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Monetary transmission with frequent policy events

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Abstract

We empirically examine the role of both official monetary policy announcements and policymakers' speeches in the transmission of monetary policy to financial markets and the real economy in the euro area. Using intraday data covering a broad cross-section of financial assets, we construct the Euro Area Extended Monetary Policy Event-Study Database (EA-EMPD). We refine the identification of monetary policy surprises by exploiting granular, quote-level data on individual participants' bid and ask submissions. This novel dataset expands the set of identifiable policy events by an order of magnitude relative to databases based solely on scheduled rate-setting meetings. Our analysis yields three main findings. First, speeches by euro area policymakers exert statistically and economically significant effects on asset prices across maturities, with magnitudes comparable to those observed following official policy announcements. Second, the transmission of speech-induced short-rate changes to the real economy closely mirrors that of policy decisions and combining both types of surprises significantly enhances the precision of statistical inference. Finally, when speeches are included in the measurement of policy surprises, the share of real-economy variance attributable to monetary policy increases fivefold, although its absolute magnitude remains relatively modest.

JEL Classification: E43, E44, E52, E58, G14

Keywords: Monetary Policy Surprise, Speeches, Event Study, BVAR

Non-Technical Summary

Central bankers have increasingly adopted speeches delivered outside formal policy meetings as a key instrument for guiding market expectations and communicating the stance of monetary policy. The rising prominence of policymakers' speeches as a policy tool reflects several broader developments. First, modern central banks place a strong emphasis on transparency, regularly communicating not only their decisions but also the rationale underpinning them. Second, since the global financial crisis, the introduction of complex policy instruments—such as quantitative easing—has further increased the need for clear and detailed communication. Third, greater financial literacy and enhanced media engagement have led investors and the public to pay closer attention to central bank communications beyond formal meetings. As a result, measuring the effects of monetary policy by focusing solely on official rate-setting meetings may no longer capture its full impact on financial markets and the broader economy.

This paper shows that in the euro area jointly analyzing monetary policy decisions made during official meetings and policymakers' communications outside those meetings provides a more accurate understanding of monetary policy's effectiveness and transmission. While monetary policy decisions have traditionally been conveyed through scheduled meetings, in recent years central banks have increasingly relied on public speeches to clarify and guide expectations. The study finds that ECB Executive Board members' speeches are not merely complementary to official announcements but serve as powerful signals capable of influencing financial conditions and economic outcomes.

To examine the transmission of monetary policy communication to financial markets and the real economy, we construct a comprehensive new dataset—the Euro Area Extended Monetary Policy Event-Study Database (EA-EMPD)—which covers not only official ECB policy meetings but also all speeches delivered by Executive Board members since the euro's inception. This expansion increases the number of relevant policy events more than tenfold compared to datasets limited to official meetings.

Using this enriched database in combination with high-frequency financial market data, the study yields three main findings. First, policymakers' speeches significantly move financial markets, particularly affecting interest rates across maturities along the yield curve. These effects are comparable in magnitude to those triggered by official monetary policy announcements, suggesting that markets closely monitor and respond to public statements even in the absence of formal decisions. Second, incorporating speeches into policy analysis provides a clearer and more comprehensive view of how monetary policy affects the real economy, including output and inflation. When the expanded set of policy events is used in empirical models, the estimated macroeconomic effects of monetary policy shocks are more precisely measured. Third, when speeches are included in the measurement of policy surprises, the share of real-economy variance attributable to monetary policy increases fivefold.

Overall, the findings underscore the crucial role of central bank communication beyond formal decisions in shaping the transmission of monetary policy. Incorporating a broader range of policy events into empirical analysis offers a deeper and more accurate understanding of how monetary policy is transmitted through financial markets to the real economy.

1 Introduction

Central bankers increasingly communicate monetary policy through speeches delivered outside official meetings. This trend reflects three main developments. First, monetary policy communication has shifted from the opacity of the 1980s and early 1990s toward a more transparent approach (Blinder et al. 2008; Issing 2019). Modern central banks actively communicate their policy actions, anticipated effects, and expected policy paths to shape market expectations, particularly near the effective lower bound of interest rates (Coibion et al. 2019; Guthrie and Wright 2000; Melosi 2017). Second, the expansion of policy tools following the global financial crisis has required more frequent updates on their implementation, effectiveness, and potential side effects. In this context, central banks have devoted increasing effort to explaining the functioning and expected implications of new measures such as forward guidance and quantitative easing. Third, greater financial literacy and enhanced media engagement have led investors and the public to pay closer attention to central bank communications beyond formal policy meetings. As a result, focusing exclusively on official rate-setting meetings may no longer capture the full impact of monetary policy on financial markets and the broader economy (Bholat et al. 2019; Istrefi 2019; Assenmacher et al. 2021).

In this paper, we extend the traditional approach to measuring monetary policy surprises, typically confined to official policy meetings, by augmenting the policy event set with policymakers' speeches. A growing body of evidence suggests that such speeches enhance our understanding of monetary policy transmission (Swanson 2023; Ahrens et al. 2024; Swanson and Jayawickrema 2024). This is particularly relevant when monetary authorities aim to shape expectations and improve the predictability of policy decisions (Swanson 2006; Bauer and Swanson 2023b). Significant changes in policy stance are often communicated through speeches that convey valuable information about intended actions. These speeches therefore complement the signals embedded in official post-meeting communications and help clarify the policy direction. The pioneering work of Swanson and Jayawickrema (2024) and Bauer and Swanson (2023b) highlights the importance of such communication for understanding U.S. monetary policy transmission.

Our analysis for the euro area proceeds in three steps. First, we construct a comprehensive dataset using intraday financial data, extending the event-study database of Altavilla et al. (2019) to include all speeches delivered by members of the ECB Executive Board since the inception of the euro. The resulting Euro Area Extended Monetary Policy Event-Study Database (EA-EMPD) provides a significantly expanded set of policy events. We devote substantial effort to curating this dataset by carefully analyzing each event window and removing outliers and misquotes to ensure that observed market reactions accurately reflect policy communication. Second, we characterize the impact of monetary policy actions on financial markets by leveraging high-frequency surprises around both Governing Council (GC) meetings and policymaker speeches. Third, we assess the transmission of monetary policy to the real economy by incorporating this expanded set of surprises into standard empirical macroeconomic models. By including speeches, we analyze a policy event set roughly an order of magnitude larger than those typically examined in the literature, allowing for a more robust evaluation of monetary policy's overall impact and a fuller

understanding of its contribution to real economic fluctuations.

The literature on high-frequency identification of monetary policy shocks is extensive. Studies for the Federal Reserve (Kuttner 2001; Gürkaynak et al. 2005; Bernanke and Kuttner 2005; Swanson 2021) and the European Central Bank (Brand et al. 2010; Jardet and Monks 2014; Altavilla et al. 2019; Andrade and Ferroni 2021) document the effects of policy announcements on asset prices. More recent work highlights the information content of central bank communication outside official meetings, showing that speeches by presidents or board members can substantially influence financial markets (Aruoba and Drechsel 2025; Ahrens and McMahon 2021; Ahrens et al. 2024). Using U.S. data, Swanson and Jayawickrema (2024) finds that Federal Reserve Chair speeches can move markets even more than FOMC announcements. For the euro area, evidence remains limited, though Istrefi et al. (2024) shows that markets respond to all forms of ECB communication, not just Governing Council events. Regarding the real-economy effects of monetary policy, recent advances in high-frequency identification have enabled researchers to use intraday changes in interest rates around central bank announcements as instruments for estimating the effects of policy shocks on output, inflation, and employment (Stock and Watson 2012; Cochrane and Piazzesi 2002; Faust et al. 2004; Gertler and Karadi 2015; Ramey 2016; Jarociński and Karadi 2020; Swanson 2023).

Our paper contributes to this literature by expanding the set of policy events and by examining both financial-market and macroeconomic responses in the euro area, a setting where such evidence remains scarce. We obtain three main results. First, policymakers' speeches significantly influence the term structure of risk-free interest rates in the euro area, underscoring their role as signals of intended policy actions. In contrast to the United States, where Swanson (2023) finds that non-meeting communications dominate, our results indicate that Governing Council meetings remain the primary source of monetary policy information in the euro area, accounting for a substantial share of intraday asset price movements. Second, incorporating speeches into the policy event set substantially enhances the precision of estimated macroeconomic responses to monetary policy shocks. More specifically, our impulse response estimates indicate that expanding the policy event set to include speeches increases the estimated responses of key macroeconomic variables to monetary policy shocks and markedly improves statistical significance, particularly for variables associated with the monetary policy transmission, such as lending volumes and spreads. Third, when speeches are incorporated into the measurement of policy surprises, the contribution of monetary policy to real-economy variance increases fivefold.

An additional contribution lies in enhancing the measurement of policy surprises by employing high-frequency interest rate data from Overnight Index Swaps (OIS). In the euro area, policy surprises on Governing Council (GC) decision dates are typically measured as raw changes in the one-month OIS rate. We introduce two key refinements. First, we adjust for the time remaining until the next GC meeting, analogous to the day-count adjustment applied to Federal Funds Futures in the U.S. (Kuttner 2001). This adjustment aligns the measured surprise with the relevant policy horizon and mitigates the weak-instrument problem noted by Bauer and Swanson (2021). Second, we incorporate granular bid and ask quotes from individual OIS market participants, such

as brokers and banks, to better capture genuine reactions to policy signals. This level of granularity is crucial for distinguishing true market responses from noise generated by microstructure dynamics, such as bid-ask outliers.

The paper proceeds as follows. Section 2 introduces the main features of the new Euro Area Extended Monetary Policy Event-Study Database (EA-EMPD). Section 3 examines the impact of monetary policy on financial markets. Section 4 analyzes the transmission of monetary policy to the real economy. Section 5 concludes.

2 The Euro Area *Extended* Monetary Policy Event-Study Database (EA-EMPD)

One of the contributions of this paper is to expand the Euro Area Monetary Policy Event-Study Database (EA-MPD) by Altavilla et al. (2019), the standard source of monetary policy surprises in the euro area, to include policy communications outside the Governing Council (GC) meetings. This section serves as a guide to this new dataset: the Euro Area *Extended* Monetary Policy event-study Database (EA-*E*MPD). The dataset is based on tick-by-tick data from the LSEG database, enabling the measurement and reporting of asset price changes during relevant policy and communication windows.

The assets covered in the EA-EMPD are: overnight index swap (OIS) rates with 1 week, 1, 3, 6 month, 1 to 10, 15, and 20 year maturities; German, French, Italian, and Spanish sovereign yields with 2, 5, and 10 year maturities, the STOXX50E and the stock price index comprising banks (SX7E), and the exchange value of the euro against the dollar, pound, and yen. The EA-EMPD is made available as a supplement to this paper and will be regularly updated.

We note that there is concurrent work by Istrefi et al. (2024), who compile a dataset of policymaker speeches in the euro area and analyse financial market responses. Our dataset differs in several important respects. First, we are the first to track individual participants in the OIS market and to correct for potential biases in measuring monetary policy surprises. Specifically, we address the issue that apparent changes in rate expectations may reflect differences between contributors rather than genuine revisions in individual expectations due to policy announcements. Second, we treat speeches that occur when financial markets are closed—such as in the evenings or on weekends—differently. These events are excluded from our sample, with event windows kept fixed around trading hours, whereas Istrefi et al. include them, requiring substantially wider "close-to-open" windows for these events. Third, to ensure accurate measurement of policy surprises, we explicitly account for the timing between each speech and the subsequent monetary policy decision, and the dataset makes the day count information available. Given these methodological differences, the two datasets are likely to serve distinct analytical purposes. The dataset accompanying this paper will be updated quarterly and hosted by the European Central Bank (ECB).

We begin by outlining the monetary policy communication process in the euro area, followed by a detailed overview of the dataset's features developed to capture monetary policy surprises.

When using high-frequency changes in swap rates as a proxy for monetary policy expectations, it is essential to account for quotation conventions of swap contracts and technical features inherent in the market structure. The EA-EMPD carefully addresses the following three major issues.

First, since October 2019, the euro short-term rate (€STR) has replaced Euro Overnight Index Average (EONIA) as the benchmark overnight rate.[1] Accordingly, the OIS surprises in the EA-EMPD are measured using EONIA up to September 2019 and €STR thereafter. This transition is consistent with the broader benchmark rate reforms aimed at enhancing robustness and representativeness.

