The Differential Market Impact of ECB Narrative Tone Across Communication Channels

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Contents

1 Introduction

> *'When the monetary policy committee regularly provides information about its objectives, economic outlook, and policy plans, two benefits result. First, with more complete information available, markets will price financial assets more efficiently. Second, the policymakers will usually find that they have achieved a closer alignment between market participants' expectations about the course of future short-term rates and their own views.'*
>
> [Ben Bernanke, 2004, Japan Society Corporate Luncheon, New York]

1.1 Background and Context

Central bank communication has evolved from relatively opaque signals to sophisticated, structured process that plays a central role in the conduct of modern monetary policy. This transformation reflects a broader shift toward transparency in central banking, involving greater clarity around objectives, models, data, and decision-making procedures (Geraats, 2002). As conventional policy tools became constrained, particularly during low-interest rate environments, communication strategies emerged as vital instruments for guiding expectations and enhancing monetary transmission (Filardo and Hofmann, 2014).

The European Central Bank (ECB) exemplifies this evolution. Since its inception, the ECB has developed a multi-channel framework that includes Monetary Policy Statements, Monetary Policy Accounts, and Executive Board speeches. These formats differ in timing, content, and institutional authority, and each is closely monitored by financial markets for signals about the ECB's policy stance and reaction function. Given this layered structure, not all ECB communications are interpreted equally. The informational value of a message depends not only on its wording and tone but also on its source and timing.

1.2 Research Motivation

While a growing body of literature has examined the impact of central bank communication on asset prices, most empirical studies have focused on a single communication channel or have been limited to the U.S. Federal Reserve. For example, Tadle (2022) shows that the tone of FOMC statements and minutes can have distinct and statistically significant effects on financial markets. In contrast, there remains a clear lack of comparable research for the euro area, despite the ECB's similarly layered communication framework. Given the institutional complexity of the eurozone and the fragmentation of its financial markets, investigating whether markets respond differently to the tone of ECB statements, minutes, and speeches is both timely and important.

1.3 Research Objective and Questions

The objective of this dissertation is to systematically examine whether the narrative tone of ECB communication, conveyed through multiple official channels, generates distinct reactions across euro area financial markets. Using a dictionary-based sentiment analysis framework, tone indices will be constructed for each channel. These indices will then be linked to daily movements in a set of core financial indicators.

The study is guided by the following research questions:

1. How does the tone of ECB communication influence euro area financial market outcomes?
2. Do markets respond differently to tone depending on whether it is delivered via statements, accounts, or speeches?
3. Which communication channel exhibits the strongest or most consistent market response?

2 Literature Review

This work contributes to several strands of the literature.

First, it contributes to the literature that studies the effectiveness of monetary policy on asset prices. Kuttner (2001) was among the first to empirically demonstrate the effectiveness of monetary policy in influencing prices on financial markets. Using a similar methodology, Bernanke and Kuttner (2005) found that stock markets respond significantly to these surprises. Since then, many studies have extended this framework to assess monetary policies. For a comprehensive overview, Blinder et al. (2008) surveyed the expanding literature and concluded that central bank communication can not only move markets but also enhance policy predictability and support macroeconomic objectives.

Second, this dissertation contributes to the growing literature on the role of narrative tone and sentiment in central bank communication (see, e.g., Ehrmann and Fratzscher 2007; Hayo and Neuenkirch 2010; Hubert 2017). Early contributions applied basic textual methods to extract sentiment from monetary policy statements. A notable advancement came from Lucca and Trebbi (2009), who introduced Google Semantic Scores to systematically evaluate the market response to FOMC communication. More recent approaches have adopted dictionary-based sentiment scoring (see Loughran and McDonald 2011; Banerjee et al. 2019; Shapiro et al. 2020) to classify central bank tone as hawkish or dovish. However, standard dictionaries are often inadequate for monetary contexts and

risk misclassification, as noted by Picault and Renault (2017). To overcome this, I would employ the domain-specific dictionary developed by Tadle (2022), which is now widely used in central bank communication studies.

Finally, this dissertation contributes to the growing literature that applies sentiment analysis to central bank communication to assess its impact on financial markets. Schmeling and Wagner (2024) evaluate the tone of central bank press conferences and find that positive tone surprises are associated with higher stock prices, rising interest rates, lower volatility risk premia, and narrower credit spreads—even after controlling for policy rate changes and monetary shocks. In the U.S. context, Gardner et al. (2022) demonstrate that equity price reactions to macroeconomic news are conditional on the prevailing tone of FOMC statements. Similarly, Parle (2022) analyze the ECB's monetary policy press conference tone and identify statistically significant effects across multiple asset classes. Much of the existing literature has emphasized press conferences and policy statements due to their immediate release and concise format, but minutes (or accounts), though published with a lag, offer richer contextual information and policy nuance (Rosa, 2013).

More recently, Ahrens et al. (2025) extend tone analysis to Executive Board speeches to identify how monetary policy news affects bond and stock market volatility and tail risk. Collectively, these studies underscore the economic relevance of tone in monetary communication, yet very few have compared the effects across multiple ECB communication channels, a gap that this dissertation directly addresses.

3 Data

This dissertation will integrate textual and financial market datasets to examine how the tone of European Central Bank (ECB) communication across different channels affects various financial markets in the euro area.

