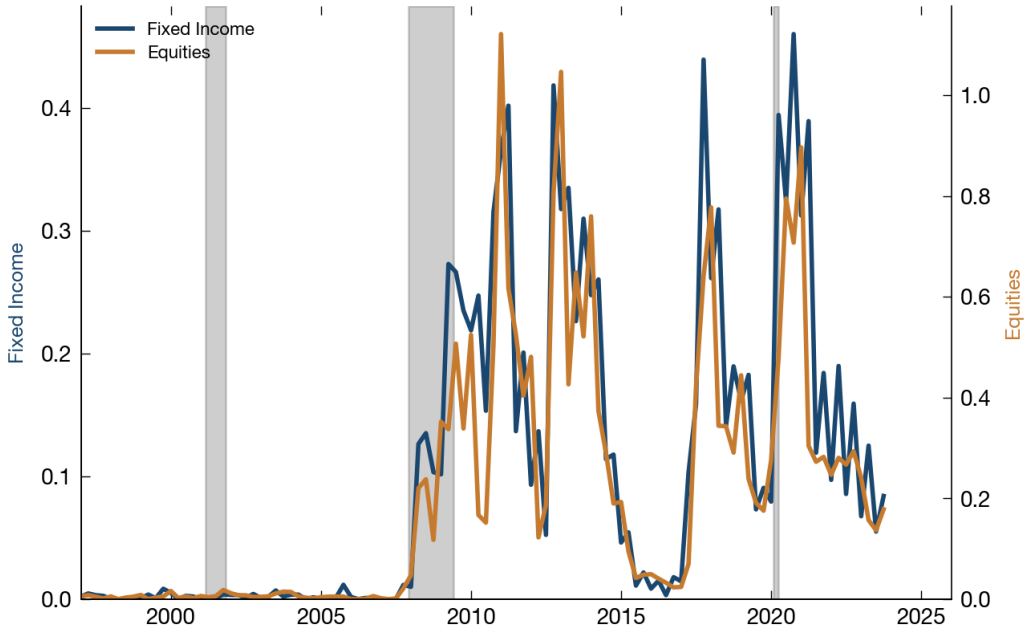


Figure 10: Non-Rate Discussion by Fund Type: Equity vs. Fixed Income.

Notes: Quarterly non-rate paragraph detections from mutual fund investor letters, split by fund type (equity vs. fixed income). Fund types are classified by CIK using Gemini 2.5 Flash-Lite. Same normalization as prior figures.

8. Expectations Predict Portfolio Repositioning

The previous sections show that non-rate interventions move asset prices. A natural follow-up: do investors actually reposition their portfolios in response? The fund letter excerpts in Section 5.2 suggest they do — managers describe extending duration into QE and shortening it ahead of tapering. We test this directly by linking the text of mutual fund shareholder letters to the funds' actual portfolio holdings from CRSP.

8.1 Matching Letters to Holdings

We match each fund's shareholder letter text to its weighted-average portfolio maturity from CRSP at the quarterly frequency. The key variable is the *balance sheet paragraph share*: the fraction of all paragraphs in a fund's letter classified as discussing balance sheet easing or tightening, using our standard classification pipeline. We use shares rather than raw

paragraph counts to control for fund verbosity — a long letter that mentions QE once is different from a short letter devoted entirely to it. We take first differences of both the text variable and the maturity variable to isolate within-fund changes, and include fund fixed effects. We control for ΔVIX to absorb time-varying risk conditions; the VIX coefficient is not reported in the table but enters positively and significantly across all specifications. The sample ends in 2023 to avoid the thin coverage in the most recent filings.

The specification is:

$$\Delta \text{wa_maturity}_{i,t} = \alpha_i + \beta\, \Delta \text{BS Net Share}_{i,t} + \gamma\, \Delta \text{VIX}_t + \varepsilon_{i,t} \tag{1}$$

where $\text{BS Net Share}_{i,t}$ is the difference between BS easing and BS tightening paragraph shares in fund i's letter in quarter t, and $\text{wa_maturity}_{i,t}$ is the CRSP weighted-average portfolio maturity in years. Standard errors are clustered by fund.

8.2 Expected Future Easing Drives Portfolio Duration

Table 11 reports the results. Columns (1)–(2) winsorize the dependent variable at the 1st and 99th percentiles; columns (3)–(4) use the raw variable. In each panel, column (1)/(3) uses the net BS share (easing minus tightening) and column (2)/(4) separates the two components. Funds that shift toward more BS easing discussion in their shareholder letters also extend portfolio maturity. The net BS share coefficient is 0.95 (winsorized) and 1.50 (unwinsorized), both significant at the 5% level.

The asymmetry between easing and tightening is informative. BS easing discussion predicts maturity extension at the 5% level in both panels. BS tightening discussion has the correct (negative) sign but is not statistically significant. This pattern is consistent with a reach-for-yield channel: funds that anticipate easing extend duration to capture the lower long-term rates that QE is expected to deliver. The asymmetry also echoes the event study finding that easing announcements generate stronger asset price responses than tightening announcements — the "QE put" operates more forcefully on the easing

side.

The within-R^2 is small (0.0023 winsorized, 0.0004 without), as expected for a quarterly change regression with a single text-based predictor. The signal is in the cross-section of funds, not in time-series predictability.

