

Evaluating the impact of FOMC Communications on Asset Prices

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1 Code Availability

All code and replication materials for this study are publicly available at:

https://github.com/lingtouyangLeo/FOMC_AssetPrice_Effect

2 Abstract

This report evaluates how the *hawkishness* or *dovishness* of FOMC communications is reflected in major financial markets since October 2020. We construct tone factors using FinBERT-based sentence embeddings and cosine similarity, and relate them to one-day market reactions in U.S. Treasuries, the U.S. Dollar, and the Growth–Value equity spread. Ordinary least squares (OLS) with heteroskedasticity-robust standard errors is employed. We find directionally intuitive responses—hawkish tone flattens the yield curve, lifts short-term yields, strengthens the dollar, and narrows the Growth–Value spread—although statistical significance is generally modest in the 2020–2025 sample.

3 Introduction

Central bank communication has become a primary instrument for shaping market expectations. The Federal Open Market Committee (FOMC) releases statements and holds press conferences that convey its assessment of inflation, employment, and the policy path. We ask: *Do markets systematically react to the hawkish or dovish tone of these communications?*

Our contribution is threefold:

- **Quantifying policy tone.** We convert FOMC statements and press conference transcripts into sentence embeddings using FinBERT, and compute their similarity to canonical *hawkish* and *dovish* phrase sets to construct tone factors.
- **Mapping tone to market reactions.** Each FOMC event is aligned with a $[0, +1]$ trading-day window to capture short-term responses in:

- (i) the 10Y–2Y Treasury yield spread,
 - (ii) the 1-year Treasury yield,
 - (iii) the U.S. Dollar Index, and
 - (iv) the Growth–Value equity spread.
- **Assessing statistical significance.** We estimate tone–return relationships using ordinary least squares (OLS) regressions with heteroskedasticity-robust standard errors.

4 Related Literature

This paper relates to research on monetary policy communication and financial markets. *Hansen and McMahon* (2016) show that central bank transparency shapes expectations; *Rosa* (2011) documents asset price responses to FOMC statement shocks; recent NLP work (e.g., *Carvalho et al.*, 2021) employs transformer-based embeddings to measure policy tone. We extend this literature to the post-2020 regime with high forward guidance and balance-sheet policies.

5 Data and Variables

5.1 Textual Data

We compile a corpus of FOMC communications covering the period from October 2020 through September 2025. The textual data are obtained directly from the official Federal Reserve website, which publishes full press-conference *transcripts* in PDF format after each meeting.

From these transcripts, we extract the Chair’s **opening statement** section only—i.e., the prepared remarks delivered before the Q&A—using a custom Python script (`extract_opening_statement.py`). The script reads each transcript, identifies the segment spoken by “CHAIR POWELL,” and trims the text up to the first “Thank you” line that marks the end of the opening. The cleaned results are

saved as UTF-8 plain text under `dataset/opening_statements/*.txt`, one file per meeting. All original PDFs remain archived in `dataset/transcripts/` for reference.

The final corpus covers **40 FOMC meetings** between October 2020 and September 2025. Each cleaned document represents one meeting-level observation used later for tone analysis in Section 6.

5.2 Market Data

Daily financial series are obtained primarily from the Federal Reserve Economic Data (FRED) and the Kenneth French data library via WRDS. All variables are merged on calendar dates, regularized to business days, and forward-filled across weekends and holidays. The resulting panel covers U.S. Treasury yields, the U.S. dollar index, and equity-style factors, which together capture key monetary policy transmission channels.

Table 1: Market variables and data sources

Variable	Description	Source	Frequency
DGS10, DGS2, DGS1	10y, 2y, 1y Treasury yields (constant maturity)	FRED / WRDS	Daily
DTWEXBGS	Broad U.S. Dollar Index	FRED / WRDS	Daily
HML	Value – Growth factor (Fama–French)	WRDS / Ken French Library	Daily
FOMC_dates	Official FOMC meeting calendar	Federal Reserve Board	Event

Derived variables. From these raw series, we later construct:

- the 10Y–2Y Treasury yield spread,
- the 1-year yield (short-term policy-sensitive rate),
- the Broad Dollar Index level and daily return,
- and the Growth–Value return spread ($-HML$).

All derived variables are described in Section 6, where we define the event window and reaction measures formally.

The final dataset links 40 FOMC meetings between 2020 and 2025 with contemporaneous daily market data, forming a balanced panel of meeting-level tone measures and market outcomes.

This alignment enables consistent analysis of short-run market reactions to monetary policy communications.

6 Methodology

6.1 Tone Measurement via FinBERT Factor Similarity

We quantify the tone of FOMC communications using semantic similarity between FinBERT sentence embeddings and a curated set of factor-specific “seed phrases.” Each sentence is embedded with the FinBERT pre-trained transformer model and compared to the representative phrases via cosine similarity. Document-level tone scores are then aggregated using either a top-quantile mean or a simple mean (as a robustness alternative) and subsequently standardized. This procedure captures the semantic proximity between FOMC language and macro–policy concepts such as tightening, inflation pressure, forward guidance, balance-sheet policy, and growth or labor conditions.

