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## ECB Communication and its Impact on Financial Markets

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January 2022, WP #859  
New version July 2024

### ABSTRACT

This paper introduces the Euro Area Communication Event-Study Database (EA-CED), a new dataset tracking financial market movements around the ECB Governing Council meetings (GC) and inter-meeting communication (IMC). Covering the period from 1999 to 2024, the EA-CED contains intraday changes in euro area financial variables around 304 ECB GC policy announcements and around 4,400 IMC events, the latter being primarily speeches and interviews. We document several new empirical findings regarding the impact of IMC on financial markets. First, we show that many IMC events are associated with significant market movements, often of similar or larger magnitude than ECB policy announcements, particularly for yields at longer maturities. Significant effects are not limited to communication from the ECB president but extend to other members of the Governing Council. Second, the importance of IMC varies over time, reaching its peak around tightening cycles, particularly during 2022-2023. Third, similarly to ECB GC announcements, IMC events convey multidimensional information and lead to surprises related to the path of monetary policy and the state of the economy.

**Keywords:** Monetary Policy, ECB, Communication, Financial Markets, Euro Area

**JEL classification :** E03, E50, E61

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## NON-TECHNICAL SUMMARY

We examine the importance of various dimensions of the ECB's and the Eurosystem's communication for financial markets. To this aim, we construct a *Euro Area Communication Event-Study Database* (EA-CED) which combines 304 ECB Governing Council meetings and approximately 4,400 inter-meeting communication (IMC) events from Governing Council members with the intraday changes of 47 euro area financial variables around these events, from January 1999 to February 2024.

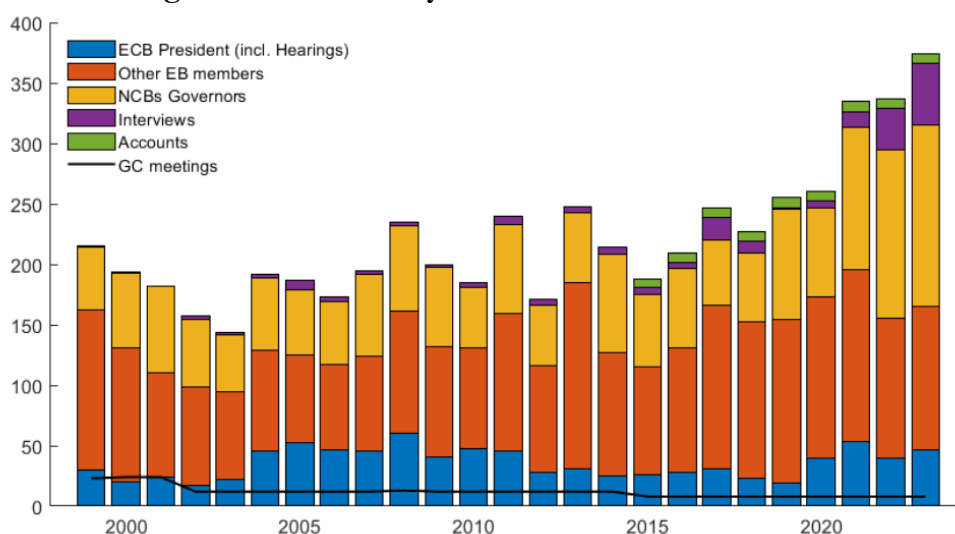
The IMC events in the EA-CED are public remarks in the form of speeches and interviews given by i) ECB presidents, (ii) the other five members of the ECB Executive Board (EB), (iii) the Governors of the French, German, Italian, and Spanish national central banks (NCBs), as well as the European Parliament hearings of the ECB president and the publication of the ECB Monetary Policy Accounts. The EA-CED dataset allows for analyzing the impact of communication on financial markets and on the macroeconomy. We make this database publicly available.

We document that Eurosystem inter-meeting communication has a considerable impact on euro area financial assets, often of similar or larger magnitude than ECB policy announcements, particularly for medium- and long-term interest rates. The share of ECB GC meetings significantly affecting the risk-free interest rates declines as their maturity increases. The opposite holds for the IMC events, which have stronger effects as the maturity of the assets increases. We also find evidence of time variation in these patterns. IMC events are associated with peak effects predominantly in years with rate hiking cycles. Importantly, communication from other Governing Council members than the ECB president also plays a significant role.