Table 11: Balance Sheet Expectations and Portfolio Maturity

	Winsorized (1/99)		No Winsorization	
	(1)	(2)	(3)	(4)
Δ BS Net Share	0.951**		1.501**	
	(0.466)		(0.694)	
Δ BS Easing Share		1.335**		2.077**
		(0.668)		(1.014)
Δ BS Tightening Share		−0.429		−0.718
		(0.679)		(1.011)
Observations	17,103	17,103	17,103	17,103
Funds	1,244	1,244	1,244	1,244
Fund FEs	Yes	Yes	Yes	Yes
VIX Control	Yes	Yes	Yes	Yes
Within R^2	0.0023	0.0024	0.0004	0.0005

Notes: The dependent variable is $\Delta\text{wa_maturity}_{i,t}$, the quarterly change in weighted-average portfolio maturity (in years) for fund i in quarter t. Sample excludes 2024–2025. BS Net Share is the difference between BS easing and BS tightening paragraph shares in the fund's shareholder letter (each measured as paragraphs classified in that direction divided by total paragraphs). BS Easing (Tightening) Share is the share of paragraphs classified as discussing balance sheet expansion (contraction). All specifications include fund fixed effects and control for ΔVIX (coefficient not reported). Standard errors clustered by fund are reported in parentheses. Columns (1)–(2) winsorize Δwa_maturity at the 1st and 99th percentiles; columns (3)–(4) use the raw dependent variable. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

9. Conclusion

Modern central banks are not just interest rate setters. They purchase assets, lend to banks, open swap lines, and adjust regulation. These tools reshape balance sheets, alter

risk premia, and change who can borrow on what terms. Before 2008, the Fed rarely used them and rarely discussed them. Since the financial crisis, they have become a persistent part of the toolkit, deployed in every major stress episode and sustained through periods of strong growth and positive interest rates. Market participants treat them accordingly: financial journalists, fund managers, and central bankers worldwide devote sustained attention to non-rate tools and form forward-looking expectations about their future use.

Our text-based indices provide the first comprehensive measurement of these interventions. The indices track what the Fed actually did, they reveal asset price effects that operate through a channel distinct from the expected path of short rates, and they show that market participants actively anticipate future non-rate tool use. The 2-year yield is informative: it does not respond to non-rate announcements in any specification, ruling out the conventional expectations channel and pointing to a term premium channel for long rates and a risk premium channel for equities and credit spreads.

Linking the market indices to portfolio holdings data confirms that these expectations have real consequences: funds that shift toward balance sheet easing discussion in their shareholder letters subsequently extend portfolio duration, consistent with anticipated central bank actions driving risk-taking. The distinction between actions and signals reveals that the Fed manages expectations about its non-rate toolkit as a policy instrument in its own right, with signals of future intent persisting long after crisis-era interventions end. The measurement approach can be extended further — applying the same classification to other central banks would allow cross-country comparisons of intervention intensity. The federal funds rate has a long tradition of careful measurement and theoretical analysis. The rest of what central banks do deserves the same.

References

Adrian, Tobias, Erkko Etula, and Tyler Muir, 2014, Financial intermediaries and the cross-section of asset returns, *Journal of Finance* 69, 2557–2596.

Bahaj, Saleem, and Ricardo Reis, 2022, Central bank swap lines, *Review of Economic Studies* 89, 1654–1693.

Baker, Scott R, Nicholas Bloom, and Steven J Davis, 2016, Measuring economic policy uncertainty, *Quarterly Journal of Economics* 131, 1593–1636.

Bauer, Michael D, and Eric T Swanson, 2023, An alternative explanation for the "Fed information effect", *American Economic Review* 113, 664–700.

Bernanke, Ben S, 2013, Communication and monetary policy, Speech at the National Economists Club Annual Dinner, Washington, D.C.

Bernanke, Ben S, 2020, The new tools of monetary policy, *American Economic Review* 110, 943–983.

Bu, Chunya, John Rogers, and Wenbin Wu, 2021, A unified measure of Fed monetary policy shocks, *Journal of Monetary Economics* 118, 331–349.

Caballero, Ricardo J., Tomás Caravello, and Alp Simsek, 2024, Financial conditions targeting, Working Paper 33206, National Bureau of Economic Research.

Christiano, Lawrence J., Martin Eichenbaum, and Charles L. Evans, 2005, Nominal rigidities and the dynamic effects of a shock to monetary policy, *Journal of Political Economy* 113, 1–45.

Cieslak, Anna, and Andreas Schrimpf, 2019, Non-monetary news in central bank communication, *Journal of International Economics* 118, 293–315.

Cieślak, Anna, and Annette Vissing-Jorgensen, 2021, The economics of the Fed put, *Review of Financial Studies* 34, 4045–4089.

Cochrane, John H, and Monika Piazzesi, 2002, The Fed and interest rates—a high-frequency identification, *American Economic Review* 92, 90–95.

D'Amico, Stefania, and Thomas B King, 2013, Flow and stock effects of large-scale treasury purchases: Evidence on the importance of local supply, *Journal of Financial Economics* 108, 425–448.

Del Negro, Marco, Gauti B Eggertsson, Andrea Ferrero, and Nobuhiro Kiyotaki, 2017, The great escape? A quantitative evaluation of the Fed's liquidity facilities, *American Economic Review* 107, 824–857.

Dell'Ariccia, Giovanni, Pau Rabanal, and Damiano Sandri, 2018, Unconventional monetary policies in the Euro Area, Japan, and the United Kingdom, *Journal of Economic Perspectives* 32, 147–172.

Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack, 2011, The financial market effects of the Federal Reserve's large-scale asset purchases, *International Journal of Central Banking* 7, 3–43.