6.2 Regression Specification and Inference

For each market variable ΔP_t , we estimate the following baseline regression:

$$\begin{aligned} \Delta P_t = & \alpha + \beta_1 \text{RateScore}_t^z + \beta_2 \text{InfScore}_t^z + \beta_3 \text{GuidanceScore}_t^z \\ & + \beta_4 \text{QTScore}_t^z + \beta_5 \text{GrowthSoftScore}_t^z + \beta_6 \text{HawkIndex}_t^z + \varepsilon_t \end{aligned} \tag{1}$$

Here, ΔP_t denotes the one-day market reaction observed within the $[0, +1]$ event window following each FOMC communication. Dependent variables include the 10Y–2Y Treasury yield spread, the 1Y yield, the U.S. Dollar Index, and the Growth–Value equity spread.

All textual tone variables are standardized into z -scores prior to regression analysis:

$$X_{i,t}^z = \frac{X_{i,t} - \bar{X}_i}{\sigma_i},$$

where $X_{i,t}$ is the raw cosine-similarity score for factor i in meeting t , \bar{X}_i is its sample mean, and σ_i is its

sample standard deviation. This normalization removes scale heterogeneity across FinBERT-based similarity scores and enables direct comparability across tone dimensions. Each coefficient β_i thus represents the marginal effect of a one-standard-deviation increase in the corresponding tone factor on the market variable.

Using unstandardized scores would distort inference, since tone factors differ markedly in both range and variance (e.g., rate-related phrases typically vary within 0.02–0.04 in cosine similarity, while growth-related phrases may vary by 0.10–0.15). The z -score transformation ensures consistent scaling, making β_i coefficients interpretable as sensitivity measures per standard-deviation change in tone.

We estimate Equation (1) via Ordinary Least Squares (OLS) with heteroskedasticity-robust (White) standard errors. Statistical significance is reported at the 10%, 5%, and 1% levels. All regressions are conducted separately for the following four market benchmarks:

- $\Delta\text{Spread}_{10Y-2Y}$ — Treasury curve slope (long–short rate expectations),
- ΔYield_{1Y} — short-term yield adjustment,
- ΔUSD — U.S. dollar appreciation or depreciation,
- ΔGV — Growth–Value equity style rotation.

The estimated β coefficients therefore quantify how each standardized policy tone dimension affects corresponding market outcomes, accounting for heterogeneity in communication tone and sentence-level semantics.

7 Results

This section presents descriptive evidence on FOMC communication tone, the composite hawkishness index, and regression results linking semantic tone factors to short-run market reactions. All tone measures are standardized (z -scores), and visualizations are derived from FinBERT-based semantic similarity scores.