Second, isolating monetary policy surprises from the OIS market requires careful treatment of its market microstructure. When using data from over-the-counter (OTC) markets, such as the OIS market, we use and track granular bid and ask quotes from individual contributors such as brokers, banks, and market makers, sourced from LSEG. This granularity is essential to distinguish genuine reactions to policy signals from noise generated by microstructure dynamics, including bid-ask outliers. This challenge is particularly acute when examining high-frequency responses to communication events, such as speeches, where the policy signal may be weak relative to background volatility.

Figure 1 illustrates how the surprises reported in the EA-EMPD are cleansed to correct for potential misquotes and distortions arising from the disproportionate influence of individual contributors' bids or asks. The figure presents two examples: a speech by a former ECB Vice-President (upper panels) and a Governing Council meeting (lower panels).

In the case of the speech, the upper-left panel displays the available intraday data. Applying a standard event-study methodology, the estimated surprise associated with this event (the red line) amounts to approximately 2 basis points. But all of this change is due to the measured rate jumping from the quote of one market participant to that of another one. The upper-right panel instead reports the surprise when the identity of individual contributors is taken into account, with each contributor represented by a distinct colour. In the event, expectations remained stable both before and after the event across all market participants. The apparent surprise that might erroneously be attributed to the speech is in fact driven by two contributors (depicted in red and blue) whose expectations remained unchanged around the policy event.[2]

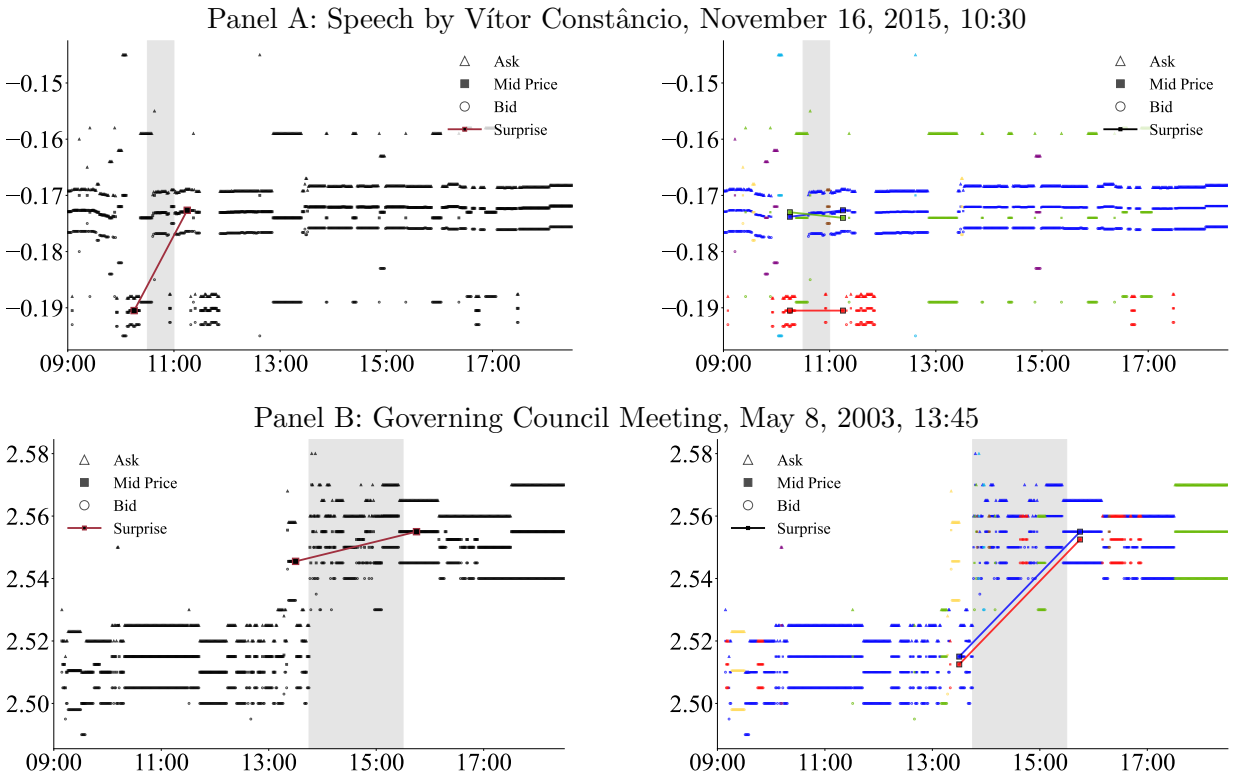
The lower panels report intraday movements during a Governing Council meeting day, again with and without information on contributor identities. In this instance, omitting contributor-level data results in a downward bias in the estimated surprise. More broadly, this correction proves relevant even for rate-setting meetings, as fewer than 20% of Governing Council–related surprises exceed the median bid–ask spread. Incorporating contributor level information is therefore essential to accurately identify policy induced yield changes and to mitigate the confounding

[1] The €STR, published by the ECB since October 2019, serves as the benchmark overnight interest rate for the euro area. It reflects the average rate at which banks borrow overnight deposits from other financial institutions (both banks and non-banks) on an unsecured basis, meaning no collateral is posted. Following a coordinated transition, the €STR has replaced the EONIA as the standard benchmark. EONIA was officially discontinued on 3 January 2022.

[2] Bids, asks, and associated mid points may differ across participants even at the same point in time both because of genuine economic reasons and sometimes because of quotes that are associated with negligible volumes. Complete historical data on volumes associated with these bids and asks are not available.

influence of market microstructure noise.

Figure 1: Selected policy surprises with and without contributors



Notes: The figure illustrates the procedure used to clean the surprises reported in the EA-EMPD, correcting for potential misquotes and distortions stemming from the disproportionate influence of individual contributors' bids or asks. The figure presents two examples: a speech by a former ECB Vice-President (upper panels) and a Governing Council meeting (lower panels).

Table 1 presents the estimated impact of incorporating information on individual contributors, as opposed to relying solely on the raw, unadjusted data. For each sample (the pre-2008 period, the post-2008 period, and the full sample), the table reports the mean and median absolute differences between the datasets with and without the application of clustering corrections, as well as the corresponding correlations between the two measures. The results are displayed separately for policy meetings (Panel A) and for speeches (Panel B).

The evidence suggests that accounting for individual contributors can lead to non-negligible differences in the resulting measures for both policy meetings and speeches. In particular, the absolute differences are often sizable, indicating that aggregation without correction may obscure meaningful variation attributable to contributor-specific effects. However, these discrepancies appear to diminish over time, implying that the influence of clustering corrections has become less pronounced in more recent years. This temporal pattern may reflect improvements in data collection, greater market liquidity, or increased homogeneity in contributors' behavior. Consequently, while such corrections remain important for earlier periods, their relevance may decline going forward.

Table 1: The Effect of controlling for contributor-level variation

	OIS Rates						
	1m	**2m**	**3m**	**1y**	**2y**	**5y**	**10y**
Panel A: Policy Meetings							
2000–2008							
Correlation	0.94	0.87	0.96	0.94	0.92	-	-
Mean	0.57	0.69	0.56	0.44	0.49	-	-
Median	0.20	0.31	0.33	0.25	0.28	-	-
2009–2025							
Correlation	0.99	0.99	0.99	0.97	0.98	1.00	0.99
Mean	0.28	0.26	0.25	0.34	0.36	0.15	0.16
Median	0.11	0.10	0.13	0.16	0.22	0.09	0.09
Full Sample							
Correlation	0.96	0.93	0.97	0.96	0.96	1.00	0.99
Mean	0.41	0.45	0.39	0.38	0.42	0.15	0.16
Median	0.13	0.17	0.20	0.19	0.25	0.09	0.09
Panel B: Speeches							
2000–2008							
Correlation	0.76	0.65	0.60	0.91	0.91	-	-
Mean	0.40	0.39	0.42	0.31	0.37	-	-
Median	0.15	0.20	0.20	0.22	0.25	-	-
2009–2025							
Correlation	0.53	0.73	0.75	0.93	0.93	0.98	0.92
Mean	0.14	0.15	0.16	0.19	0.25	0.15	0.14
Median	0.01	0.05	0.07	0.11	0.14	0.10	0.06
Full Sample							
Correlation	0.72	0.67	0.65	0.92	0.92	0.98	0.92
Mean	0.20	0.20	0.22	0.22	0.28	0.15	0.14
Median	0.02	0.07	0.09	0.13	0.16	0.10	0.06

Notes: The table shows the impact of controlling for different contributors. Reported values are absolute changes in basis points (except for correlation) between surprises estimated with and without controlling for individual contributors in the OIS market. OIS rate observations for 5- and 10-year maturities start in 2011.

The third issue EA-EMPD addresses has to do with the day count between a speech and the next Governing Council meeting. Swap rates, particularly short-term OIS rates, reflect the average expected overnight rate over the entire contract period, rather than the expected policy rate on a specific day (and term premium, which we disregard for the one-month rate in daily changes). As a result, high-frequency changes in OIS yields around policy announcements capture only a fraction of the underlying shift in expectations, depending on how many days remain in the contract's accrual period after the next meeting. Specifically, assume the one-month OIS at time $t-1$ and t (both times within the day of the speech) are weighted averages of the known (old) policy rate i^o that applies for m days of the month and the expected (new) policy rate i^n that will apply for the remaining $30-m$ days:

$$30 \times OIS_{t-1} = m \times i^o + (30-m) \times \mathbb{E}_{t-1} i^n, \tag{1}$$

$$30 \times OIS_t = m \times i^o + (30-m) \times \mathbb{E}_t i^n. \tag{2}$$

Subtracting the the pre-speech rate from the post-speech one relations eliminates the known i^o term and gives the change in the market's expectation of the new policy rate—the speech surprise associated with the policy rate—as:

$$\mathbb{E}_t i^n - \mathbb{E}_{t-1} i^n = \frac{30}{30-m} \left(OIS_t - OIS_{t-1} \right). \tag{3}$$

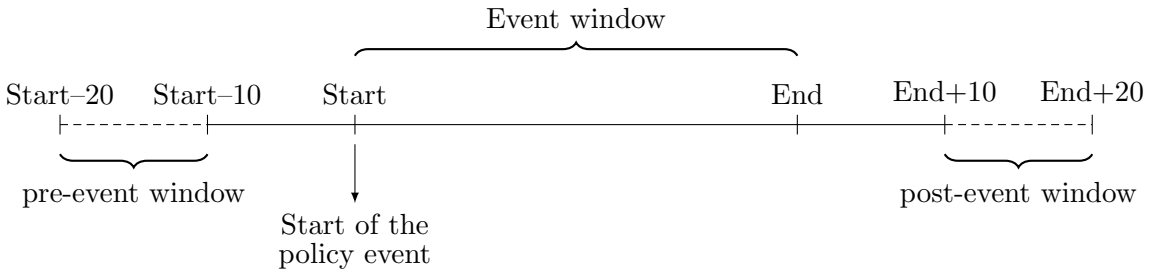
For example, if a 30-day OIS rate falls by 2 basis points when 20 accrual days remain in the contract after the next meeting, the implied step decline in the expected overnight rate is approximately 2×(30/20)=3 bps. To obtain an accurate measure of the monetary policy surprise at each point in time, we rely on OIS contracts whose maturities encompass only one Governing Council meeting, hence we drop the events that have more than one meeting in the next 30 days (very rare) and use the two-month OIS rate when there is no meeting in the next month.

On days featuring monetary policy events—either Governing Council (GC) meetings or public speeches by ECB policymakers—we record both the start and end times of each event and define two distinct intervals around the event: a pre-event window and a post-event window. To ensure data quality, we begin by cleaning the high-frequency financial data to remove outliers, misquotes, and participant cluster effects. We then discretize the time series by extracting the last available quote for each one-minute interval within both windows.

The pre-event price is computed as the median of these one-minute quotes during the interval spanning 20 to 10 minutes before the event, while the post-event price is calculated as the median over the 10 to 20 minute window following the conclusion of the event. This approach—using a range of minutes rather than relying on a single point estimate—reduces sensitivity to noise and minimizes the risk of selecting an unrepresentative or spurious price observation due to microstructure effects or short-term volatility.