Gentzkow, Matthew, Bryan Kelly, and Matt Taddy, 2019, Text as data, *Journal of Economic Literature* 57, 535–574.

Gertler, Mark, and Peter Karadi, 2011, A model of unconventional monetary policy, *Journal of Monetary Economics* 58, 17–34.

Gilardi, Fabrizio, Meysam Alizadeh, and Maël Kubli, 2023, ChatGPT outperforms crowd workers for text-annotation tasks, *Proceedings of the National Academy of Sciences* 120, e2305016120.

Greenwood, Robin, Samuel G Hanson, Jeremy C Stein, and Adi Sunderam, 2023, A quantity-driven theory of term premia and exchange rates, *Quarterly Journal of Economics* 138, 2327–2389.

Gürkaynak, Refet S, Brian Sack, and Eric T Swanson, 2005, Do actions speak louder than words? The response of asset prices to monetary policy actions and statements, *International Journal of Central Banking* 1, 55–93.

Haddad, Valentin, Alan Moreira, and Tyler Muir, 2021, When selling becomes viral: Disruptions in debt markets in the COVID-19 crisis and the Fed's response, *Review of Financial Studies* 34, 5309–5351.

Haddad, Valentin, Alan Moreira, and Tyler Muir, 2023, Whatever it takes? The impact of conditional policy promises, *American Economic Review* 113, 2064–2091.

Haddad, Valentin, Alan Moreira, and Tyler Muir, 2024, Asset purchase rules: How QE transformed the bond market, Working Paper.

Haddad, Valentin, and Tyler Muir, 2021, Are intermediary constraints priced?, *Review of Financial Studies* 34, 578–628.

Haddad, Valentin, and Tyler Muir, 2025, Market macrostructure: Institutions and asset prices, Working Paper.

Hansen, Stephen, Michael McMahon, and Andrea Prat, 2018, Transparency and deliberation within the FOMC: A computational linguistics approach, *Quarterly Journal of Economics* 133, 801–870.

Hanson, Samuel G, Anil K Kashyap, and Jeremy C Stein, 2011, A macroprudential approach to financial regulation, *Journal of Economic Perspectives* 25, 3–28.

Hanson, Samuel G, and Jeremy C Stein, 2015, Monetary policy and long-term real rates, *Journal of Financial Economics* 115, 429–448.

He, Zhiguo, and Arvind Krishnamurthy, 2013, Intermediary asset pricing, *American Economic Review* 103, 732–770.

Jiang, Zhengyang, Arvind Krishnamurthy, and Hanno Lustig, 2021, Dollar safety and the global financial cycle, *Review of Financial Studies* 34, 4526–4586.

Jiménez, Gabriel, Steven Ongena, José-Luis Peydró, and Jesús Saurina, 2014, Hazardous times for monetary policy: What do twenty-three million bank loans say about the effects of monetary policy on credit risk-taking?, *Econometrica* 82, 463–505.

Korinek, Anton, 2023, Generative AI for economic research: Use cases and implications for economists, *Journal of Economic Literature* 61, 1281–1317.

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen, 2011, The effects of quantitative easing on interest rates: Channels and implications for policy, *Brookings Papers on Economic Activity* 2011, 215–287.

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen, 2013, The ins and outs of lsaps, *Proceedings - Economic Policy Symposium - Jackson Hole* 57–111.

Lucca, David O, and Francesco Trebbi, 2009, Measuring central bank communication: An automated approach with application to FOMC statements, *NBER Working Paper* .

Manela, Asaf, and Alan Moreira, 2017, News implied volatility and disaster concerns, *Journal of Financial Economics* 123, 137–162.

Mehrling, Perry, 2010, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (Princeton University Press).

Nakamura, Emi, and Jón Steinsson, 2018, High-frequency identification of monetary non-neutrality: The information effect, *Quarterly Journal of Economics* 133, 1283–1330.

Rochet, Jean-Charles, and Xavier Vives, 2004, Coordination failures and the lender of last resort: Was Bagehot right after all?, *Journal of the European Economic Association* 2, 1116–1147.

Romer, Christina D, and David H Romer, 2004, A new measure of monetary shocks: Derivation and implications, *American Economic Review* 94, 1055–1084.

Swanson, Eric T, 2021, Measuring the effects of Federal Reserve forward guidance and asset purchases on financial markets, *Journal of Monetary Economics* 118, 32–53.

Taylor, John B, 1993, Discretion versus policy rules in practice, *Carnegie-Rochester Conference Series on Public Policy* 39, 195–214.

Woodford, Michael, 2003, *Interest and Prices: Foundations of a Theory of Monetary Policy* (Princeton University Press).

A. Data Appendix

This appendix provides additional detail on data sources, sample construction, and variable definitions. Section 2 in the main text summarizes the key design choices.

A.1 Federal Reserve Document Types

We scrape all publicly available documents from `federalreserve.gov`. Table 12 lists the document types, their codes, and sample sizes. The sample begins in 1996, when the Fed began routinely posting documents online. FOMC meeting transcripts are released with a five-year publication lag, so the transcript series ends earlier than other document types.

Table 12: Federal Reserve Document Types.