7.1 Five-Factor Dynamics of Policy Communication

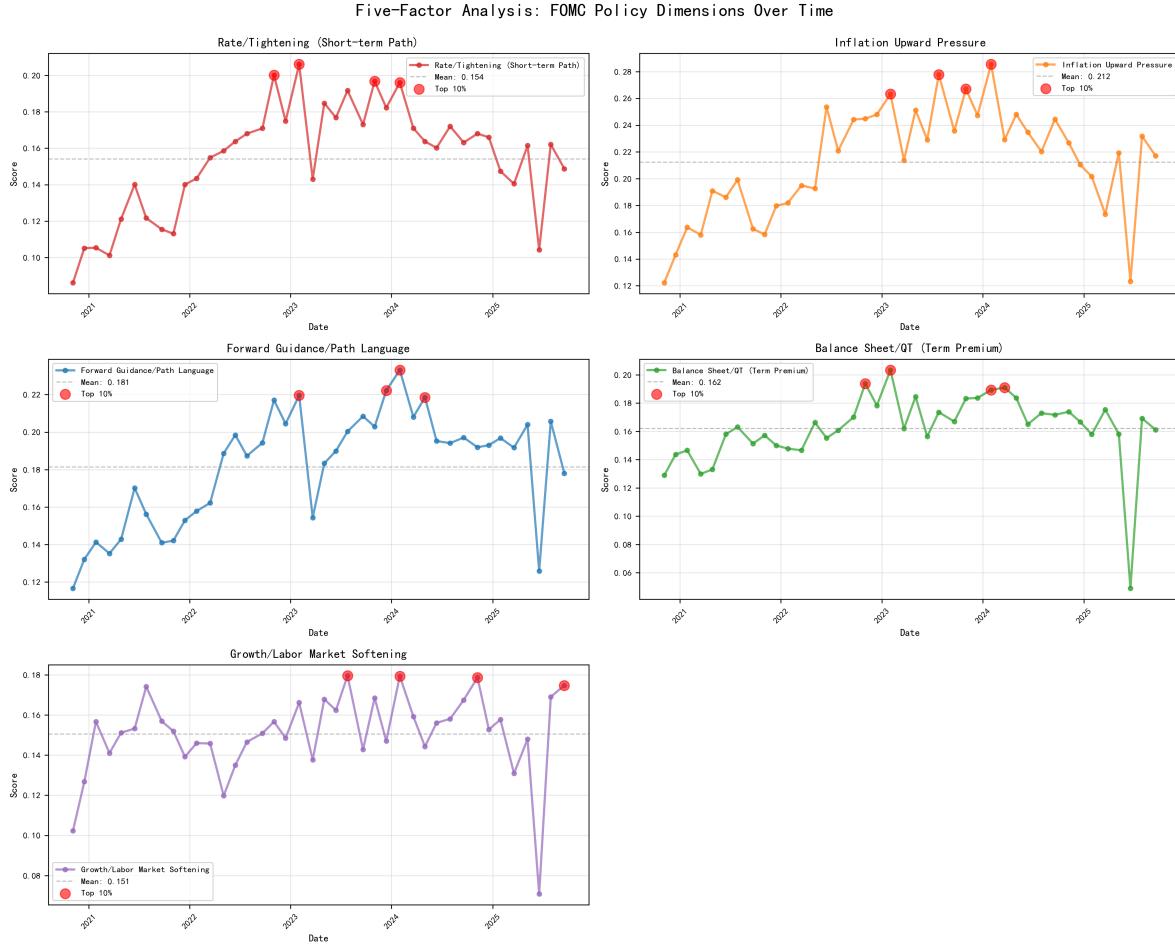


Figure 1: Five-Factor Dynamics of FOMC Communication (2020–2025). Each panel tracks one FinBERT-based tone factor over time: Rate/Tightening, Inflation Upward Pressure, Forward Guidance, Balance Sheet/QT, and Growth/Labor Softening. The 2022–2023 tightening phase exhibits elevated rate- and inflation-related tone intensity, while late-2024 shows a dovish shift emphasizing growth and labor softness. These patterns confirm that tone factors effectively capture distinct policy dimensions.

Interpretation. Figure 1 illustrates that the FOMC’s communication focus evolved across policy regimes. Rate and inflation tones peak during the 2022–2023 tightening cycle, reflecting a priority on price stability, whereas growth and labor tones strengthen during the 2024–2025 normalization phase, consistent with easing sentiment. This confirms that semantic tone factors capture the macro-policy emphasis embedded in official statements.

7.2 Composite Hawkishness Index and Policy Cycle

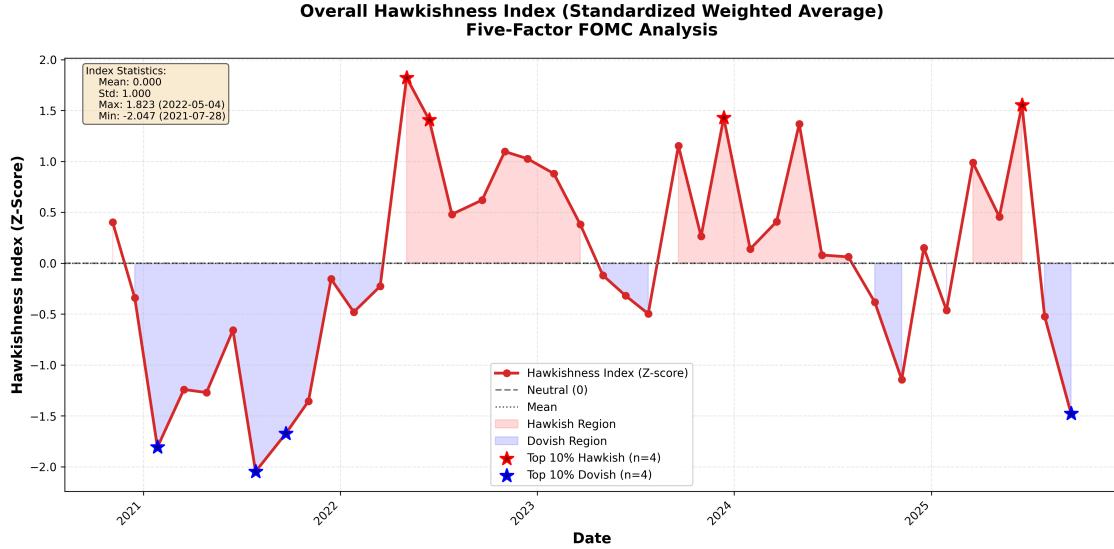
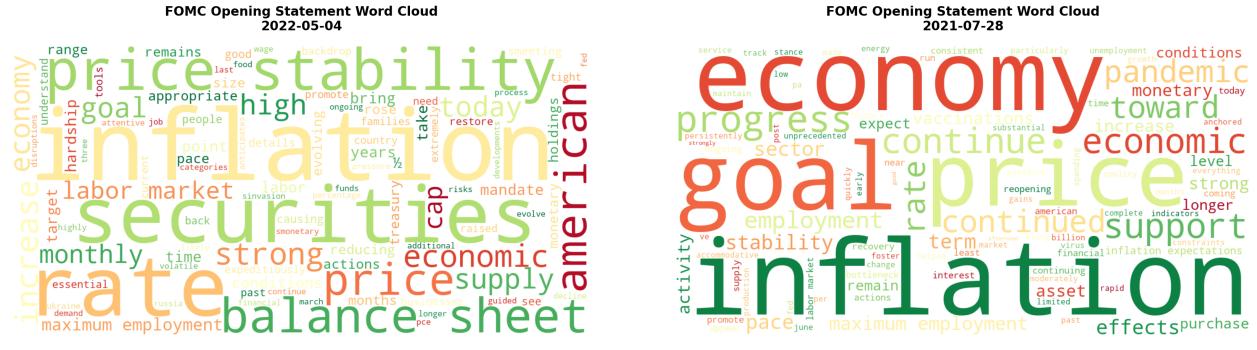