We also examine why markets react around IMC events, in order to assess the information content of this communication in comparison to the ECB GC policy announcements. We show that IMC events ahead of monetary policy decisions contain important policy signals as they move risk-free rates or specific sovereign yields in the direction of the forthcoming decision. Examining how risk-free interest rates and sovereign yields move jointly in response to central bank communication, we find that news in IMC events, similar to ECB GC policy announcements, is multidimensional and relates mostly to news about the path of policy and the state of the economy.

Overall, our research highlights the crucial role of central bank communication in influencing market movements. It also underscores the importance of considering communication outside of regular meeting days to fully understand the transmission of monetary policy. This means that analyses of the effects of monetary policy should not just focus on policy announcements during official meetings but also include the policy signals conveyed by ECB officials between these meetings.

Figure 1: ECB/Eurosystem communication events



Note. The figure displays the number of annual IMC events by the ECB president, including EU Parliament Hearings, the number speeches by other members of the ECB Executive Board and by NCBs Governors, the number of interviews by ECB and NCB officials, ECB Accounts' publications and ECB Governing Council monetary policy meetings (black line).

# Communication de la BCE et son impact sur les Marchés Financiers

## RÉSUMÉ

Cet article présente la nouvelle base de données EA-CED (Euro Area Communication Event-Study Database), qui retrace les mouvements des marchés financiers autour des réunions du Conseil des gouverneurs (CG) de la BCE et de divers types de communication ayant lieu entre les réunions du CG (IMC). Couvrant la période de 1999 à 2024, l'EA-CED contient les variations intra-journalières de plusieurs variables financières de la zone euro autour de 304 annonces de politique monétaire du GC et d'environ 4400 événements IMC, ces derniers étant principalement des discours et des interviews des membres du GC. Nous présentons plusieurs nouveaux résultats empiriques concernant l'impact de l'IMC sur les marchés financiers. Premièrement, nous montrons que de nombreux événements IMC sont associés à des mouvements de marché significatifs, souvent d'une ampleur similaire ou supérieure à celle des annonces de politique monétaire de la BCE, en particulier pour les taux d'intérêt à plus long terme. Les effets significatifs ne se limitent pas à la communication du président de la BCE, mais s'étendent à d'autres membres du GC. Deuxièmement, l'importance de l'IMC varie dans le temps, avec un pic autour des cycles de resserrement monétaire, en particulier au cours de la période 2022-2023. Troisièmement, à l'instar des annonces du GC, les événements IMC véhiculent des informations multidimensionnelles et génèrent des surprises liées à la trajectoire de la politique monétaire et à l'état de l'économie.

**Mots clés :** politique monétaire, BCE, communication, marchés financiers, zone euro.

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# 1 Introduction

ECB Governing Council monetary policy announcements move financial assets, such as overnight interest rates or sovereign bond yields. However, these announcements represent only a fraction of the overall communication on monetary policy from Governing Council (GC) members. Instead, a considerable part of the communication, such as speeches and interviews, takes place during the inter-meeting period. Even if inter-meeting communication does not constitute actual policy decisions, it may move markets by revealing central bankers' views on the economy, their policy reaction function, or future policy decisions. Its importance increased when the ECB introduced forward guidance on interest rates in 2013 and new measures aimed at lowering the long end of the yield curve in the euro area. This required extensive communication outside of official policy meetings from ECB GC members.<sup>1</sup> Therefore, studying market movements associated with both ECB GC meetings *and* IMC events, rather than just GC meetings, provides a more comprehensive picture of the impact of central bank communication.<sup>2</sup>

This paper contributes by constructing the *Euro Area Communication Event-Study Database* (EA-CED), which consists of 304 ECB GC meetings and approximately 4,400 inter-meeting communication from GC members and the respective intraday changes of 47 financial variables around these events, from January 1999 to February 2024.

The IMC events in the EA-CED are public remarks in the form of speeches and interviews given by i) ECB presidents, (ii) the other five members of the ECB Executive Board (EB), (iii) the Governors of the French, German, Italian, and Spanish national central banks (NCBs), as well as the European Parliament hearings of the ECB president and the publication of the ECB Monetary Policy Accounts. The available information about our IMC events includes the title, date, time, speaker, and its location.<sup>3</sup> The EA-CED dataset allows for analyzing the impact of communication on financial markets and on the macroeconomy. We make this database publicly available.