Document Type	Code	Count	Notes
Board speeches	SPCH	1,930	Speeches by Fed Governors
Press releases (general)	PR06	1,562	Facility launches, regulatory actions
Enforcement actions	ENAC	1,300	Regulatory enforcement orders
FOMC minutes	MNTS	1,195	Published 3 weeks after meeting
Banking/consumer press releases	BCRP	1,081	Bank-specific regulatory releases
Oral testimony	ORAN	656	Congressional testimony
Monetary policy operations	MNPO	554	Open market operation notices
Other Board actions/press	OBAP	441	Misc. Board announcements
FOMC meeting transcripts	FMCM	342	5-year publication lag
FOMC policy statements	FMCS	315	Post-meeting statements
Total		*9,376*	

Press releases (PR06, BCRP) and monetary policy operations (MNPO) are the primary "announcement" document types: these are where the Fed formally communicates new facilities, regulatory changes, and operational details. FOMC statements (FMCS) announce rate decisions but also contain language about non-rate tools. Minutes and transcripts provide deliberative context. Speeches reflect how individual Governors frame the policy toolkit to external audiences.

A.2 Market Source Details

Financial news (Reuters). We access the LSEG/Reuters news archive and retrieve all articles tagged with the Federal Reserve topic code. Raw articles are cleaned in three steps: (1) removal of exact and near-duplicate articles (common for wire copy), (2) filtering of articles primarily covering foreign central banks (ECB, BOJ, BOE, PBOC), and (3) removal of formulaic market wrap articles that mention the Fed only in passing. The cleaned corpus contains approximately 130,000 articles spanning 2004 to 2025.

Articles are split into paragraphs, and each paragraph is classified independently. This is necessary because a typical news article about an FOMC meeting might contain two paragraphs about the rate decision, one about asset purchases, and three about market reactions. Document-level classification would lose this granularity.

Mutual fund investor letters. We extract shareholder letters from three SEC EDGAR filing types: N-CSR (certified annual shareholder reports), N-CSRS (certified semi-annual reports), and N-30D (older shareholder reports, discontinued after 2003). The extraction pipeline uses heuristic prose detection to separate narrative commentary from tables, boilerplate, and legal disclosures, achieving a hit rate of approximately 96%.

The resulting corpus covers 219,000 filings from 6,700 CIK entities (fund families) spanning 1994 to 2026. Filing volume exhibits strong calendar seasonality due to fiscal year-end clustering. We adjust for this using X-13 ARIMA-SEATS seasonal adjustment (Census Bureau, v1.1 Build 62) applied to quarterly paragraph counts in ratio mode without differencing.

Each CIK entity is classified as equity-focused or fixed-income-focused using the fund family name and filing metadata. This allows us to decompose NRR attention by fund type in Section 7.2.

Press conference questions. FOMC press conferences have been held since April 2011, initially four times per year and expanding to eight per year in January 2019. We extract the journalist questions from Q&A transcripts, excluding the Fed Chair's answers. The frequency change is handled naturally by the document-count normalization: more conferences means more documents in the denominator, so the index measures question intensity per conference rather than total question volume.

Central bankers' speeches. The BIS Central Bankers' Speeches database contains approximately 20,000 speeches from central bankers worldwide since 1996. We exclude Federal Reserve speeches, which enter our analysis through the Fed Documents pipeline. Unlike the other market sources, we do not filter for Federal Reserve content specifically — central bankers discuss their own non-rate tools (asset purchases, swap lines, macroprudential regulation), so filtering for "Fed" would miss most of this content. Instead, we apply a broad monetary policy keyword filter to remove speeches on unrelated topics (fintech, climate, payments infrastructure), then classify the remaining documents using generic central bank prompts rather than the Fed-specific questions applied elsewhere. Classification is at the document level.

A.3 Event Study Variable Definitions

NRR total. For each trading day, we count the number of NRR detections across the four intervention categories (BS, LF, SW, REG) in Fed announcement documents (FMCS, PR06,

BCRP, MNPO) released on that date. Announcements on non-trading days (weekends, holidays) are rolled forward to the next trading day. NRR total is zero on non-event days.

RR count. The number of Fed announcement documents on that date classified as discussing rate-related policy.

Outcome variables. All outcome variables use a two-day $[0, +1]$ window: the cumulative change from market close on day -1 to market close on day $+1$. This window captures both the announcement-day reaction and the following day's response, accounting for announcements that arrive after market close. Equity and bank returns are from CRSP (value-weighted market return) and the KBW Bank Index. Treasury yields (2-year, 10-year) and the 3-month T-bill rate are from FRED. The term slope is the 10-year minus 3-month spread. Credit spreads use the BAA-10Y spread. Dollar returns use the Federal Reserve's trade-weighted major currencies index. VIX is the CBOE Volatility Index.

All return variables enter in absolute value (unsigned), except VIX which enters as the level change. Returns are scaled by 10,000 (basis points). Yield and spread changes are scaled by 100 (basis points). VIX is in index points.

Controls. All event study regressions control for: the daily change in the 3-month T-bill rate, an FOMC meeting day indicator (from the FOMC calendar), and day-of-week fixed effects (Monday through Thursday, with Friday as the omitted category). The realized volatility specification (Panel C of Table 7) additionally controls for each outcome's own 22-trading-day rolling standard deviation, lagged 5 trading days. The lag ensures the volatility measure's estimation window ends before the event date.

A.4 Fund Type Decomposition by Category

Figure 11 decomposes the fund-type split from Figure 10 into individual intervention categories.

A.5 Signed Direction Validation: Additional Evidence

Figure 12 shows the average yield curve slope change (10-year minus 3-month Treasury) on QE announcement dates, split by whether the financial news balance sheet signal is easing (net positive) or tightening (net negative). Our set of 24 canonical dates follows Krishnamurthy and Vissing-Jorgensen (2011) and Gagnon et al. (2011) for QE1 and QE2, with additional dates for Operation Twist, QE3, the taper, QT1, COVID-era QE, and QT2. Of these, 11 carry an easing signal and 9 carry a tightening signal.