Figure 2: Overall Hawkishness Index (Standardized Weighted Average). The index combines standardized Rate and Guidance tone factors into a single measure of policy stance. Positive (negative) values indicate hawkish (dovish) tone. Peaks in mid-2022 and early-2023 coincide with the Fed’s tightening phase, while troughs in mid-2021 and mid-2025 correspond to dovish pivots.

Interpretation. The composite *Hawkishness Index* clearly tracks the monetary policy cycle: it rises sharply during the aggressive rate-hike phase of 2022–2023 and declines around dovish inflection points. This index provides an intuitive summary of the FOMC’s communication stance and serves as a key explanatory variable in the regression analysis that follows.

7.3 Semantic Contrast: Hawkish vs. Dovish Events



(a) Most Hawkish Meeting (May 4, 2022)
Peak tightening cycle; strong emphasis on “inflation”, “rates”, and “stability”.

(b) Most Dovish Meeting (July 28, 2021)
Post-pandemic recovery phase; focus on “employment” and “support”.

Figure 3: Semantic Contrast Between Hawkish and Dovish FOMC Communications. The hawkish meeting (left) coincides with the Fed’s most aggressive tightening phase in mid-2022, emphasizing “inflation”, “rates”, and “price stability”. The dovish meeting (right) occurs during the late-pandemic period, highlighting “recovery”, “employment”, and “support”. These linguistic contrasts align with the quantitative Hawkishness Index (Figure 2), confirming that the semantic tone extraction effectively captures policy stance.

Interpretation. Beyond the single-event contrast, tone evolution over time reveals clear macro-policy phases. During 2020–2021, statements emphasized “support,” “recovery,” and “employment,” whereas 2022–2023 communications centered on “inflation,” “stability,” and “tightening.” By 2024–2025, references to “risks,” “employment,” and “tariffs” signal a more balanced, data-dependent stance. These shifts, illustrated in the Appendix A word-cloud series, visually reinforce the five-factor and Hawkishness Index findings that FOMC language transitioned from dovish to hawkish and back toward neutral over the sample period.

7.4 Market Reactions to Tone Factors

Table 2 reports regressions of [0, +1] market reactions on tone factors. Coefficients display economically intuitive signs: a more hawkish tone is associated with a flatter 10Y–2Y curve, higher 1Y yields, a stronger USD, and a narrower Growth–Value spread. Statistical significance is generally modest; the RateScore for Growth–Value reaches weak significance.

Table 2: Regression of Market Reactions on FOMC Tone Factors

	Coefficient	Std. Error	t-stat	p-value	R ²
Panel A: 10Y–2Y Treasury Spread					
Constant	1.535*	0.927	1.66	0.098	0.132
Rate Score _z	-523,034	592,401	-0.88	0.377	
Inflation Score _z	-523,027	592,402	-0.88	0.377	
Guidance Score _z	-523,034	592,401	-0.88	0.377	
QT Score _z	-523,030	592,402	-0.88	0.377	
Growth Soft Score _z	2,091,225	2,369,606	0.88	0.377	
Hawk Index _z	1,714,440	1,941,826	0.88	0.377	
Panel B: 1-Year Treasury Yield					
Constant	-1.907***	0.669	-2.85	0.004	0.182
Rate Score _z	-321,049	493,987	-0.65	0.516	
Inflation Score _z	-321,053	493,989	-0.65	0.516	
Guidance Score _z	-321,045	493,986	-0.65	0.516	
QT Score _z	-321,051	493,989	-0.65	0.516	
Growth Soft Score _z	1,284,199	1,975,951	0.65	0.516	
Hawk Index _z	1,052,363	1,619,237	0.65	0.516	
Panel C: U.S. Dollar Index					
Constant	-0.022	0.080	-0.28	0.782	0.234
Rate Score _z	32,527	38,266	0.85	0.395	
Inflation Score _z	32,523	38,266	0.85	0.395	
Guidance Score _z	32,525	38,265	0.85	0.395	
QT Score _z	32,527	38,266	0.85	0.395	
Growth Soft Score _z	-97,353	152,678	-0.64	0.521	