As a second contribution, we document that Eurosystem inter-meeting communication has a considerable impact on euro area financial assets, often of similar or larger magnitude than ECB policy announcements, particularly for medium- and long-term rates. We calculate the impact of IMC events on a specific financial asset following the literature that attempts to identify monetary policy surprises using high-frequency data, in the spirit of [Kuttner \(2001\)](#); [Gürkaynak et al. \(2005b\)](#), among others. This amounts to computing the asset's price change in a narrow time window around the event; narrow enough to exclude other events but large enough to capture the effect of the event. To unravel price differences due to market noise and price differences due to information revealed during the event, we follow the event study approach of [MacKinlay \(1997\)](#), by estimating the intraday variance up to the start of the event and building confidence bands of how much asset price changes can be expected over the event window based on the *prior to the event* intraday volatility. Any price change that lies outside of these confidence bands is what we label an abnormal return associated with the communication. This approach allows us to take

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<sup>1</sup>The post-financial crisis trend of more interaction with the public via inter-meeting communication was also observed in other countries. [Blinder et al. \(2017\)](#) show that more than 90% of governors in advanced countries agreed that the financial crisis induced them to communicate with the public more than they did prior to the crisis.

<sup>2</sup>For the Federal Reserve, [Swanson \(2023\)](#) and [Swanson and Jayawickrema \(2024\)](#) show that Fed Chair speeches are more important than FOMC announcements, providing an important source of variation in US monetary policy.

<sup>3</sup>For a subset of speeches and interviews, the database also allows us to link the IMC event to the respective text of the event. Details are explained in [Section 2](#).

into account substantial time-varying market volatility and filter events based on their relevance, conditional on market volatility prior to the event. Thus, differently from the existing literature, we assess the significance of each individual event, rather than assuming all as significant or using a rule-of-thumb threshold to select them.

Overall, we identify 2,620 IMC events versus 280 ECB GC policy meetings associated with abnormal returns in at least one asset, together amounting to 60% of the total events in the EA-CED. The share of ECB GC meetings significantly affecting the risk-free rates declines as their maturity increases. The opposite holds for the IMC events, as a higher share of them are associated with abnormal returns as the maturity of the asset increases (both for risk-free rates and the sovereign yields of Germany, France, Spain, and Italy). This pattern also holds in terms of the impact over the full sample, such that the cumulative absolute effect of ECB GC meetings is smaller than the impact of IMC events for maturities over one year. We also find evidence of time variation in these patterns. IMC events are associated with peak effects at the shorter end of the OIS curve predominantly in years with hiking cycles. Notably, since 2022, the total impact of IMC events in both short- and long-term OIS rates is double the effect of ECB GC policy announcements. With respect to the speakers, we find that not only the communication of the ECB president is important.

Our third contribution consists of examining why markets react around IMC events associated with abnormal returns. We look at this question from three different angles in order to assess the information content of this communication in comparison to the ECB GC policy announcements.

First, we show that IMC events ahead of monetary policy decisions contain important policy signals as they move risk-free rates or specific sovereign yields in the direction of the forthcoming decision. For example, IMC events ahead of ECB GC meetings with changes in the policy rate move the short-term OIS rates in the same direction as the forthcoming policy action. The signaling effect is stronger for communication ahead of *tightening* decisions compared to *easing* decisions. Similarly, IMC events ahead of the announcement of major ECB unconventional monetary measures move long-term yields, especially the long-term sovereign yields of Italy and Spain, in the same direction as the forthcoming policy decision.

Second, examining how risk-free interest rates and sovereign yields move jointly to central bank communication, inspired by [Gürkaynak et al. \(2005a\)](#) among others, we find that news in IMC events, similar to ECB GC policy announcements, is multidimensional. Many IMC events in our database are associated with abnormal movements in several financial variables which suggests that new information was conveyed to the market; for instance, information about the ECB's current policy, the path of policy, quantitative easing-type decisions, or support measures for the transmission mechanism of monetary policy, referred to as Target, Forward Guidance (FG), Quantitative Easing (QE) and Transmission surprises in the literature. We find that, compared to ECB GC announcements, IMC events are predominantly associated with FG- and QE-like surprises, as they move significantly risk-free rates and sovereign yields at longer maturities.

Finally, examining the comovement of OIS rate changes and stock returns around IMC events, in the spirit of [Jarociński and Karadi \(2020\)](#), confirms that many of them convey news about monetary policy, but also about the economy. Importantly, the share of economic news relative to monetary news in the IMC varies significantly over time, and since 2022, the majority of IMC events reveal monetary policy (tightening) news. Overall, these results support a higher role of

IMC communication in tightening episodes.