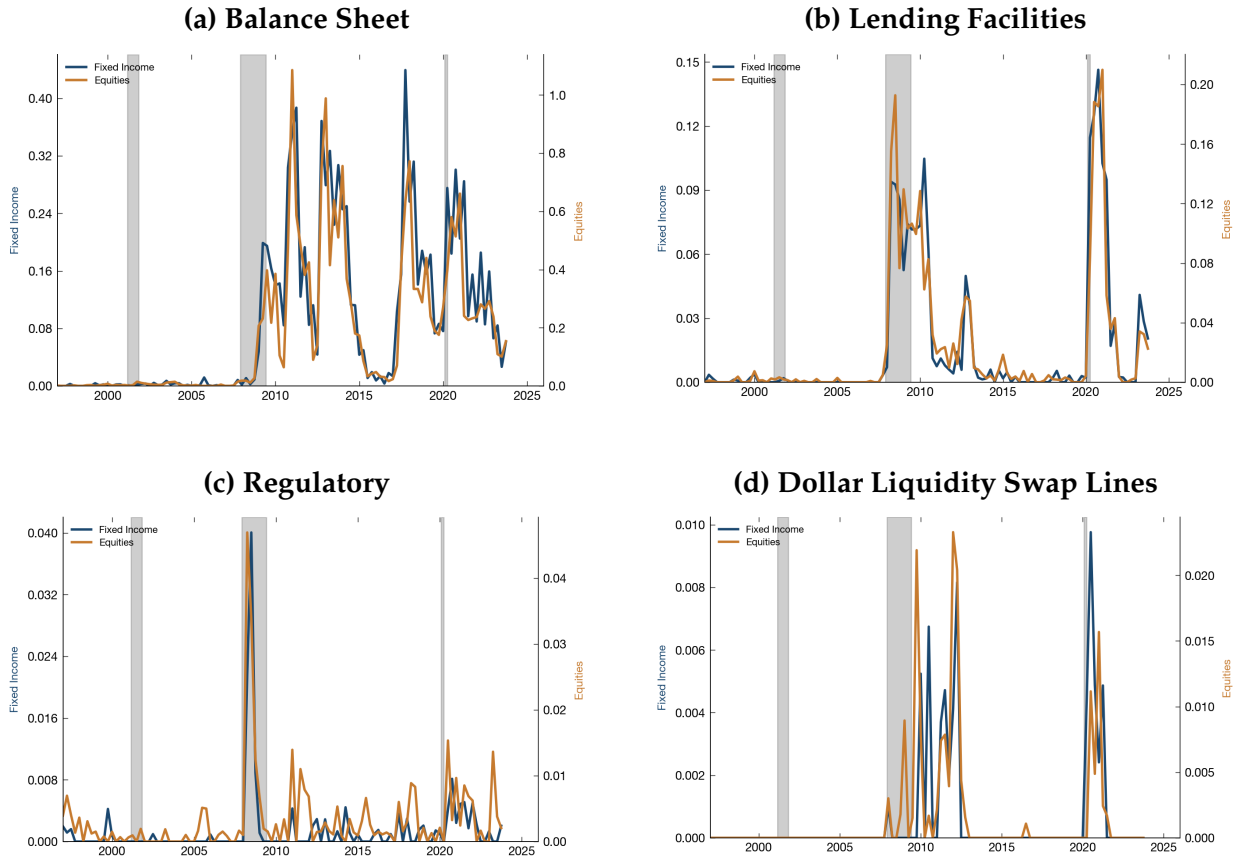


Figure 11: NRR Discussion by Fund Type and Intervention Category.

Notes: Quarterly NRR paragraph detections from mutual fund investor letters, split by fund type (equity vs. fixed income) for each intervention category. Same normalization as prior figures.

A.6 Persistence of Speculative vs. Factual Coverage

Figure 13 reports the lag-one autocorrelation of speculative and factual NRR paragraph counts for financial news (monthly) and investor letters (quarterly). Speculative coverage is substantially more persistent than factual coverage in both sources, consistent with expectations evolving more smoothly than realized Fed actions.

A.7 Representative Market Text Excerpts

Table 13 presents representative financial news paragraphs — both speculative (anticipating Fed actions) and factual (reporting on realized interventions) — spanning the major non-rate episodes. Table 14 presents the corresponding excerpts from mutual fund investor letters, where fund managers form forward-looking expectations about the Fed's balance sheet and adjust portfolio positioning accordingly.

Table 13: Representative Excerpts from Financial News.