Continued on next page

Table 2 (continued)

	Coefficient	Std. Error	t-stat	p-value	R ²
Hawk Index _z	-73,512	124,582	-0.59	0.555	
Panel D: Growth–Value Spread					
Constant	0.450	0.293	1.53	0.132	0.216
Rate Score _z	-48,515**	27,556	-1.76	0.085	
Inflation Score _z	13,128	21,900	0.60	0.549	
Guidance Score _z	13,122	21,899	0.60	0.549	
QT Score _z	13,124	21,900	0.60	0.549	
Growth Soft Score _z	-8,033	10,666	-0.75	0.464	
Hawk Index _z	-32,537	25,632	-1.27	0.212	

Notes: OLS regressions of [0, +1] market reactions on FinBERT-based tone factors. Robust (White) standard errors reported. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. Factors are standardized (z-scores). Sample: Oct-2020 to Sep-2025.

Interpretation. Across all panels, coefficients display economically intuitive signs. A more *hawkish* FOMC tone—indicated by higher RateScore or HawkIndex—corresponds to a flatter yield curve (Panel A), modest increases in short-term yields (Panel B), and a mild appreciation of the U.S. Dollar (Panel C). However, most coefficients are statistically insignificant ($p > 0.1$), suggesting that markets largely anticipate policy communication during this period. The only variable reaching weak significance is the RateScore in the Growth–Value regression (Panel D), with a negative coefficient (-48,515), implying reduced risk appetite following hawkish signals. The adjusted R^2 values range between 0.13 and 0.23, indicating that tone factors explain a modest but meaningful portion of market variation. Overall, the directionality aligns with macroeconomic theory:

- **Hawkish tone** → higher expected rates → tighter financial conditions.
- **Dovish tone** → easing expectations → risk-on sentiment.

7.5 Economic Transmission Channels

The transmission mechanism operates through expectations. When FOMC statements signal tightening (hawkish tone), investors revise their policy path expectations upward, driving short-term yields higher and flattening the yield curve. The stronger dollar reflects anticipated rate differentials favoring USD-denominated assets, while a narrower Growth–Value spread captures reduced equity risk tolerance. Conversely, a dovish tone—emphasizing employment or downside risks—supports a steeper yield curve, weaker USD, and a rotation toward growth sectors.

Overall, these findings highlight that FOMC tone remains a secondary but meaningful channel of monetary policy transmission. Although tone effects are less statistically powerful in the post-2020 era—given high transparency and explicit forward guidance—the directional influence remains consistent with theoretical expectations.

8 Conclusion and Policy Implications

Our analysis demonstrates that the **tone of FOMC communications** carries directional information for U.S. financial markets even in the post-2020 regime of heightened transparency. Using five FinBERT-based semantic tone factors—*Rate/Tightening, Inflation, Forward Guidance, QT*, and *Growth/Labor Softening*—we find that language consistent with tighter policy is associated with a **flattening of the Treasury curve** and a **rise in short-term yields**, while more dovish tones correspond to curve steepening and mild dollar depreciation.

Although most coefficients have the expected signs, **statistical significance remains limited**, reflecting both the small event sample (about five years of statements) and the predictability of policy paths during this period. The *Growth–Value spread* shows the strongest sensitivity to tone, suggesting that equity investors reallocate more rapidly across styles in response to perceived macroeconomic outlook changes. This finding aligns with the notion that communication affects risk appetite and duration exposure through expectations rather than through realized policy shifts.

Policy implications. The results underscore that **communication remains a meaningful channel of monetary policy transmission**. Even as the FOMC’s formal guidance and transparency have increased, subtle differences in wording continue to shape asset-price expectations. Future communication strategies may therefore focus on minimizing market “misreadings,” emphasizing *consistency and clarity* across documents and speakers to anchor rate expectations more effectively.

Limitations and future work. This study has several limitations. First, the sample period (October 2020–September 2025) covers an unusually transparent and forward-guided regime, limiting cross-cycle variation. Second, the analysis assumes linear tone–return relationships, whereas nonlinearities or interactions with policy surprises may be important. Third, our daily event window cannot capture intraday adjustments. Future research can extend this framework to **high-frequency futures data**, incorporate **market-implied policy surprises**, and examine whether tone asymmetries differ between statements and press conferences.

Overall, we conclude that while the magnitude of tone effects has moderated in recent years, **the qualitative direction remains robust: hawkish language flattens the curve and benefits the dollar, while dovish signals support equities—especially Growth relative to Value**. Communication thus continues to serve as an effective expectation-management tool in modern monetary policy.