Figure 2 provides an illustration of the event measurement timeline.

Figure 2: Policy event timeline



Notes: The figure illustrates the typical structure of policy communication on the day of a policy event, whether it involves a speech or a Governing Council meeting of the ECB.

The policy surprise associated with a given event is defined as the change in asset prices induced by the communication, operationalized as the difference between the post-event and pre-event median quotes. These changes, recorded in the database, are market-based measures of

monetary policy surprises.

We use 30-minute event windows for both Governing Council press releases and speeches. Since the euro's inception, ECB policymakers' speeches have been published in full text at the scheduled start time, meaning that market reactions reflect the content of the text more than the delivery itself, which in any case typically lasts about 30 minutes. Accordingly, 30-minute windows are sufficient to capture the full market response.[3]

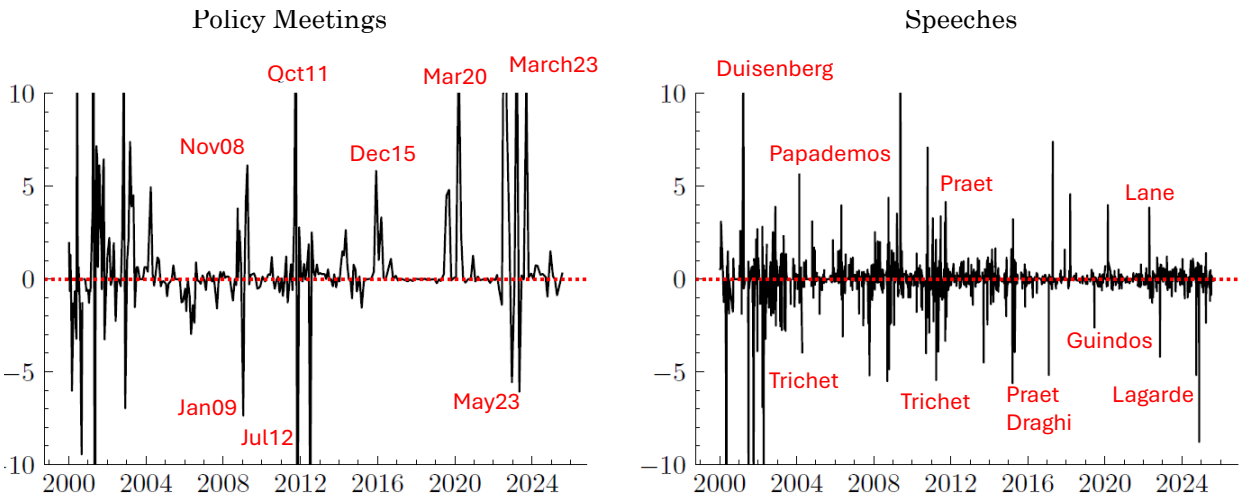
When expanding the set of policy events to include speeches, three additional challenges arise. First, the event window may be too tight to capture market reactions to speeches of various types. Second, in some cases, speeches occur outside of trading hours. Third, concurrent events, such as significant macroeconomic data releases, can act as confounding factors, complicating identification efforts.

We address the first concern using robustness tests in which we vary the timing of the event window. The second issue is handled by excluding, in our baseline specification, speeches delivered outside trading hours. In robustness checks, we alternatively use the last available quote before the announcement window and the first quote at next day's market opening. To mitigate the third concern, related to potential confounding events, we rely on the Bloomberg Economic Calendar (ECO) to replicate the real-time information set available to market participants. Specifically, we account for all euro area and U.S. macroeconomic data releases that overlap with our event windows. In particular, we exclude all speeches and rate-setting meetings whose event windows contain a data release with a relevance index above 90—that is, a release for which at least 90% of Bloomberg users have set an alert.

Figure 3 displays the time series of one-month Overnight Index Swap rate changes surrounding events included in the EA-EMPD dataset. The left panel plots surprises associated with Governing Council announcements, with particularly large surprises highlighted in red. The right panel illustrates market reactions to policymakers' speeches, where the names of ECB officials delivering the speeches are marked in red to indicate the most prominent events.

[3]For the U.S., where Q&A is common, Swanson and Jayawickrema (2024) implement a similar measurement strategy but tailor the event window length to the specific type of policy communication: 30 minutes for FOMC announcements, 85 minutes for post-FOMC press conferences, 60 minutes for the release of meeting minutes, 90 minutes for speeches by the Fed Chair or Vice Chair (excluding Congressional testimony), and up to 2 hours and 55 minutes for Congressional testimony.

Figure 3: Monetary policy surprises



Notes: The figure presents monetary policy surprises associated with policy meetings (left panel) and speeches by ECB Executive Board members (right panel), as captured by changes in 1-month overnight index swap (OIS) rates over a 30-minute window around each event.

The left panel highlights several notable monetary policy surprises associated with key ECB decisions. For instance, the 50 basis point policy rate cut in November 2008 generated a sizeable positive surprise, whereas a similar cut in January 2009 produced a negative one. Another pronounced negative surprise occurred in July 2012, when the ECB lowered its key rates by 25 basis points. As this indicator is designed to capture surprises related to policy rate changes, the market's reaction to the announcement of the Asset Purchase Programme (APP) in January 2015—a landmark expansion of the ECB's policy toolkit—was essentially zero, indicating that this announcement was not directly linked to policy rate adjustments. More recently, a strong positive surprise is observed in March 2023, following the ECB's decision to raise rates by 50 basis points.[4] These surprise measures are consistent with stories in the financial press.

The right panel demonstrates that speeches delivered by ECB Presidents and other members of the Executive Board have also occasionally exerted a measurable influence on short-term interest rate expectations. This implies that policy-relevant communication delivered through speeches also plays a non-negligible role in shaping financial market outcomes.

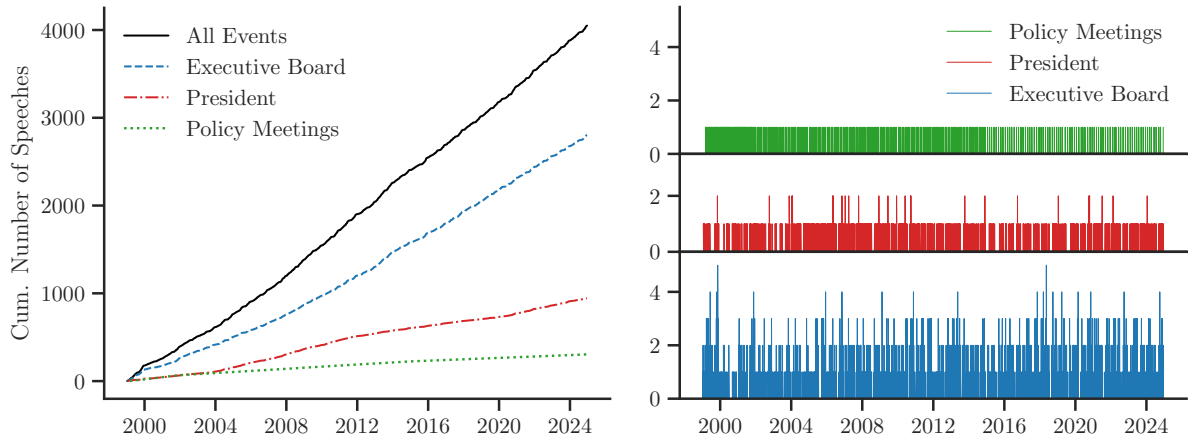
Figure 4 illustrates the evolution of monetary policy communication events over time. Panel (a) presents the cumulative count of speeches delivered by members of the ECB Executive Board, including the President, alongside the cumulative number of official monetary policy decisions issued at Governing Council (GC) meetings. Panel (b) provides further insight into the intensity and temporal distribution of policy communication. It documents the increasing prevalence of policy-relevant speeches outside of formal decision days (which have decreased in frequency from twice a month to monthly to eight times a year), as well as the rising number of speeches delivered

[4] Rostagno et al. (2021) presents a comprehensive overview of the first two decades of monetary policy in the euro area.

per day. In recent years, it is not uncommon to observe multiple speeches by Executive Board members on a single day, underscoring the increasingly decentralized and continuous nature of ECB communication.

Expanding the analytical scope from exclusively considering official policy meetings to also including speeches results in a dramatic increase in the number of identifiable policy events. Specifically, while the total number of ECB Governing Council meetings since the euro's inception is approximately 300, the inclusion of speeches raises the total count of events to over 4,000—a more than tenfold increase. This substantial expansion highlights the richness of the EA-EMPD dataset and underscores the need to account for a broader set of communication channels when assessing the transmission of monetary policy in the euro area.

Figure 4: Policy events over time



(a) Cumulative number of events

(b) Daily number of speeches

Notes: This figure plots the cumulated number of all policy events considered in the empirical analysis (left panel) and their daily distribution (right panel). *Executive Board* excludes speeches by the president.

Table 2 provides a quantitative assessment of the relative importance of different types of monetary policy communication—namely, policy meetings, presidential speeches, and speeches by other Executive Board (EB) members—on a range of financial assets. Policy meetings generate the largest responses across all asset classes, particularly at the short end of the risk-free yield curve (1m and 3m OIS). However, speeches by both the ECB President and other EB members also exert substantial effects, especially on longer-term yields and risk assets such as exchange rates and equities. These findings underscore the importance of broadening the scope of monetary policy event studies beyond formal meetings.

Overall, policy meetings remain the primary source of monetary policy-induced variation in the euro area financial markets. This contrasts with evidence from the US, where FED Chair speeches are found to have a greater market impact than FOMC announcements (Swanson and Jayawickrema, 2024). This difference may stem from the distinct power structures of the ECB Governing Council and the Federal Reserve's FOMC. A thorough examination of this difference is a topic for future research.

Table 2: Importance of different policy events

	OIS rates							other assets	
	1m	2m	3m	1y	2y	5y	10y	EXR	stock
Mean absolute change [bp]									
Policy Meetings	1.36	1.23	1.27	1.30	1.40	1.71	1.37	24.62	37.50
President	0.22	0.24	0.27	0.60	0.83	0.84	0.90	10.85	22.73
Executive Board	0.20	0.21	0.22	0.43	0.62	0.67	0.78	9.73	23.69

Notes: This table reports the impact of different policy events on risk-free rates, exchange rates and the European stock index. It shows the average absolute change around each policy event in basis points. Observations of the risk-free rates for 5- and 10-year maturities start in 2011.