Period	Excerpt
Panel A: Speculative — Anticipating Fed Actions	
Pre-QE1 (2008)	"The Fed is widely expected to…use so-called quantitative measures to pump up financial market liquidity and curb economic weakness."
Pre-QE2 (2010)	"Most are pricing in some $500 billion of easing, and I don't think this really changes that. I think the Fed still intervenes."
Pre-taper (2013)	"Investors have largely positioned for the Fed to start tapering its $85 billion per month of bond purchases soon, but are looking for more data to support that view."
Pre-QT (2017)	"Investors are also looking for more details on the central bank's plans to trim its $4.5 trillion balance sheet."
COVID (2020)	"Fund managers had turned increasingly bullish, driven by a confidence that the Fed would do whatever it takes, as well as a fear of missing out on the rally."
Pre-taper 2.0 (2021)	"Investors (are) bullishly positioned for permanent growth, transitory inflation and a peaceful Fed taper," said Michael Hartnett, chief investment strategist at BofA.
Panel B: Factual — Reporting on Realized Interventions	
QE1 (2009)	"The Fed stunned financial markets by announcing that it was buying $300 billion in Treasury debt over the next six months."
COVID QE (2020)	"In its latest mould-breaking step, the Fed offered to buy unlimited amounts of assets to steady markets and expanded its mandate to corporate and municipal bonds."
Fed corporate bonds (2020)	"The data showed the Fed's first-ever holdings of corporate bonds totaled just $305 million after the newest emergency facility launched by the central bank kicked off purchases."
Full toolkit (2008)	"The United States alone has pledged over $3 trillion to prop up the commercial paper market and money market mutual funds, lend to banks via the Federal Reserve's discount window, make dollars available to foreign central banks via swap lines, inject $250 billion of fresh capital into banks, and buy toxic loans."

Notes: Each row is a paragraph from a Reuters financial news article classified as discussing non-rate Fed interventions. Panel A shows speculative paragraphs — market participants forming expectations about future Fed actions before they occur. Panel B shows factual paragraphs — journalists reporting on realized interventions. Excerpts span all three major non-rate episodes (2008–2009, 2013 taper, 2020 pandemic) and both directions (expansion and withdrawal).

Table 14: Speculative Excerpts from Mutual Fund Investor Letters.

Period	Excerpt
QE1 (2009)	"We tactically extended duration on a rise in Treasury rates…as we expect mortgages to continue to respond well to the Fed's quantitative easing program, whereby they have targeted purchases of up to $1.25 trillion in agency mortgages."
QE1 ending (2009)	"The massive government buying in the mortgage-backed sector, as part of the Federal Reserve's quantitative easing program, is likely to slow over the coming months…We remain cautious on whether or not private investor support for the sector will be able to compensate as the currently insatiable government buying subsides."
QE1 ending (2010)	"There is some uncertainty surrounding the end of the Federal Reserve's MBS purchase program in March. We expect demand for mortgage-backed securities from banks and money managers to replace the Fed's purchase program but at modestly wider valuations."
Pre-QE3 (2012)	"We recognize that the Fed may resume purchases of MBS as part of a possible third round of quantitative easing (QE3)…which we expect would drive up sector valuations, and we are monitoring economic conditions, Fed comments, and investor sentiment for signs of such an event."
Taper (2014)	"We increased our overweight to high-yield bonds…as yields spiked, in part due to market overreaction to Fed Chairman Bernanke's comments about tapering its asset purchases."
Taper (2014)	"Rates in this portion of the curve are currently being dampened by Fed bond buying, and we believe intermediate-term rates will begin to rise as the central bank continues to reduce its bond purchases."
QT1 (2017)	"We have shortened its duration and reduced exposure to highly credit-sensitive debt…We also anticipate that the Fed will unwind its balance sheet by holding fewer government-agency mortgages and Treasuries. That, too, has the potential to push market interest rates higher."
QT2 (2022)	"We remain underweight the agency MBS sector…MBS valuations are expensive given relentless purchases under the fourth phase of quantitative easing. The Fed's tapering of MBS purchases will end balance sheet expansion by March 2022, and there is potential for an accelerated rundown of its balance sheet as early as the third quarter of 2022."

Notes: Each row is a speculative paragraph from a mutual fund investor letter (N-CSR or N-CSRS filing on SEC EDGAR), classified as discussing anticipated balance sheet operations. Excerpts are selected to illustrate how fund managers form forward-looking expectations and adjust portfolio positioning across the full QE cycle: entering QE, monitoring for additional rounds, navigating the taper, and preparing for quantitative tightening.

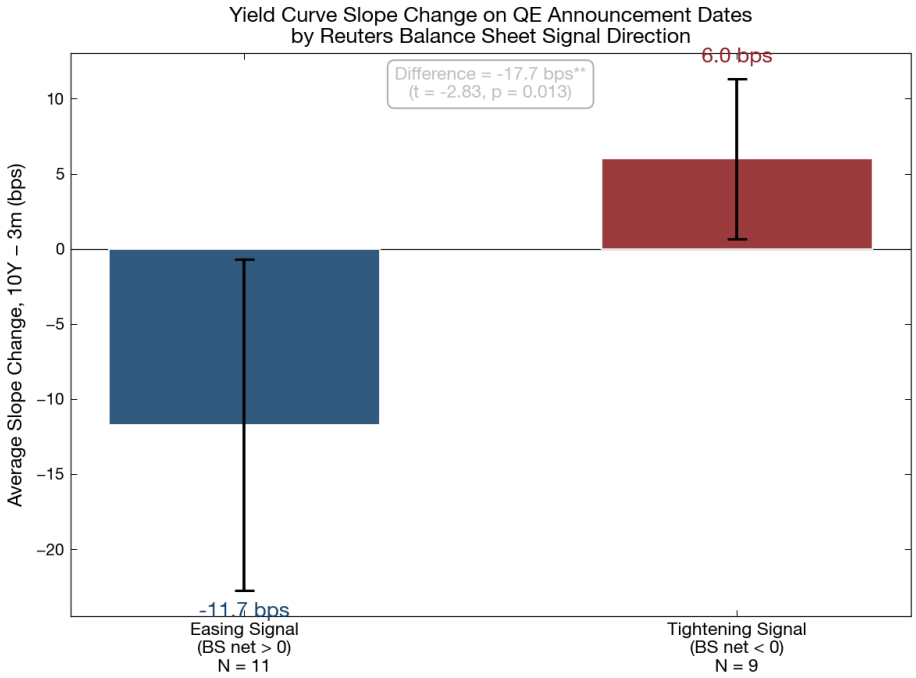


Figure 12: Yield Curve Slope Change on QE Announcement Dates by News Signal Direction. Average two-day $[0, +1]$ cumulative change in the yield curve slope (10-year minus 3-month Treasury, in basis points) on 24 canonical QE announcement dates, split by whether the financial news balance sheet signal is net easing or net tightening. Error bars show 95% confidence intervals. The 17.7 basis point difference is significant at the 1% level ($t = 2.83$, $p = 0.013$).