3.1 Communication Data

The textual dataset includes three key ECB communication channels:

- **Monetary Policy Statements** — published immediately following each Governing Council meeting, summarizing decisions and forward guidance;
- **Monetary Policy Accounts** — released with a four-week lag (available from January 2015 onward), providing detailed insights into internal deliberations;
- **Executive Board Speeches** — public remarks by ECB board members on monetary and macro-financial topics.

All communication texts will be sourced from the *ECB's official website*. Each document will be time-stamped according to its release date and classified by communication type.

3.2 Financial Market Data

Financial market data will be collected from the following sources: *Bloomberg Terminal*, *Refinitiv Datastream*, the *ECB's Open Data Portal*, and the *Euro Area Monetary Policy Event-Study Database (EA-MPD)* publicly shared by Altavilla et al. (2019).

- **Equity Market Index**: EURO STOXX 50
- **Bank Sector Index**: EURO STOXX Banks (SX7E)
- **Exchange Rate**: EUR/USD spot rate
- **Sovereign Bond Yields**: Euro area yield curves for short-, medium-, and long-term maturities (ECB Open Data Portal).
- **Fragmentation Measure**: 10-year BTP–Bund spread, capturing sovereign risk differentials and euro area fragmentation.
- **Corporate Credit Risk**: Markit iTraxx Europe 5Y CDS Index.

To ensure proper attribution of effects, financial variables will be differenced to reflect daily changes (e.g., log returns or basis point shifts) and aligned with the release timing of each ECB communication. When necessary, adjustments will be made for weekends or non-trading days.

4 Methodology

To quantify the tone embedded in ECB communication, this study will employ a dictionary-based sentiment analysis approach. The goal is to generate tone indices for each communication type.

4.1 Sentiment Analysis of ECB Communication

To quantify the narrative tone of ECB communication, this study adopts a dictionary-based sentiment analysis approach, following the methodology outlined in Parle (2022), which builds upon the central bank-specific dictionary developed by Tadle (2022).

After preprocessing the documents, the analysis is conducted at the sentence level to preserve semantic context. Each sentence is evaluated through a two-step process. First, a *base tone classification* is made: if the number of pessimistic economic terms exceeds

neutral ones, the sentence is considered pessimistically tilted; otherwise, it is classified as neutral. Second, a *polarity assessment* is performed. A sentence with a neutral economic base is considered hawkish if it contains more positive than negative tone words, and dovish otherwise. Conversely, a pessimistic sentence is considered hawkish only if it contains more negative than positive tone words, and dovish otherwise.

The sentence-level classification rule is formalized as follows:

$$sent_{i,t} = \begin{cases} 1 & \text{if } neut_{i,t} > pess_{i,t} \text{ and } pos_{i,t} > neg_{i,t} \\ -1 & \text{if } neut_{i,t} > pess_{i,t} \text{ and } pos_{i,t} < neg_{i,t} \\ 1 & \text{if } neut_{i,t} < pess_{i,t} \text{ and } pos_{i,t} < neg_{i,t} \\ -1 & \text{if } neut_{i,t} < pess_{i,t} \text{ and } pos_{i,t} > neg_{i,t} \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

where $sent_{i,t}$ is the tone score of sentence i at time t, and $pos_{i,t}$, $neg_{i,t}$, $neut_{i,t}$, and $pess_{i,t}$ represent the number of positive, negative, neutral, and pessimistic economic terms, respectively.

The overall tone of each communication event is captured by the average of all scored sentences, yielding the Dictionary Hawk-Dove Index:

$$\textit{Dictionary Hawk-Dove Index}_t = 100 \times \frac{1}{J} \sum_{i=1}^{J} sent_{i,t} \tag{2}$$

where J is the number of sentences containing at least one relevant economic term in communication t.

This approach provides a transparent and replicable measure of monetary policy tone and it captures both the direction and intensity of tone while accounting for contextual nuances.

4.2 Empirical Framework

To evaluate the differential market impact of ECB communication tone across channels, this dissertation adopts a *panel data regression approach*. The panel structure allows efficient estimation while accounting for unobserved heterogeneity across asset classes and time.

Panel Regression Model

The baseline specification is defined as:

$$\Delta Y_{i,t} = \alpha_i + \beta_1 \cdot \text{Tone}_t^{\text{Statement}} + \beta_2 \cdot \text{Tone}_t^{\text{Account}} + \beta_3 \cdot \text{Tone}_t^{\text{Speech}} + \gamma' X_t + \delta_t + \varepsilon_{i,t} \tag{3}$$

Where:

- $\Delta Y_{i,t}$ denotes the daily return or yield change of financial asset i on day t,
- α_i captures *asset-specific fixed effects*,
- δ_t includes *time fixed effects*,
- $\text{Tone}_t^{\text{Statement}}$, $\text{Tone}_t^{\text{Account}}$, and $\text{Tone}_t^{\text{Speech}}$ are the standardized *Hawk-Dove tone scores* constructed for each ECB communication type on day t,
- X_t is a vector of *control variables*, such as lagged dependent variables or financial stress indices,
- $\varepsilon_{i,t}$ is the *idiosyncratic error term*.

The model tests whether an equivalent level of tone (hawkish or dovish) triggers different market reactions depending on the communication channel.. Estimation will be conducted using robust standard errors, clustered by date or asset type as appropriate. *Event-time estimation* around communication releases will also be used as a robustness check.

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