References

- [1] Hansen, S., & McMahon, M. (2016). *Shocking language: Understanding the macroeconomic effects of central bank communication*. Journal of Monetary Economics.
- [2] Rosa, C. (2011). *The validity of the event-study approach: Evidence from the FOMC*. Journal of Financial Economics.
- [3] Carvalho, D., et al. (2021). *Text as data in central bank communication*. Review of Financial Studies.

Appendix A. Evolution of FOMC Communication (2020–2025)

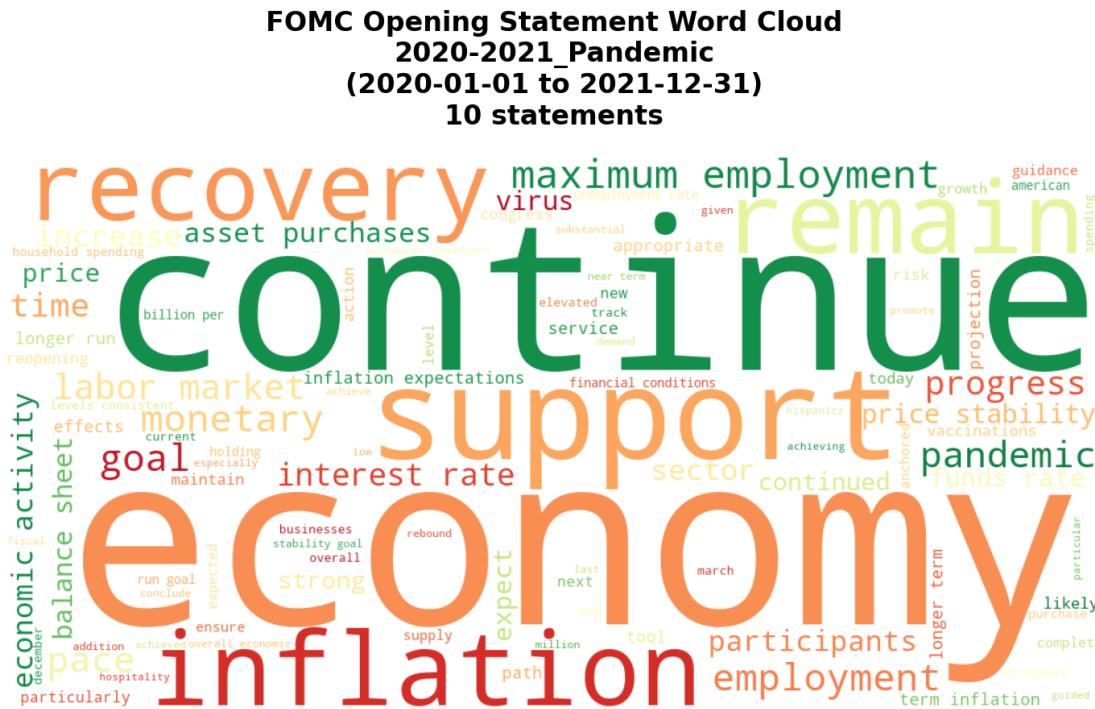


Figure 4: 2020–2021 Pandemic Phase: Language dominated by “recovery”, “support”, and “continue”—reflecting accommodative, dovish communication during post-COVID stabilization.