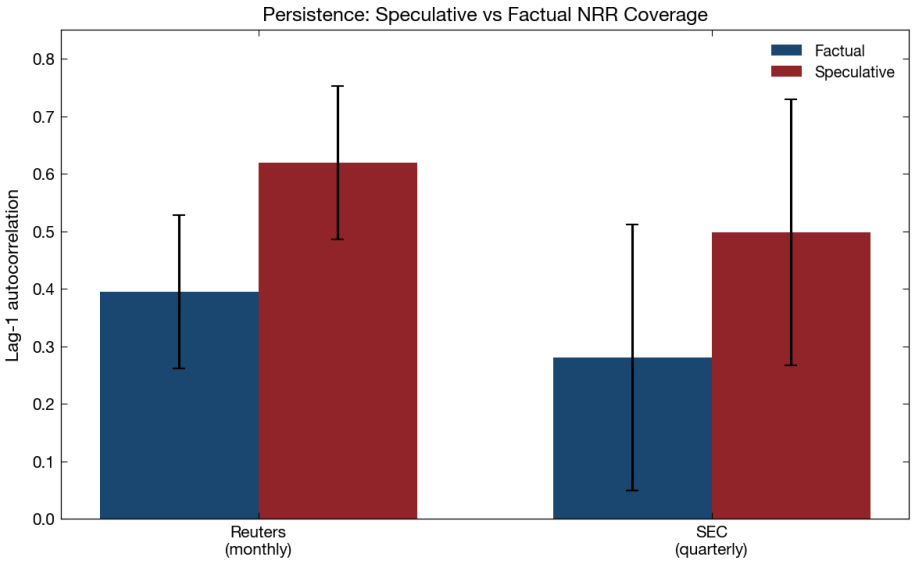


Figure 13: Persistence of Speculative vs. Factual NRR Coverage. Lag-one autocorrelation of monthly (financial news) and quarterly (mutual fund) NRR paragraph counts, split by factual and speculative classification. Error bars show 95% confidence intervals.

B. Methodology Appendix

This appendix provides the full specification of the text classification pipeline, including the exact questions used, model details, and the document-type reweighting methodology. Section 2.2 in the main text summarizes the approach.

B.1 Classification Model and Parameters

All classifications use Google's Gemini 2.5 Flash-Lite at temperature 0.0 (deterministic output). We chose this model for three reasons: it processes long documents reliably, it is inexpensive enough to run on the full corpus, and its structured output mode returns clean categorical responses without post-processing. Each document or paragraph is sent as a single prompt with the classification question and the full text. There is no fine-tuning: we rely on the model's pre-trained understanding of central bank policy language.

Temperature 0.0 ensures reproducibility. Running the same document through the classifier twice produces the same output. We verified this on a random subsample of 500 documents.

B.2 Classification Questions: NRR Categories

The Fed classification uses a battery of binary questions for each intervention category. Each question is designed to be concrete and specific, with explicit inclusion and exclusion criteria to reduce ambiguity.

Balance Sheet (BS). Two-stage classification. The first stage asks eight binary questions about specific balance sheet actions: Treasury purchases, MBS purchases, balance sheet expansion framing, shrinkage framing, dollar amounts, open-ended language, and named program references (LSAP, QE, Operation Twist). The key expansion question is:

> *Does this paragraph indicate the Federal Reserve will expand or increase the size of its balance sheet?*

These are used to determine direction: documents discussing expansion or purchases are coded as easing (+1), while documents discussing runoff, normalization, or sales are coded as tightening (-1).

Lending Facilities (LF). Two questions. The detection question asks:

> *Does this document describe the Federal Reserve establishing, reestablishing, activating, reactivating, modifying, extending, or allowing the expiration of a lending, credit, or liquidity facility?*

The inclusion list covers creation of new facilities (TALF, CPFF, PDCF, MMLF, Main Street), renewals, expansions in eligible collateral or borrowers, changes to terms or pricing, Treasury credit protection, and wind-downs or closures. The direction question codes establishment and expansion as easing (+1), and expiration, wind-down, and reduction as tightening (-1).

Swap Lines (SW). Two questions with similar structure. The detection question requires a *concrete action or decision*, not merely discussion or deliberation:

> *Does this document announce, authorize, or formally decide to establish, reestablish, activate, reactivate, modify, extend, or allow the expiration of a currency swap arrangement with one or more foreign central banks?*

The exclusion criteria are important here: speeches that discuss swap arrangements without announcing a decision, FOMC transcript deliberations about whether to establish swaps, and retrospective analysis of past swap activity are all excluded. Direction follows the same easing/tightening logic.