3 The impact of monetary policy on financial markets

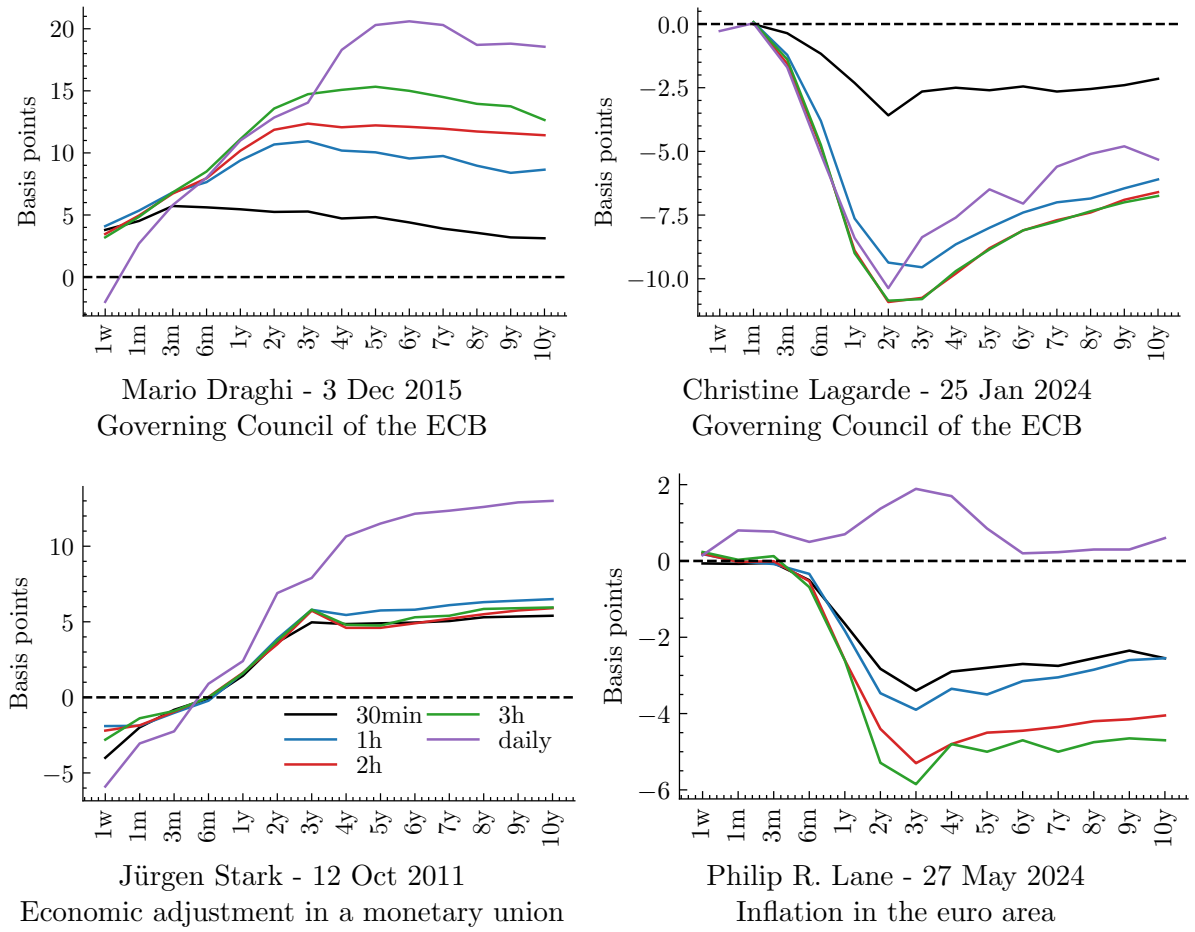
In this section, we assess the effects of monetary policy on financial markets, when monetary policy is not limited to Governing Council announcements. Leveraging the EA-EMPD, we track changes in asset prices for numerous variables within a narrow window surrounding a comprehensive set of policy events.

Many studies have used high-frequency changes in asset prices around the Federal Reserve's Federal Open Market Committee (FOMC) announcements to measure the effects of US monetary policy on financial markets (Kuttner 2001, Gürkaynak et al. 2005, Bernanke and Kuttner 2005, and Swanson 2021). For the euro area, work on related questions have been done by Brand et al. (2010), Rogers et al. (2018), Altavilla et al. (2019), Cieslak and Schrimpf (2019), Jarociński and Karadi (2020), and Andrade and Ferroni (2021), among others.

Figure 5 shows the impact of four selected policy events across different OIS maturities (x-axis) and event windows, ranging from 30 minutes (black line) to 60, 120, 180 minutes,[5] and 1 day (purple line). The first row presents the reactions of risk-free rates to two Governing Council meetings, while the second row displays the changes in OIS rates following two speeches by the ECB Chief Economists. The figure suggests that speeches can influence OIS rates across maturities in a manner similar to Governing Council announcements. It also shows that the market reactions are not temporary changes that die out within the day. Daily changes are close to and often larger than 30-minute window changes. In the next subsection, we will formalize this evidence through a comprehensive analysis of the footprint of policy events.

[5]These windows begin at the beginning of the speech and in effect determine the end of the speech. The 10-minute buffer and the post-event price window follow the end of the speech.

Figure 5: Selected policy events



Notes: The figure shows the reaction of OIS rates at various maturities (x-axis) in basis points (y-axis) to four selected policy events.

3.1 The effect on financial markets

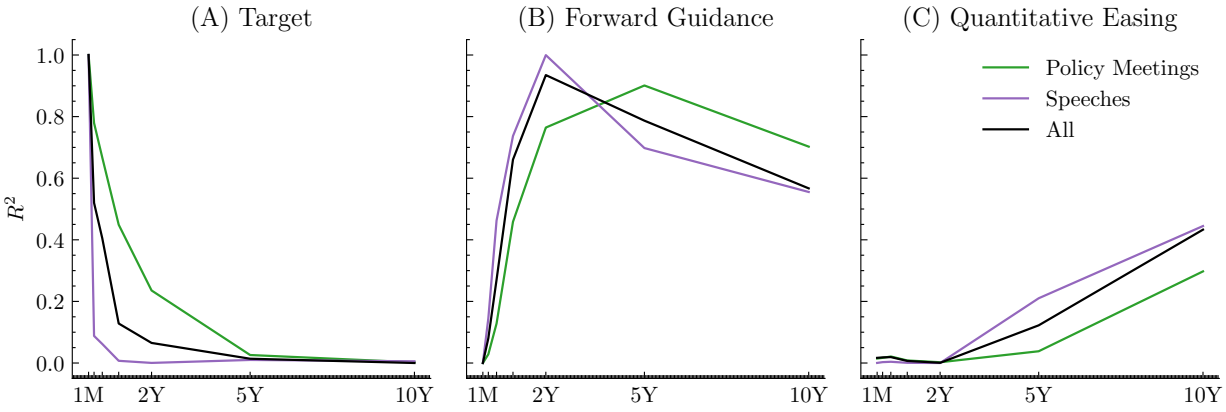
In this section we characterise the impact of monetary policy events (both speeches and official announcements) according to their effect on the term structure of interest rates. The key identifying assumption is that monetary policy communication does not react to asset price movements within the same day, allowing us to infer causality from monetary policy to asset prices.

We measure monetary policy as a potentially three-dimensional process, encompassing Target, Path (Forward Guidance), and Quantitative Easing (QE) components. Instead of employing a full factor analysis (Gürkaynak et al. 2005; Altavilla et al. 2019), we define the target factor as the surprise change in the 1-month OIS rate itself, the forward guidance factor as any additional movement in the 2-year OIS yield orthogonal to the change in the target factor, and the QE factor as any additional movement in the 10-year OIS yield orthogonal to the first two factors. This straightforward set of identifying assumptions, used in prior studies (Rogers et al. 2018; Gilchrist et al. 2019; Swanson 2021), produces empirical factors that exhibit a correlation exceeding 90%

with the three rotated factors obtained from the comprehensive factor analysis of Altavilla et al. (2019).

Figure 6 displays the typical footprint of the three empirical factors across different maturities.

Figure 6: Empirical factors



Notes: The figure depicts the distinct influence of the three estimated empirical factors across different maturities of the risk-free yield curve. The target factor is represented by changes in 1-month OIS rates. Forward guidance is indicated by changes in the 2-year OIS rate, adjusted to exclude the effects of target surprises. Quantitative easing is shown through changes in 10-year OIS yields, adjusted to exclude the effects of both target and forward guidance surprises.

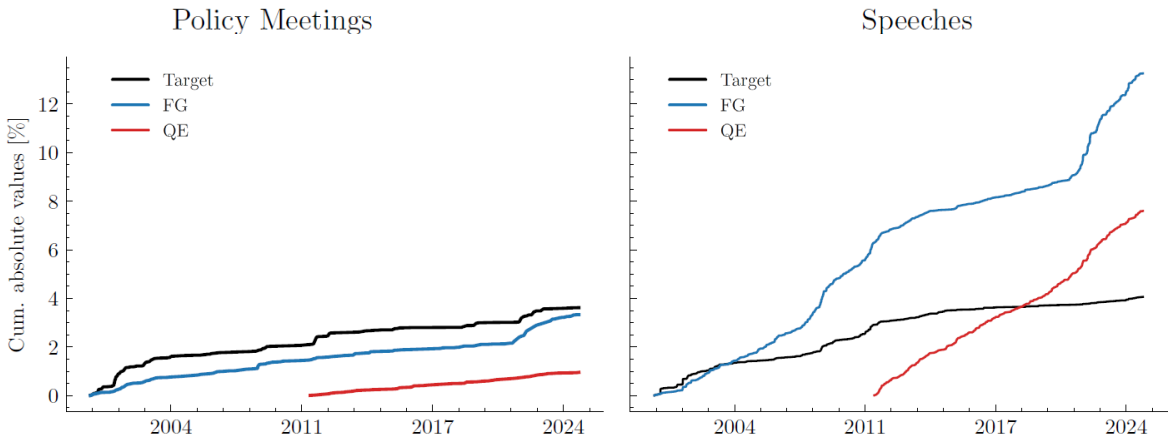
The charts show that the factors–estimated using surprises from policy meetings only (green line), speeches only (purple line), or a combination of both (black line)–leave a broadly similar imprint on the term structure. Specifically, the Target surprise primarily affects the short end of the curve, with its impact diminishing as maturity increases (Panel A). [6]

The Forward Guidance factor influences interest rates across all maturities beyond one month and typically follows a hump-shaped pattern (Panel B). In contrast, the QE factor differs from Forward Guidance by exerting a stronger influence at longer maturities (Panel C).

We now turn to examining how frequently policy meetings and speeches correspond to each of the three empirical factors. Figure 7 investigates whether these events leave distinct footprints on the term structure of interest rates. By analyzing how their impact propagates across maturities, we classify each event based on its dominant monetary policy effect: Target, Forward Guidance, or QE. Each policy event is assigned to a factor according to the maturity at which it exerts its maximum impact (1-month for Target, 2-year for Forward Guidance, and 10-year for QE).

[6] Although the footprint of the target factor extracted from speeches appears visually small, it is positive and correlates with longer maturities of up to 10%.

Figure 7: Importance of empirical factors over time



Notes: The figure reports the cumulative absolute changes in policy events classified as Target (black line), Forward Guidance (blue line), and Quantitative Easing (QE). Each event is assigned to a specific factor based on the largest absolute empirical factor movement.

The figure reports the cumulative absolute changes in policy events classified as Target, Forward Guidance, and Quantitative Easing, with each event assigned to the factor exhibiting the largest absolute empirical movement. The figure distinguishes between policy meetings (left column) and speeches (right column). The results reveal that speeches exert their largest impact at intermediate maturities, consistent with a forward guidance channel. In contrast, policy meetings display a more balanced distribution between target and forward guidance components, with pronounced effects on short-term rates that taper off along the maturity spectrum. These patterns suggest that, while speeches are primarily used to shape market expectations about the future path of monetary policy (both with respect to interest rates and balance sheet policies), they are also used to signal imminent policy changes. In contrast, Governing Council meetings tend to focus more heavily on immediate rate-setting decisions, reinforcing their influence on the short end of the yield curve. This highlights potential complementarities between speeches and meetings, the differentiated role of various communication tools in shaping market expectations and the maturity-specific transmission of monetary policy shocks.