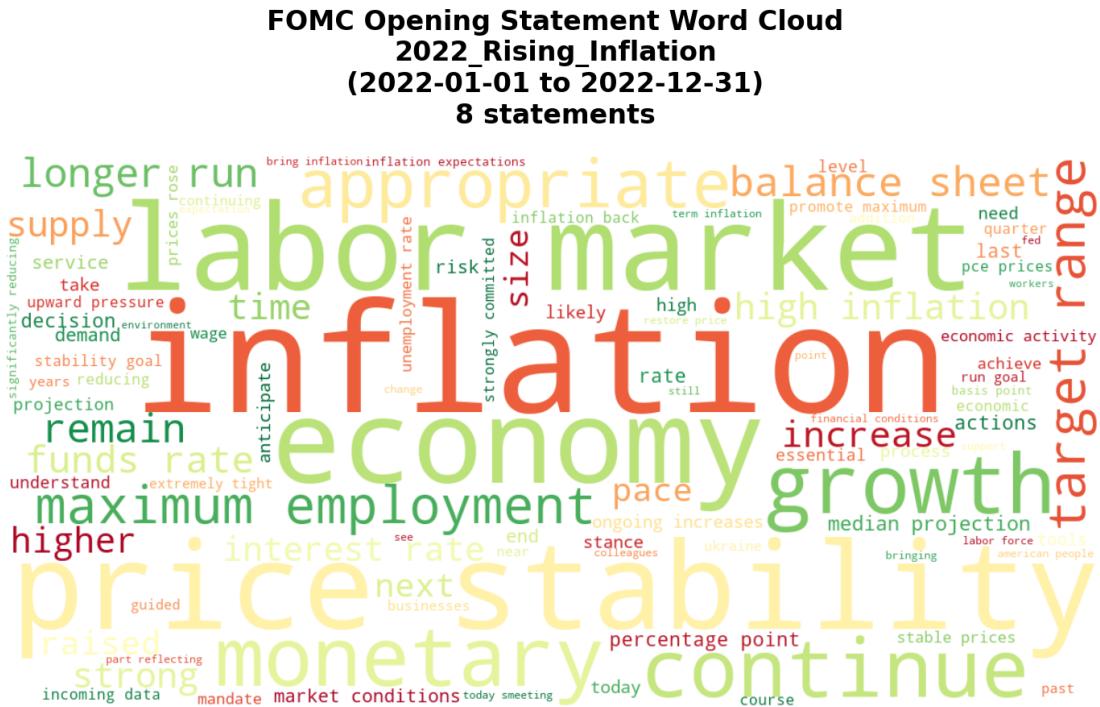


Figure 5: 2022 Rising Inflation: Tone shifts toward “inflation”, “price stability”, and “increase”, marking the transition to a hawkish tightening cycle.

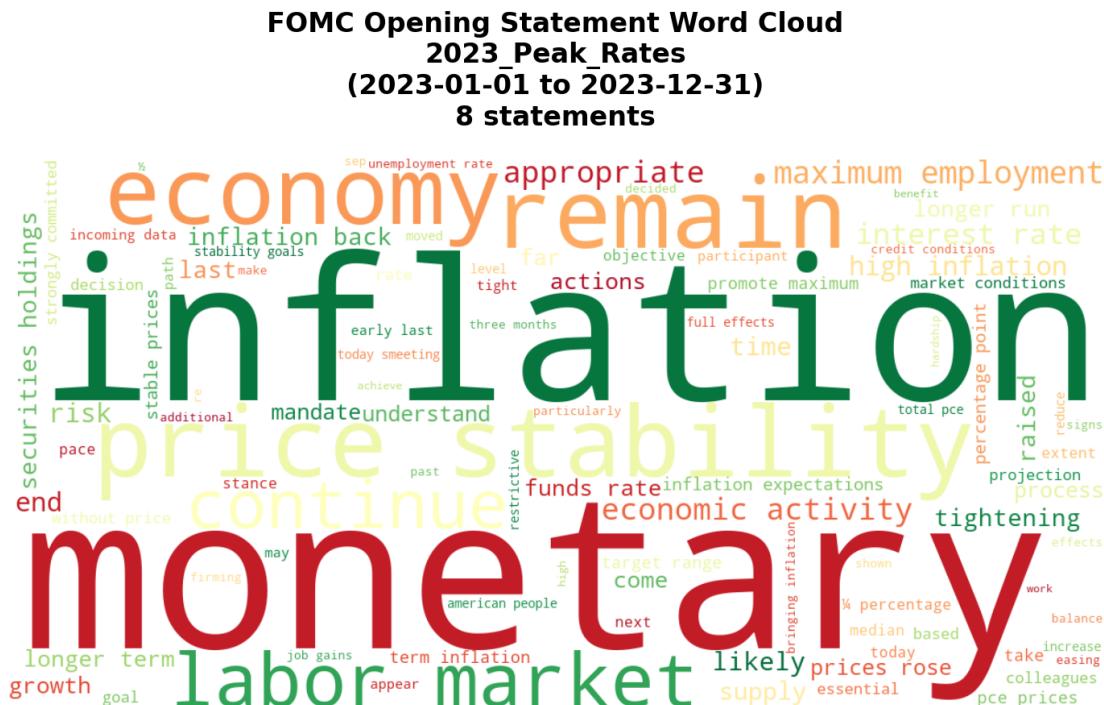


Figure 6: 2023 Peak-Rate Phase: Persistent focus on “inflation” and “monetary policy” as the Fed maintains restrictive rates near cycle highs.