We contribute to the literature that studies the role of central bank communication for movements in financial markets, where the most traditional approach has been to assess market fluctuations around central bank communication on policy announcement days (see [Gürkaynak et al. \(2005a\)](#); [Nakamura and Steinsson \(2018\)](#) for the Fed and [Rosa and Verga \(2008\)](#); [Brand et al. \(2010\)](#); [Altavilla et al. \(2019\)](#); [Andrade and Ferroni \(2021\)](#) for the ECB, among others). More recently, the literature has expanded towards studying the role of inter-meeting communication, i.e., in the form of speeches or Congress/Parliament hearings; see [Kohn and Sack \(2004\)](#); [Kliesen et al. \(2019\)](#); [Neuhierl and Weber \(2019\)](#); [Istrefi et al. \(2023\)](#); [Swanson \(2023\)](#); [Cieslak and McMahon \(2023\)](#) for the Fed, [Mumtaz et al. \(2023\)](#) for the Bank of England (BoE), [Ehrmann et al. \(2014\)](#); [Gertler and Horvath \(2018\)](#); [Tillmann and Walter \(2019\)](#); [Leombroni et al. \(2021\)](#); [Ehrmann et al. \(2023\)](#); [Belly et al. \(2023\)](#) for the ECB, among others, and [Ehrmann and Fratzscher \(2007\)](#); [Cieslak and Schrimpf \(2019\)](#); [Fadda et al. \(2022\)](#) for the Fed, the BoE, and the ECB.

Compared to the existing literature, our added value is first the compilation and public dissemination of a comprehensive database of ECB and Eurosystem communication events (the EA-CED), consisting of communication on ECB GC policy meeting days and intermeeting ones. Second, based on this original database, we provide a comprehensive analysis of ECB and Eurosystem communication, across different forms of it, across different speakers, across a wide range of financial assets, and across time.<sup>4</sup> Third, we measure not only the market movements around GC and IMC events but also their (time-varying) significance. While we confirm previous results in the literature that financial markets react to both types of communication of central bankers, we find that not all events lead to significant market movements; Significant effects vary between asset types and maturities. In addition and new to the literature, we show that, while on average many IMC events are often associated with similar or larger market movements than ECB policy announcements for rates at longer maturities, they have strong effects along the whole yield curve around tightening cycles. Moreover, our results highlight the role of communication from different ECB GC members and uncover many important events compared to a few ECB president speeches that are commonly used in the literature. We believe that the set of IMC events that we have identified has a great potential to increase the relevance of monetary policy variation, in addition to policy announcements, when assessing monetary policy effects on the economy.

For the rest of the paper, [Section 2](#) describes the *Euro Area Communication Event-Study Database*, [Section 3](#) and [Section 4](#) present our findings on intraday movements of financial variables around GC policy meetings and IMC events, and [Section 5](#) concludes.

## 2 The Euro Area Communication Event-Study Database

We start with the construction of the *Euro Area Communication Event-Study Database* (EA-CED) by combining three datasets, labeled *Eurosystem Events*, *Control Events*, and *Financial Markets*. In this section, we provide a detailed explanation of each dataset.

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<sup>4</sup>For comparison, [Ehrmann and Fratzscher \(2007\)](#) analyze the market reaction to Federal Reserve, the Bank of England, and ECB speeches, testimonies, and interviews for the period 1999 to 2004. [Leombroni et al. \(2021\)](#) and [Belly et al. \(2023\)](#) consider the effect of ECB policy announcements and ECB president speeches on sovereign spreads for the period 2009-2014 and 2004-2019, respectively. [Cieslak and Schrimpf \(2019\)](#); [Fadda et al. \(2022\)](#) have considered the respective Minutes of the central bank as intermeeting communication.

The *Eurosystem Events* dataset contains information on the following communication events:

1. ECB Governing Council monetary policy meetings (ECBGC).
2. ECB Monetary Policy Accounts' publication (Accounts).
3. Speaking events by ECB presidents (including Hearings at the European Parliament).
4. Speaking events by ECB Executive Board (EB) members (except the ECB president).
5. Speaking events by Bundesbank, Banque de France, Banca d'Italia, and Banco de España governors (NCBs).
6. Interviews from all six ECB EB members and the four NCB governors.

Speaking events, interviews and the publication of Accounts constitute our sample of Eurosystem inter-meeting communication (IMC). For all events, the database contains the date and the starting time (hour and minute). For speaking events, it additionally contains the title, the speaker's name, and the location of the event. Except for interviews, our source is the calendar of events in Bloomberg's (BBG) Econ page, for the period January 1999 to February 2024. A typical title in this calendar mentions the name of the speaker and the location of the event, e.g., "ECB's Lagarde speaks in Frankfurt". From the BBG list, we selected and classified events as described in *Eurosystem Events* above, for which there is a timestamp, and discarded the rest.<sup>5</sup> We thoroughly cleaned the BGG dataset for reporting errors, such as double entries or events for which the time is clearly misreported. Our source for interviews is Refinitiv Eikon, in which we retrieve the timestamp of the event, the speaker, and the text of the interview when available.