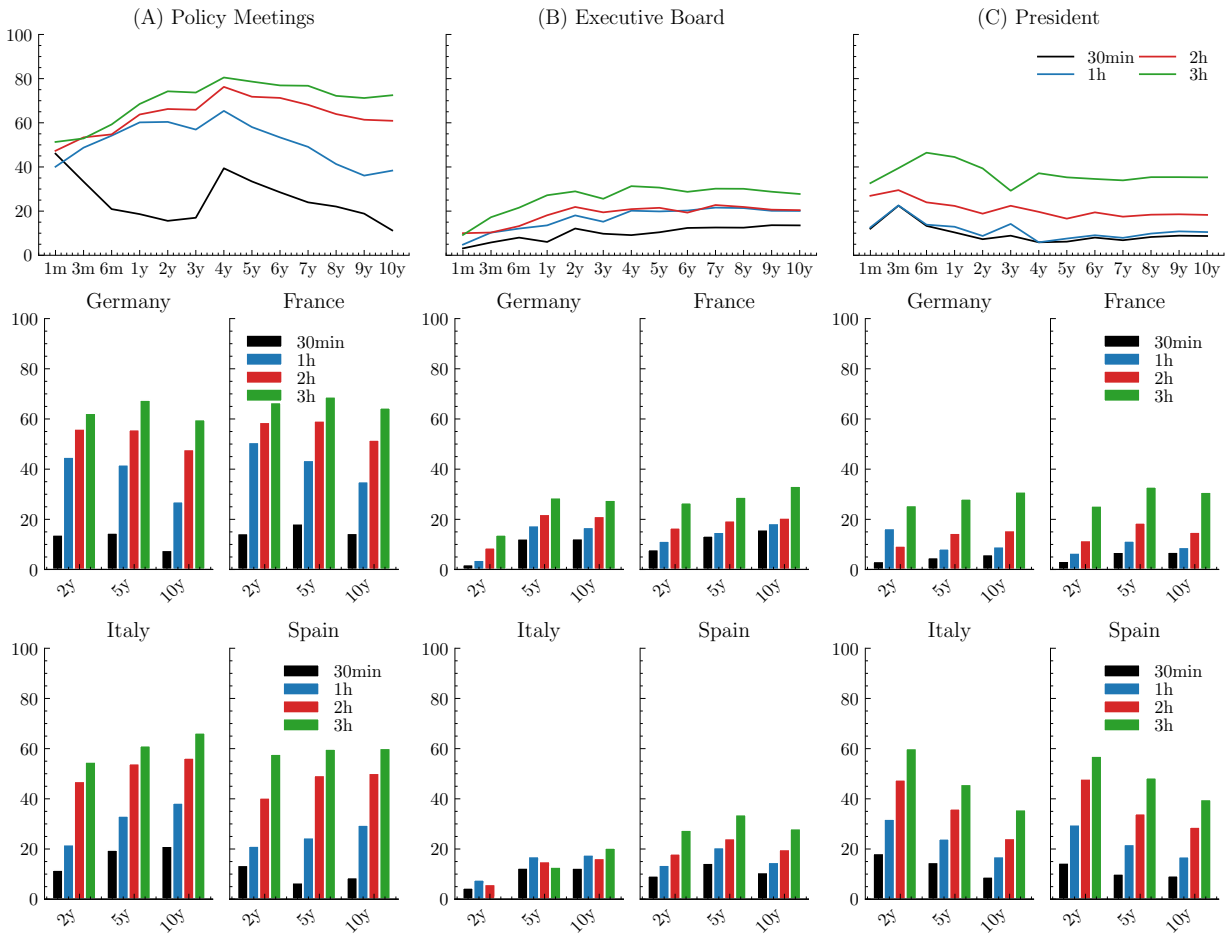
3.2 Share of variance explained by speeches and policy meetings

A central question in assessing the relative influence of monetary policy meetings versus public speeches concerns the extent to which these distinct types of communication account for daily fluctuations in financial market prices—including sovereign yields.

To this end, Figure 8 decomposes the share of daily variance in yields across various maturities that can be attributed to announcements made during Governing Council (GC) meetings (Panel A) and to speeches delivered by members of the ECB Executive Board (Panel B) and the ECB President (Panel C). The comparison yields clear and economically significant differences:

monetary policy surprises occurring on GC meeting days explain a markedly larger portion of the variance in financial market outcomes relative to those associated with speeches.

Figure 8: Share of daily variance explained by policy events



Notes: The figure shows the share of variance of OIS rates and sovereign yields at different maturities explained by Governing Council meetings (column 1), other EB member speeches (column 2) and speeches by the president (column 3).

Specifically, up to 80% of the intraday variance in sovereign yields on GC meeting days can be traced to yield changes within narrowly defined policy event windows. In contrast, the explanatory power of speeches is considerably more limited, with the share of variance attributable to within-window movements peaking at around 40%. Importantly, this pattern holds across the entire maturity structure of the euro area risk-free yield curve, indicating a robust distinction in informational content and market relevance between the two types of events.

These findings highlight the central role of formal monetary policy meetings in anchoring market expectations and driving asset price adjustments, even amid a broader shift toward communication-based monetary policy frameworks. While speeches by ECB officials do exert measurable effects on sovereign yields—particularly at shorter and intermediate maturities—their

influence is consistently more limited in magnitude and less uniform across the yield curve. This stands in sharp contrast to the U.S. experience, where Bauer and Swanson (2021) show that speeches by the Federal Reserve Chair can, at times, generate larger market responses than the formal statements issued following FOMC meetings. In the euro area, policy speeches contribute meaningfully to the overall policy signal, but their impact remains clearly below that of scheduled policy meetings.

4 Transmission to the real economy

In this section, we turn to evaluating the impact of monetary policy on the real economy and its transmission channels. Having identified the high-frequency changes in financial assets associated with policy actions using the EA-EMPD, we can now incorporate these insights into a dynamic macroeconomic model. We employ a Bayesian Vector Autoregression (BVAR) model augmented with monetary policy surprises, capturing policy-induced shocks to interest rates. Our analysis addresses three key dimensions of monetary policy identification and transmission. First, we examine how the informational content of central bank speeches affect the relevance and exogeneity of monetary policy surprises. Second, we assess the transmission of monetary policy to real economic variables by employing an alternative event set that includes both official policy meetings and communication events, thereby broadening the proxy for monetary policy actions. Third, we analyze how the inclusion of speeches as policy-relevant events affects the proportion of forecast error variance in real economic variables that can be attributed to monetary policy shocks.

4.1 Relevance of surprises

Many studies have used high-frequency changes in interest rates around FOMC announcements as an "external instrument" (Stock and Watson 2012) to estimate the effects of monetary policy on lower-frequency macroeconomic variables such as output, unemployment, and inflation (e.g., Faust et al. 2003; Faust et al. 2004; Gertler and Karadi 2015; Ramey 2016; Bauer and Swanson 2023b).

A potential issue with using high-frequency surprises around monetary policy announcements as a proxy for policy-driven changes in interest rates is that they may capture only a small portion of the variation in policy rates, limiting their effectiveness as instruments for the variables they aim to represent. This weak-instrument risk has been extensively documented in the literature, particularly in VAR settings like ours (Stock and Watson (2012); Ramey (2016)).

To address this concern, we explore whether expanding the set of monetary policy events to include policymakers' speeches can mitigate potential weak-instrument problems for the analysis of euro area. Specifically, we test whether augmenting the dataset with high-frequency interest rate responses to speeches improves the power of our high-frequency instrument. To do so, we estimate the following monthly regression:

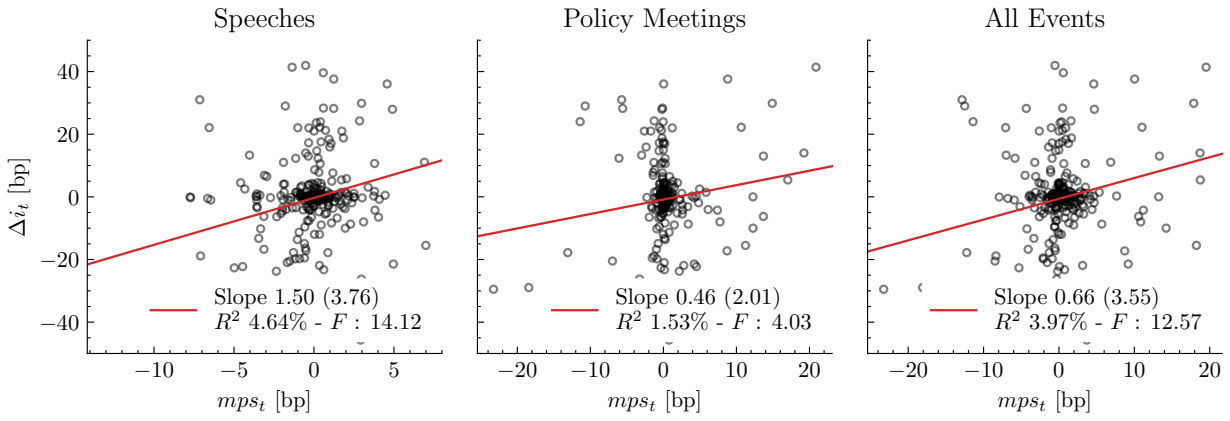
$$\Delta i_t = \alpha + \beta mps_t + \varepsilon_t \tag{4}$$

where mps_t represents monetary policy surprises measured as changes in yields around either Governing Council announcements or policymakers' speeches.

According to the rule of thumb proposed by Stock and Watson (2012), an instrument is considered weak if the first-stage F-statistic in a two-stage least squares regression is below 10. Our results show that, while using Governing Council announcements produces a weak instrument, augmenting these with information from speeches fully mitigates this problem. These findings are consistent with those of Bauer and Swanson (2023b) for the US, who highlighted the importance of policymakers' speeches as a source of monetary policy information.

Figure 9 reports the results of first-stage regressions linking monthly changes in the one-month OIS rate to high-frequency monetary policy surprises derived from the same underlying asset. Regressions are shown separately for speeches (left panel), policy meetings (middle panel), and the full set of events (right panel). The relationship is notably stronger for speeches, with an R^2 of approximately 5% and an F-statistic above 14, indicating statistically significant and economically meaningful explanatory power. In contrast, policy meetings exhibit a smaller slope and lower explanatory power ($R^2 = 1.5\%$) with a weaker F-statistic of about 4. When all events are pooled, the explanatory power remains substantial, with an R^2 of 4% and an F-statistic close to 13, suggesting that including speeches significantly enhances the predictive content of high-frequency surprises. These results highlight the importance of incorporating speech-related policy surprises in empirical specifications, as they convey information relevant to monthly yield movements.

Figure 9: First-stage regression for benchmark event windows

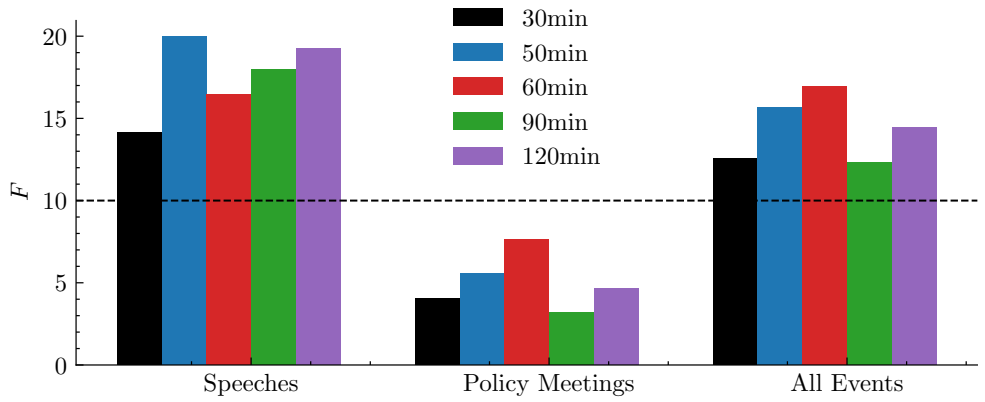


Notes: The figure reports the first stage regression of monthly changes in the one-month OIS on the high-frequency monetary policy shocks of the same underlying asset.

Figure 10 repeats the first-stage F-test of Figure 9 for wider intraday windows (45 to 120 minutes). Across all horizons, the instrument based on speeches exceeds the weak-instrument threshold of 10. By contrast, the instrument that uses Governing Council meetings only never reaches the threshold level, while combining both in "all events" also exceeds the threshold. These

patterns confirm that the relevance gains documented in Figure 9 are not an artifact of the chosen event window and incorporating speech-based surprises consistently strengthens the first stage. Event study-based monetary policy surprises become better instruments for VAR-based shocks with the inclusion of policymaker speeches in the event set.

Figure 10: First-stage regression for different windows



Notes: The figure reports the F-test statistics for the first stage regression of daily changes in the one-month OIS on the high-frequency monetary policy shocks of the same underlying asset.

4.2 Exogeneity of surprises

This subsection assesses the exogeneity of monetary policy surprises. We begin by examining their in-sample predictability using macroeconomic news. Specifically, we construct an economic surprise index by comparing actual data releases to the corresponding Bloomberg median forecasts, following Altavilla et al. (2017). To ensure comparability across different macroeconomic indicators, each surprise series is standardized by its historical standard deviation. The resulting index is then calculated as a relevance-weighted moving average over the preceding six weeks, corresponding to the typical interval between Governing Council meetings (eight per year):

$$I_t = \sum_{i \in [t-s,t]} w_i \frac{Release_t^i - Forecast_t^i}{\sigma^i}, \tag{5}$$

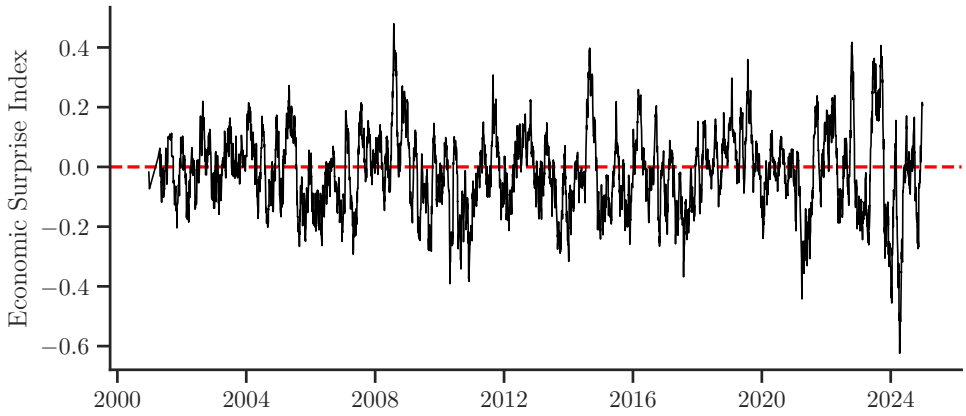
where w_i represents the weight determined by the Bloomberg relevance score and σ^i denotes the standard deviation of each macroeconomic series.