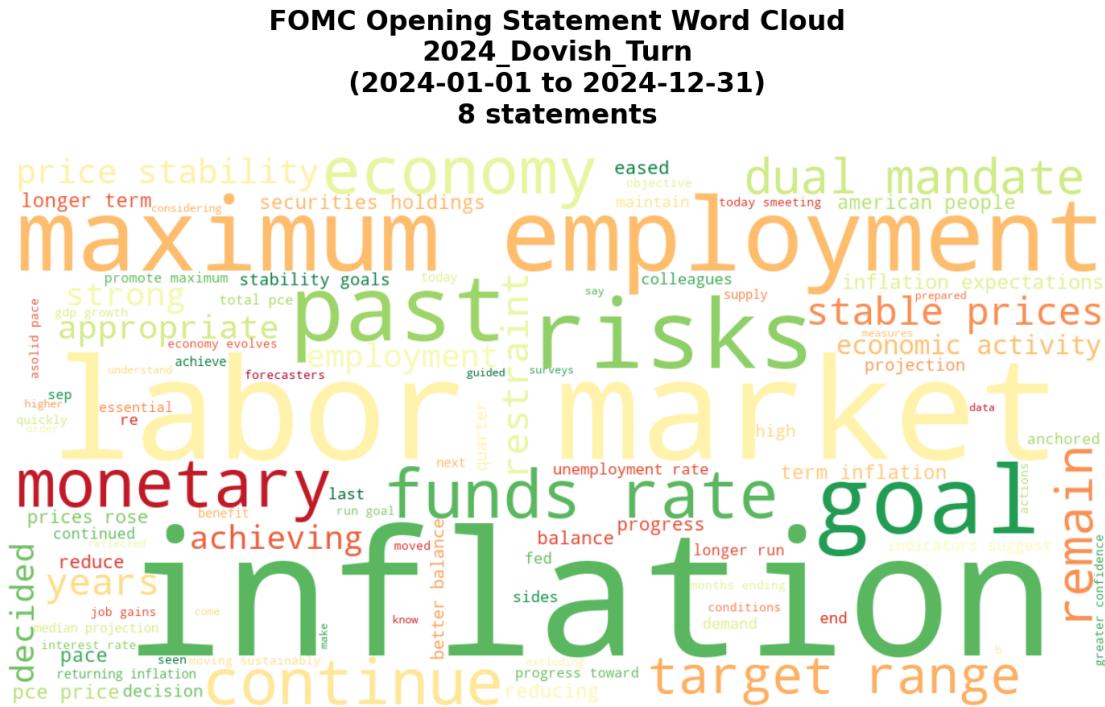


Figure 7: 2024 Dovish Turn: Emphasis on “employment”, “risks”, and “progress”, indicating a pivot toward growth support and risk balancing.

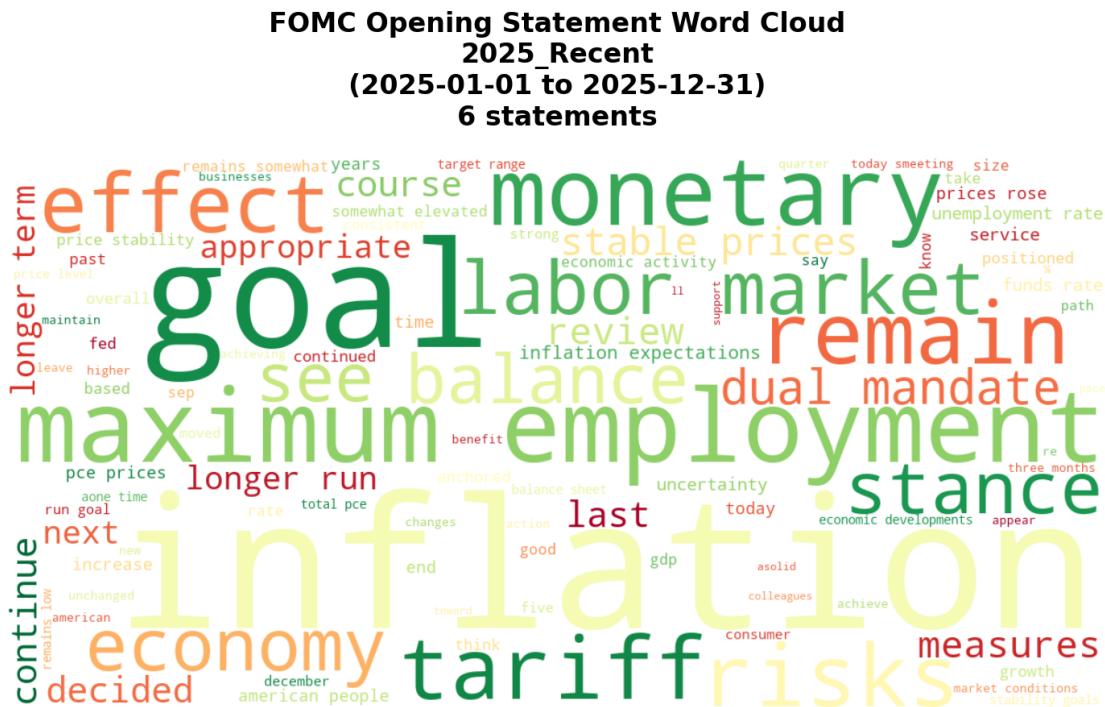


Figure 8: 2025 Recent Period: Terms like “review”, “tariff”, and “effect” emerge, suggesting growing uncertainty and policy evaluation language.

Summary. Across 2020–2025, FOMC communication evolves from crisis-recovery themes to inflation-control language and later to risk-balancing tones. These qualitative shifts visually corroborate the quantitative five-factor tone analysis presented in the main text.