Regulatory (REG). Two questions. The detection question specifically targets *discretionary* regulatory action, distinguishing it from mechanical implementation of congressional mandates:

> *Does this document describe regulators choosing to adjust, relax, tighten, or modify a rule, beyond what is strictly required by statute?*

This distinction matters for measuring Fed policy activism. Implementing Dodd-Frank requirements is qualitatively different from choosing to temporarily relax the supplementary leverage ratio during a crisis. The inclusion list covers new rulemaking where the agency had discretion, amendments to existing regulations, changes to supervisory guidance, modifications to capital or liquidity requirements, and changes to stress testing frameworks. Direction codes loosening as easing (+1) and tightening as tightening (-1).

B.3 Additional Classification Dimensions

Rate-related (RR) detection. A single binary question:

> *Does this document discuss Federal Reserve interest rate policy, including federal funds rate decisions, rate targets, rate guidance, forward guidance on rates, or the path of short-term interest rates?*

Action vs. signal. A ternary classification ($+1/0/-1$):

> *Does this document describe a concrete policy action that has been taken, is being taken, or has been decided, or does it describe a commitment, signal, or readiness to act in the future?*

Actions are coded as +1. This category covers not only past actions ("purchased," "established") but also decisions that have been made or are being implemented: "authorized," "decided to purchase," "will buy $80 billion per month." The key criterion is that the policy has been decided or is underway, not that it is already complete. Signals are coded as -1: forward-looking commitments or expressions of readiness where no specific action has been decided. Examples include "prepared to," "stands ready," "will if conditions warrant," "committed to using its full range of tools," "act as appropriate," and "for as long as needed."

Factual vs. speculative (market text). Two separate binary questions classify each market paragraph. The factual question identifies text that "discusses Federal Reserve interventions that have already been announced, implemented, or completed." The speculative question identifies text that "discusses anticipated, expected, or conditional Federal Reserve interventions" with "forward-looking, conditional" framing or "market positioning based on anticipated policy."

B.4 Worked Example: How the Classifier Scores a Document

To make the classification concrete, we show how the pipeline scores the FOMC statement from March 23, 2020, which announced open-ended asset purchases and new credit facilities in response to the COVID-19 crisis. The statement begins:

> *The Federal Reserve is committed to use its full range of tools to support the U.S. economy in this challenging time…The Federal Open Market Committee is taking further actions to support the flow of credit to households and businesses by addressing strains in the markets for Treasury securities and agency mortgage-backed securities. The Federal Reserve will continue to purchase Treasury securities and agency mortgage-backed securities in the amounts needed to support smooth market functioning…*

The classifier processes this document through the full battery of questions and returns:

Question	Answer	Reasoning
Balance sheet: expansion?	Yes (1)	"will continue to purchase…in the amounts needed"
Balance sheet: contraction?	No (0)	No mention of reducing or unwinding purchases
Lending facilities?	No (0)	Credit facilities announced in a separate release
Swap arrangements?	No (0)	No mention of currency swaps
Regulatory?	No (0)	No regulatory action
Action or signal?	Action (+1)	"is taking further actions," "will continue to purchase"
Rate-related?	No (0)	Rate held at 0–0.25% but this is not the focus

The document is classified as NRR (non-rate-related), specifically a balance sheet expansion action. It contributes to the BS sub-index for 2020Q1. By contrast, a financial

news paragraph from December 2008 stating that "the Fed is widely expected to use so-called quantitative measures to pump up financial market liquidity" would be classified as BS easing (speculative): the same policy category, but forward-looking rather than describing a realized action.

B.5 Document-Type Reweighting

Fed document types vary widely in frequency. Without adjustment, the index would be dominated by the most frequent types (speeches, press releases) and insensitive to infrequent but informative types (FOMC statements, facility announcements).

We compute weights as follows. For each document type d and calendar quarter $q \in \{1, 2, 3, 4\}$, let $n_{d,q,y}$ be the number of documents of type d in calendar quarter q of year y. The average quarterly count for type d is:

$$\bar{n}_d = \frac{1}{4} \sum_{q=1}^{4} \left(\frac{1}{|\mathcal{Y}|} \sum_{y \in \mathcal{Y}} n_{d,q,y} \right)$$

where $\mathcal{Y}$ is the set of years in the sample. Each document of type d receives weight $w_d = 1/\bar{n}_d$. The weighted quarterly sum for any detection variable x_i is then:

$$\text{Index}_Q = \sum_{i \in Q} x_i \cdot w_{d(i)}$$

where the sum runs over all documents i in quarter Q and $d(i)$ is the document type of document i.

This ensures that a quarter in which 100% of FOMC statements discuss balance sheet operations contributes the same amount to the index as a quarter in which 100% of speeches discuss balance sheet operations, regardless of how many speeches versus statements were published.

B.6 Market Text Normalization

Market sources are normalized by document volume. For source s in quarter Q, let $D_{s,Q}$ be the number of unique source documents (articles or filings) and $\text{det}_{s,Q}$ be the count of paragraphs detecting a given category. The normalized index is:

$$\text{Index}_{s,Q} = \frac{\text{det}_{s,Q}}{D_{s,Q}}$$

This measures detections per article (or per filing), controlling for time-varying publication volume.

For investor letter filings, the raw ratio $\text{det}_{s,Q}/D_{s,Q}$ is further divided by the X-13 seasonal factor S_Q estimated from the quarterly filing count series. This removes calendar-driven filing seasonality (funds with December fiscal years file annual reports in Q1, creating predictable spikes).

For swap line series across all sources, a centered four-quarter moving average is applied after normalization to smooth the inherently lumpy timing of swap line activations and expirations.