Figure 11 depicts the economic surprise index, which measures the extent to which incoming economic data exceed or fall short of market expectations, providing a real-time gauge of macroeconomic momentum relative to forecasts. The index exhibits pronounced cyclical patterns, often coinciding with key phases of the business cycle. Sustained positive values typically reflect stronger-than-expected growth or recovery, with indicators such as GDP, employment, and

sentiment measures outperforming analyst projections. Notable positive spikes appear around turning points, including post-crisis recoveries or following expansionary policy measures. Conversely, sharp declines and prolonged negative values are observed during economic slowdowns, periods of heightened uncertainty, or episodes of tighter financial conditions, when macroeconomic releases fall short of expectations.

The index also displays considerable volatility in response to exogenous shocks. Notable episodes include the global financial crisis, the European sovereign debt crisis, and the COVID-19 pandemic, during which the index fluctuated rapidly as markets struggled to recalibrate expectations in the face of unprecedented developments. More recently, elevated volatility and frequent reversals in the index reflect the heightened uncertainty surrounding monetary policy normalization, inflation persistence, and geopolitical risks.

Figure 11: Surprise index



Notes: The figure shows the economic surprise index constructed by taking the 6-weeks moving average of standardized surprises around macroeconomic news announcements.

Table 3 presents results from predictive regressions assessing the extent to which the economic surprise index (I) explain monetary policy surprises—measured around all policy events—in short-term interest rates and sovereign bond yields across a cross-section of euro area countries:

$$mps_t = \alpha + \beta I_{t-1} + \varepsilon_t. \tag{6}$$

Panel A reports the coefficients associated with policy rate changes on days of official monetary policy meetings. The estimated coefficients are generally not statistically significant, similar to those associated with speeches (Panel B). The explanatory power of these regressions remains limited, with R^2 values below 1% across all specifications, suggesting that monetary policy surprises measured around speeches and GC meetings are exogenous to macroeconomic news[7].

[7]The results remain robust when using a surprise index based on a moving average aligned with monthly Governing Council meetings prior to 2015.

Table 3: Predictive regressions

	OIS 1M	OIS 3M	OIS 1Y	DE 2Y	IT 2Y	FR 2Y	ES 2Y
A: Policy Meetings							
β	1.42	0.909	−0.718	−1.33	−2.58	−0.832	−1.66
	(1.65)	(1.34)	(1.25)	(1.42)	(1.94)	(1.39)	(1.55)
R^2	0.29%	0.18%	0.13%	0.34%	0.68%	0.14%	0.44%
B: Speeches							
β	−0.091	−0.215*	−0.172	−0.128	−0.596*	−0.121	−0.075
	(0.11)	(0.12)	(0.16)	(0.26)	(0.36)	(0.25)	(0.32)
R^2	0.03%	0.17%	0.06%	0.01%	0.14%	0.01%	0.00%

Notes: The table reports the prediction results for the high-frequency surprises using the economic surprise index.

Motivated by Bauer and Swanson (2023b), we augment the baseline univariate regression by including six-week changes in the yield curve slope (DSlope), the Bloomberg Commodity Index (DBCI), and equity markets (DStoxx) as additional controls. Table 4 reports the results of these extended predictive regressions, which aim to better isolate the informational content of economic surprises and broad financial market changes Panel A focuses on policy meeting days, while Panel B examines days with policymakers' speeches.

In Panel A, equity market changes (DStoxx) emerge as the only control variable consistently significant across OIS maturities and sovereign yields, suggesting that policy surprises on meeting days are partially predictable, with stock market movements serving as the key explanatory factor. In contrast, Panel B yields weaker results: coefficients are smaller in magnitude and statistically insignificant, implying that surprises around speeches remain largely exogenous and resistant to prediction, even after controlling for broader macro-financial conditions. Overall, explanatory power (R^2) is limited in both panels—particularly for speeches—highlighting the inherent difficulty in forecasting market reactions to communication events.

The observed negative correlation between pre-announcement equity returns and subsequent monetary policy surprises suggests that market participants anticipate a more reactive stance from the ECB than is ultimately realized. For example, declining equity prices likely lead investors to expect a dovish policy adjustment aimed at stabilizing financial conditions. However, if the central bank responds less aggressively—or with greater delay—than expected, the resulting policy surprise is perceived as contractionary. Consistent with this interpretation, we find the strongest negative co-movement with short-term rate surprises, which diminishes at longer maturities. This pattern supports the notion that markets overestimate the immediacy of the ECB's reaction to financial market developments. This stands in contrast to the findings of Bauer and Swanson (2023b), who document that U.S. markets tend to underestimate the responsiveness of the Federal Reserve.

Table 4: Extended predictive regressions

	OIS 1M	OIS 3M	OIS 1Y	DE 2Y	IT 2Y	FR 2Y	ES 2Y
Panel A: Policy Meetings							
β(Dslope)	−0.0448	−0.146	−0.0734	0.0115	0.0882	0.0212	−0.164
	(0.23)	(0.19)	(0.18)	(0.21)	(0.26)	(0.20)	(0.21)
β(DBCI)	−0.437*	−0.217	−0.0546	−0.112	0.0917	−0.187	0.225
	(0.25)	(0.20)	(0.19)	(0.22)	(0.28)	(0.21)	(0.22)
β(Dstoxx)	−0.946***	−0.44**	−0.443**	−0.36*	−1.15***	−0.398*	−0.616***
	(0.25)	(0.20)	(0.19)	(0.22)	(0.28)	(0.21)	(0.23)
$\beta(I)$	−0.0602	−0.0362	−0.315*	−0.353*	−0.744***	−0.306	−0.411*
	(0.23)	(0.19)	(0.18)	(0.21)	(0.26)	(0.20)	(0.21)
R^2	10.24%	3.87%	3.66%	2.63%	9.63%	3.29%	4.20%
Panel B: Speeches							
β(Dslope)	0.014	0.0229	−0.00947	−0.0494	−0.0993	−0.076	−0.0164
	(0.02)	(0.03)	(0.03)	(0.05)	(0.08)	(0.05)	(0.07)
β(DBCI)	0.0115	0.033	0.074**	0.059	0.0228	0.0476	0.03
	(0.02)	(0.03)	(0.03)	(0.05)	(0.08)	(0.05)	(0.07)
β(Dstoxx)	−0.00783	−0.0413	−0.063*	−0.0256	−0.0906	−0.0307	−0.0398
	(0.02)	(0.03)	(0.03)	(0.05)	(0.08)	(0.06)	(0.07)
$\beta(I)$	−0.0241	−0.0412*	−0.0396	−0.0225	−0.222***	−0.00764	−0.107
	(0.02)	(0.02)	(0.03)	(0.05)	(0.08)	(0.05)	(0.07)
R^2	0.19%	0.78%	0.72%	0.21%	0.96%	0.24%	0.26%

Notes: The table reports the coefficients from predictive regressions of high-frequency monetary policy surprises (mps_t) on four pre-event variables: the six-week change in the term-structure slope (Dslope), the Bloomberg Commodity Index (DBCI), euro-area stock-market returns (Dstoxx), and the Economic Surprise Index (I). Panel A uses GC-meeting surprises; Panel B uses speech surprises. ***, **, * denote significance at the 1, 5, 10% levels, respectively.

4.3 The transmission of monetary policy to the real economy

To investigate the transmission of monetary policy shocks to real economic variables, we extend a standard Bayesian Vector Autoregression (BVAR) framework by incorporating exogenous monetary policy surprises. Let x_t denote a vector of macroeconomic and financial variables observed in month t, and mps_t a vector of monetary policy surprises in month t.

$$x_t = \begin{pmatrix} mps_t \\ y_t \end{pmatrix} = A_1 x_{t-1} + A_2 x_{t-2} + \cdots + A_p x_{t-p} + u_t, \tag{7}$$

$$u_t \sim (0, \Sigma_u), \tag{8}$$

where mps_t denotes the monetary policy surprise and y_t is the $(n \times 1)$ vector of endogenous variables. In our baseline model the vector $\{y_t\}$ includes industrial production and inflation. We also report results for an extended set of endogenous variables, including loan volumes and

lending rate spreads, to provide a more comprehensive characterization of the monetary policy transmission mechanism. To construct mps_t, we aggregate intraday surprises from days in month t that feature Governing Council meetings or speeches by Executive Board members. The variable mps_t is set to zero for months without such announcements or speeches. The BVAR(p) model can be expressed formally in matrix notation as:

$$\begin{pmatrix} 1 & 0 \\ A_0{}^{y,mps} & I \end{pmatrix} \begin{pmatrix} mps_t \\ y_t \end{pmatrix} = A(L) \begin{pmatrix} mps_{t-1} \\ y_{t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_t^{mps} \\ \varepsilon_t^{y} \end{pmatrix}.$$

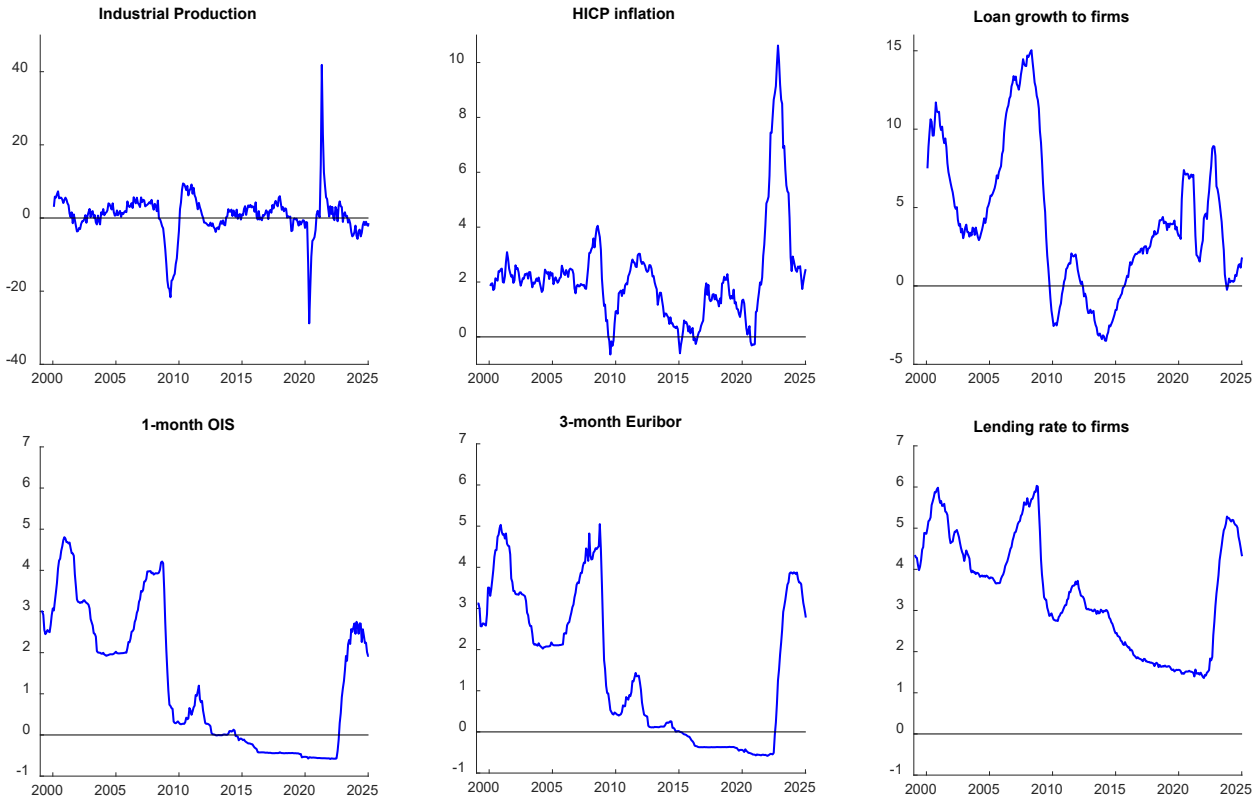
where ε_t, are now structural shocks. This "internal instrument" approach (Stock and Watson 2018, Plagborg-Møller and Wolf 2021, 2022) augments the VAR with an instrument for monetary policy, treats mps_t as exogenous, and imposes zero restrictions so that mps_t may contemporaneously affect all elements of y_t, while contemporaneous feedback from y_t to mps_t is ruled out.

Alternative approaches in the literature use mps_t as "external instruments" in VARs or in local projections (e.g., Stock and Watson 2012; Mertens and Ravn 2013; Gertler and Karadi 2015; Jarociński and Karadi 2020). In principle, these two approaches can be used interchangeably, as they produce asymptotically equivalent impulse responses, differing only by a constant scaling factor (Stock and Watson 2018; Plagborg-Møller and Wolf 2021).

The model is estimated using monthly data over the sample period spanning from January 2001 to September 2025, with four lags included for each endogenous variable. Estimation is conducted within a Bayesian framework to mitigate overparameterization and improve inference in the presence of limited sample information. In particular, the specification employs a variant of the Minnesota prior, initially proposed by Litterman (1979, 1980). This prior is grounded in the assumption that each variable evolves according to a random walk process, possibly with a deterministic drift, thereby offering a parsimonious yet empirically consistent characterization of macroeconomic dynamics (Litterman 1979). The Minnesota prior imposes shrinkage on coefficients associated with lagged and cross-variable terms, while allowing the own first lag of each variable to remain relatively unrestricted, thus reflecting prior beliefs about the persistence of economic time series. Posterior distributions of the VAR parameters are obtained via a Gibbs sampling algorithm, which iteratively samples from the conditional posterior distributions until convergence. This approach facilitates efficient estimation and yields a coherent probabilistic characterization of parameter uncertainty, forming the basis for subsequent inference, including the computation of impulse response functions and forecast error variance decompositions. Similar results are obtained when the hyperparameters of the prior are estimated following the empirical Bayes procedure proposed by (Giannone et al. 2015).

Figure 12 plots the main macroeconomic variables used in the empirical analysis.

Figure 12: Dynamics of key macroeconomic variables



Notes: This figure shows the time series of industrial production, inflation, loans to NFCs, the 1-month OIS rate, the 3-month Euribor, and bank lending rates to firms.

Table 5 reports summary statistics for the key variables used in the analysis, based on monthly data from January 2001 to September 2025.

Industrial production exhibits considerable volatility, with a mean monthly growth rate of 0.47% and a standard deviation of 5.89. The distribution is skewed, with a minimum of -28.43% and a maximum of 41.40%, reflecting the effects of large economic shocks during the sample period. Inflation, measured as the year-on-year percentage change in consumer prices, averages 2.14% with a standard deviation of 1.86%. The interquartile range is relatively tight, with the 25th and 75th percentiles at 1.17% and 2.47%, respectively, though the maximum value reaches 10.62%. Loan growth to non-financial corporations (NFCs) averages 3.94%, with a standard deviation of 4.57%. The distribution spans from -3.50% to 15.04%, suggesting periods of both credit contraction and expansion. The 1-month Overnight Index Swap (OIS) rate has a mean of 1.32% and a standard deviation of 1.69%, ranging from -0.50% to 4.81%. This series serves as a proxy for short-term monetary policy conditions. Monetary policy surprises are captured using three different measures, all expressed in basis points (bps). The composite measure has a mean of 0.62 bps and a standard deviation of 3.92, with values ranging from -16.50 to 23.25 bps. Surprises associated with policy meetings are similar in distribution, with a mean of 0.59 bps and a slightly lower standard deviation of 3.46. Surprises extracted from policy-related speeches are

less volatile, averaging 0.04 bps with a standard deviation of 1.42 and a range from -8.95 to 10.10 bps.

Table 5: Summary statistics of macro variables

Variable	Mean	Std.Dev.	Min	25%	Median	75%	Max
Industrial Production	0.669	5.834	−28.700	−1.262	0.988	3.340	41.655
Inflation	2.145	1.814	−0.642	1.246	1.986	2.456	10.621
Loans to firms	4.167	4.616	−3.501	0.863	3.415	7.000	15.037
Lending spreads	1.904	0.533	0.729	1.430	1.988	2.297	3.023
mps_{all} [bps]	0.483	4.158	−23.250	−0.599	0.000	1.101	20.755
$mps_{meeting}$ [bps]	0.467	3.805	−23.250	−0.129	0.000	0.355	20.888
mps_{speech} [bps]	0.016	1.694	−8.836	−0.436	0.000	0.592	5.682

Notes: This table reports a summary of the properties of the monetary policy shocks and macro variables used in the BVAR.

Figure 13 presents the impulse responses of key macroeconomic variables to a monetary policy shock, identified using alternative measures of high-frequency monetary policy surprises.

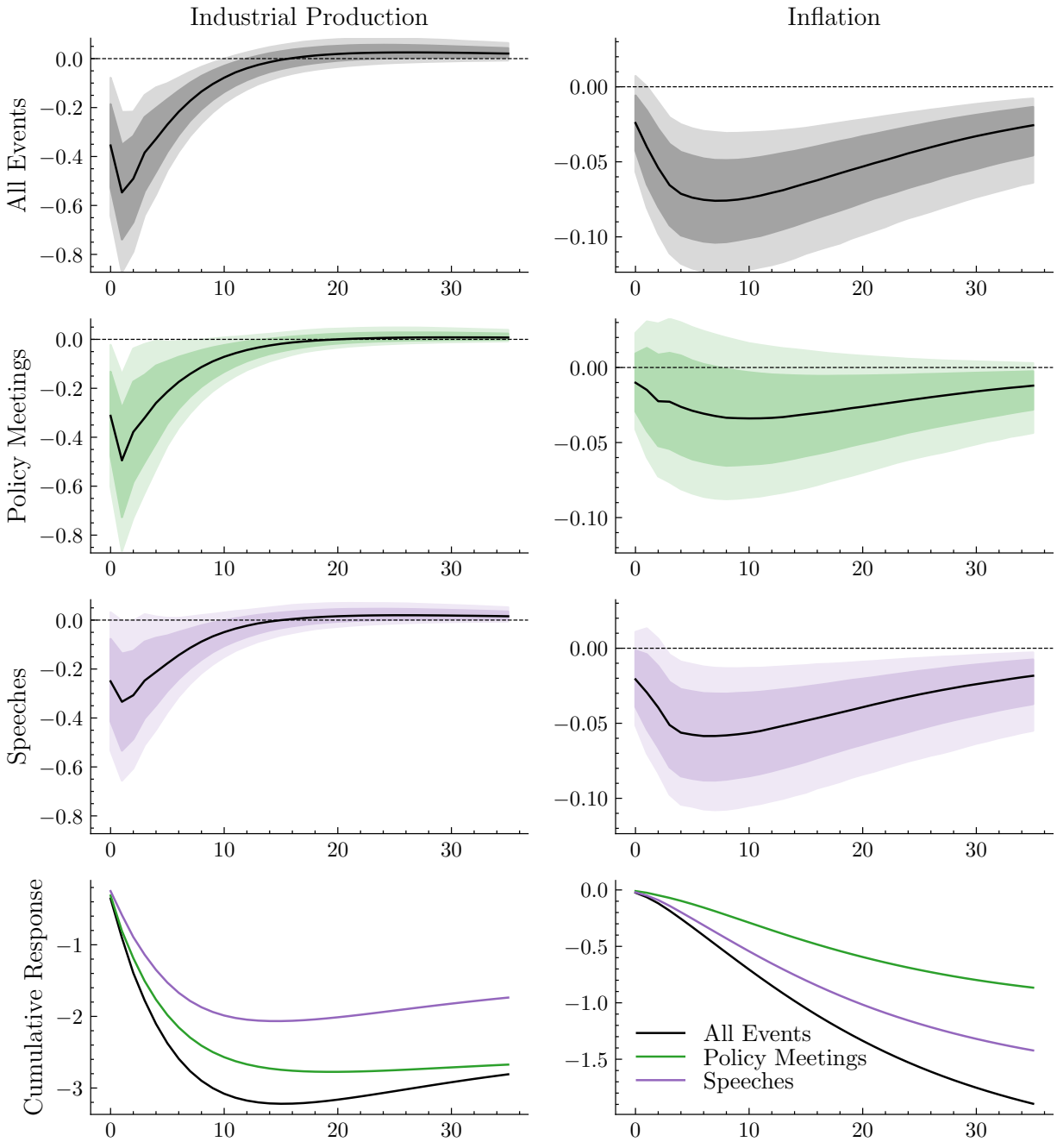
These responses are derived from three specifications of a Bayesian Vector Autoregression (BVAR) model, each employing a different proxy for monetary policy shocks. This identification strategy builds on the growing literature that utilizes high-frequency surprises around policy events to capture exogenous shifts in monetary policy.

In the third row, the shocks are identified using only speech-based surprises, capturing unanticipated movements in asset prices in response to public statements made by members of the European Central Bank (ECB) Executive Board outside of formal monetary policy meetings. The second row uses surprises observed exclusively on Governing Council meeting days, when formal policy decisions and official communications are released. The first row adopts a 'frequent policy event' approach, combining surprises measured both on the Governing Council days and during speeches by ECB officials. This broader definition captures a wider range of monetary policy communication channels.

The estimated impulse response functions report median responses, accompanied by 68% and 90% Bayesian credible intervals, thus providing a probabilistic assessment of the precision and robustness of the estimates. The results reveal a clear pattern: the transmission of monetary policy shocks is sensitive to the specific proxy used for monetary policy. Statistically significant impulse responses emerge only when the event set includes both official rate-setting meetings and policy speeches. Moreover, models that incorporate a broader set of communication events—particularly those including speeches—tend to estimate stronger effects of monetary policy on real economic variables such as industrial production and inflation. This pattern is especially evident when the impulse responses are cumulated over the simulation horizon, as shown in the last row of the figure. These findings suggest that monetary policy surprises conveyed through communication channels may carry valuable information for financial markets and the wider economy, shaping

expectations and influencing economic dynamics even outside formal policy meetings. Overall, the evidence supports the view that central bank communication has become an increasingly important component of the monetary policy transmission mechanism.

Figure 13: Effects of a one-standard-deviation monetary policy shock

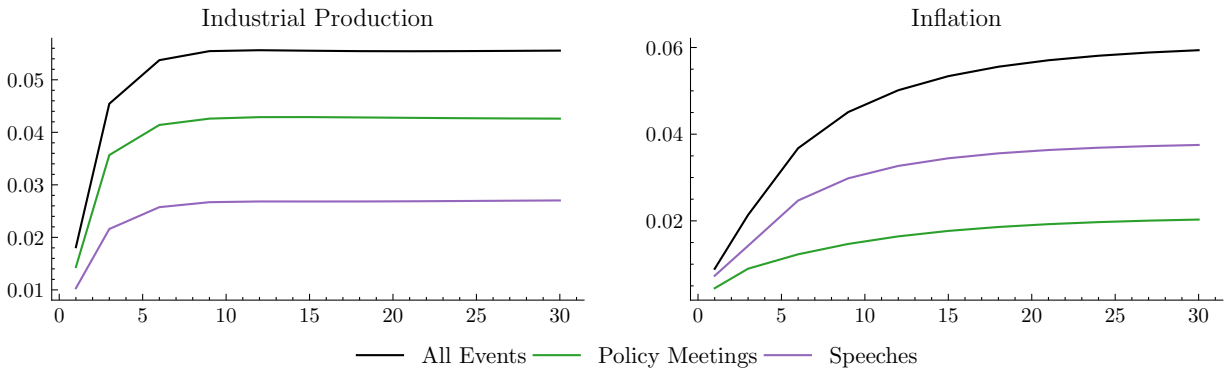


Notes: The figure presents impulse response functions of industrial production and inflation to a positive one-standard-deviation monetary policy shock. The first row shows responses for all policy events, while the second and third rows focus exclusively on policy meetings and speeches, respectively. The last row shows the cumulative responses over the simulation horizon.

Beginning with Jarociński and Karadi (2020), the literature has noted that proxy-VAR produces some puzzling impulse responses in the U.S. application. This has spurred the literature on central bank information effects, where the central bank is privy to some data on the state of the economy that market participants do not know, and therefore what is a surprise for financial markets is not a shock to the VAR system. Miranda-Agrippino and Ricco (2021), Jarociński and Karadi (2020), and Bauer and Swanson (2023a) are some of the leading contributions to this debate. In our VAR, we see that the impulse-response functions generated by the high-frequency surprise measure are already consistent with theory. This does not exclude possible information effects, but shows that, if present, these are not prevalent enough to drive the overall shape of the responses.

We now assess the contribution of monetary policy shocks to the dynamics of real economic variables through the Forecast Error Variance Decomposition (FEVD). FEVD is a widely used tool in structural vector autoregression (SVAR) analysis that allows us to quantify the relative importance of identified shocks in explaining the forecast error variance of endogenous variables over different horizons. In our case, it is employed to evaluate how much of the variability in real economic outcomes can be attributed specifically to monetary policy innovations. Figure 14 illustrates the substantial improvement in explanatory power when monetary policy speeches are incorporated into the Bayesian Vector Autoregression (BVAR) model.

Figure 14: Forecast error variance decomposition of monetary policy shocks



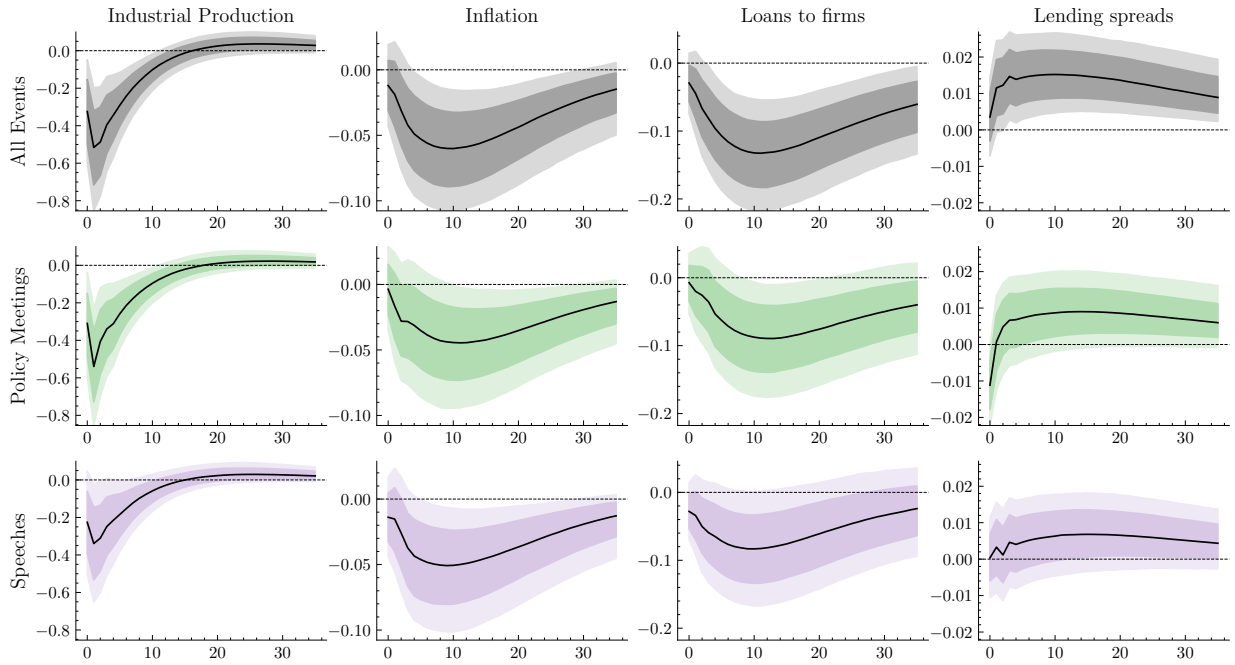
Notes: This figure reports the Forecast Error Variance Decomposition (FEVD) of monetary policy shocks for industrial production and inflation for different horizons.

The decomposition is normalized such that the total contribution of all structural shocks sums to unity at each forecast horizon. The resulting variance decompositions underscore two important insights. First, the inclusion of speech-based information significantly alters the decomposition, raising the proportion of variance attributed to monetary policy shocks—by up to 50% in relative terms. Second, and perhaps more fundamentally, the absolute share of forecast error variance explained by monetary policy shocks remains modest, never exceeding 10% at any horizon. This latter observation is consistent with the conventional view that monetary policy is primarily stabilizing in nature: its role is to smooth fluctuations in the real economy rather than to generate

them (e.g. Clarida et al. 2000). However, establishing this empirically has long been challenging due to difficulties in identifying comprehensive monetary policy shocks. Using a broader measure, incorporating both traditional policy instruments and forward guidance via speeches, we are now better positioned to address this question. Our findings suggest that monetary policy shocks do not play a dominant role in driving real economic volatility in the euro area.

To better assess the transmission of monetary policy in the euro area, particularly its sensitivity to the choice of policy event set, we extend the model to include additional variables reflecting macro-financial linkages. Specifically, we incorporate the annual growth rate of bank loans to firms and the lending spread, defined as the difference between bank lending rates to firms and the three-month Euribor. Results are reported in Figure 15.

Figure 15: Transmission of a one-standard-deviation monetary policy shock



Notes: The figure presents impulse response functions of industrial production, inflation, bank loans to firms, and lending spreads (firm lending rate minus 3-Month Euribor) to a positive one-standard-deviation monetary policy shock. The first row shows responses for all policy events, while the second and third rows focus exclusively on policy meetings and speeches, respectively.

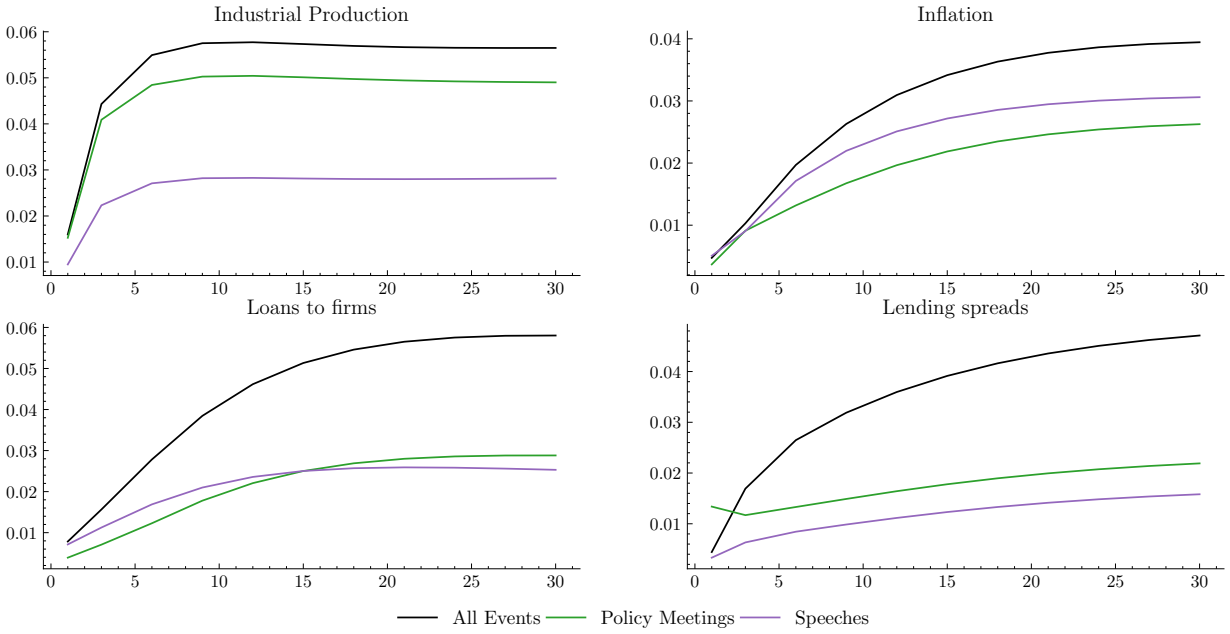
Consistent with expectations, a contractionary monetary policy shock tightens credit conditions for firms, regardless of the event set used in the simulations. This is evidenced by a widening of the lending spread and a decline in credit growth. The contemporaneous response is muted, suggesting that banks adjust lending rates only gradually. In the months following the shock, the lending volumes decline and spread rises as higher funding costs and precautionary credit supply adjustments take effect. Importantly, the figure also shows that the statistical significance of the impulse responses improves markedly when the event set includes both policy meetings and speeches (first row). This finding is consistent with the results obtained from the smaller model,

indicating that incorporating speeches alongside policy meetings enhances both the economic and statistical significance of the estimated effects of monetary policy.

We also perform the Forecast Error Variance Decomposition (FEVD) analysis for the larger model, with the results reported in Figure 16.

Consistent with the findings from the baseline specification, incorporating monetary policy speeches into the Bayesian Vector Autoregression (BVAR) substantially increases the model's explanatory power. The improvement is particularly pronounced for variables capturing credit market conditions—namely, lending volumes and loan spreads—suggesting that speeches convey relevant information for the transmission of monetary policy through financial intermediaries. This evidence indicates that communication beyond formal policy meetings helps account for a greater share of the variability in credit-related indicators. In other words, monetary policy speeches appear to complement, rather than merely reinforce, the information content of official rate-setting announcements, thereby enriching the identification of policy shocks and their propagation across the macro-financial conditions.

Figure 16: Variance decomposition of monetary policy shocks



Notes: The figure presents the Forecast Error Variance Decomposition (FEVD) of monetary policy shocks for industrial production, inflation, bank loans to firms, and lending spreads (measured as the firm lending rate minus 3-month Euribor) across different horizons.

5 Conclusion

We show that monetary policy surprises derived from policymakers' speeches contain valuable information beyond that embedded in surprises associated with official rate-setting meetings. The Euro Area Extended Monetary Policy Event-Study Database (EA-EMPD), which captures

monetary policy surprises within a narrow window around both rate-setting meetings and speeches by ECB Executive Board members, and is publicly available with regular updates, enables us to isolate the unanticipated components of monetary policy communication in a policy-event-rich environment. Using this new dataset, we draw three main conclusions.

First, speeches by central bank officials exert a statistically and economically significant influence on the term structure of risk-free interest rates, with effects visible across the entire maturity spectrum. These effects are comparable in magnitude to those following official policy announcements, suggesting that markets perceive such speeches as credible signals of future policy intentions. This finding reinforces the view that central bank communication—beyond formal decisions—plays a critical role in shaping expectations and guiding market behavior.

Second, including speech-based policy surprises in the identified set of monetary policy shocks enhances the empirical analysis of monetary transmission. The expanded event set increases the number of usable high-frequency observations, thereby improving the precision of estimated effects. Moreover, it helps mitigate the well-documented weak-instrument problem in the identification of monetary policy shocks by introducing additional, exogenous variation in the instrument set.

Comparative impulse response analysis shows that macroeconomic responses to monetary policy shocks identified solely from official meetings remain qualitatively similar but are quantitatively smaller than those obtained using the expanded event set that includes speeches. This suggests that omitting policy communications outside scheduled meetings leads to an underestimation of the full impact of monetary policy. A similar pattern emerges for transmission variables, including lending volumes and interest rates.

Third, incorporating speeches into the policy timeline increases the explanatory power of monetary policy shocks in forecast error variance decomposition (FEVD) exercises. The share of variance in key real-economy indicators—such as industrial production and inflation—attributable to monetary policy shocks rises substantially when speech-based surprises are included. Although the variance share attributable to monetary policy increases up to fivefold.

Taken together, our findings underscore the crucial role of central bank communication beyond formal decisions in the transmission of monetary policy. Incorporating such communication into empirical frameworks not only enhances identification and statistical power but also provides a more comprehensive understanding of how policy expectations are formed and transmitted to the real economy.

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