The ECB provides a speech database (ECBDB) for ECB Executive Board members, containing the date of the speech, the name of the speaker, the title, and the text of the speech.<sup>6</sup> A disadvantage of this database is the lack of the time of the day when the speech started. We matched the events of the BGG calendar with those in the ECBDB so that the researcher has information on both the text of the speech and the time of the speaking event, a prerequisite for the high-frequency analysis. Comparing the two databases, our BGG database contains about 80% of the speeches in the ECB database. Our database also includes a larger number of speaking events for ECB EB members for which ECB does not have a speech (more than 3500 events compared to about 2700 events in the ECBDB). In addition, our BGG database includes speaking events by selected NCB governors, which are not part of the ECBDB.<sup>7</sup>

Each of these communication events has its own characteristics, which are important to consider in any analysis of central bank communication. The main difference between ECB GC policy announcements and inter-meeting communication events is that the former contains information about an official monetary policy decision, decided by the Governing Council. In our database, the ECB Governing Council monetary policy meetings refer to the whole meeting window, containing both the press release and the press conference.<sup>8</sup> The ECB Monetary Policy

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<sup>5</sup>The rest of the events either do not have a timestamp or refer to speaking events of the remaining Governing Council members not included in our list.

<sup>6</sup>Available on the ECB's website: <https://www.ecb.europa.eu/press/key/html/downloads.en.html>.

<sup>7</sup>A drawback of the BGG calendar is that it does not provide the content of the IMC events.

<sup>8</sup>Note that in [Swanson \(2023\)](#), the FOMC press conference is included as Fed chair communication, distinguishing it from FOMC announcements. The case of the ECB is different, as the policy decision is announced in two steps: first

Accounts, published three weeks after the decision, is the information closest in type to an ECB GC announcement as it provides a more detailed account of what was discussed and decided in the meeting; this document is also agreed upon by the Governing Council. In contrast, all other IMC events (speeches and interviews) are not associated with a policy decision and do not necessarily represent the views of the Governing Council. They can also be on topics different from monetary policy, as typically they are speeches in international meetings, academic conferences, or other similar events, of regular or irregular frequency.<sup>9</sup> For example, Parliament hearings are regular events, where the ECB president explains the ECB's policy before Members of the European Parliament and answers their questions. The primary objective of this type of communication is to hold the ECB accountable.<sup>10</sup> The advantage of most IMC events is that they give the speaker discretion over the content and, to some extent, reflect debates and opinions that have also been expressed in the meeting and have guided policy. Many IMC events also receive extensive media coverage, which suggests that they contain "newsworthy" information.

Table 1 reports the total number of observations, the source, and the sample period for each type of communication event we consider. Notably, a substantial amount of communication occurs on inter-meeting days. In total, the Eurosystem Events dataset contains more than 5,600 IMC events and 304 GC monetary policy events.<sup>11</sup> With regard to IMC events, in our sample, the ECB presidents have the higher number of speaking events (about 900, including Parliament Hearings), followed by Bundesbank presidents (about 730).

Figure 1 displays how communication events are distributed over time. On average, our sample contains approximately 220 IMC events per year, compared to 8 (since 2015) ECB GC policy meetings. Over time, the frequency of IMC varies, with peaks in specific periods, as in 1999 with the start of the euro, during the financial crisis of 2007-2008, in 2013 when the ECB introduced forward guidance on interest rates, and in 2021 corresponding with the announcement of the ECB strategy review. We observe that ECB EB members and NCB governors have both increased their speaking engagements over the past decade. The 2022-2023 period is characterized by a marked increase in communication, driven in particular by NCB governors. With regard to ECB presidents, there is a noticeable fixed effect for speakers, with Wim Duisenberg (1998-2003) and Mario Draghi (2011-2019) displaying fewer speaking events than Jean-Claude Trichet (2003-2011) and Christine Lagarde (2019-current).

The second dataset, *Control Events*, consists of the date, time, and title of events that inform about the state of the economy and are systematically published:

- Major macroeconomic surprises for the euro area: real GDP growth, HICP inflation, unemployment, Purchasing Managers' Indices (composite), industrial production, and two survey surprises (e.g. consumer confidence and business climate).

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in a press release which is then followed by a press conference where the ECB president reads the policy statement and answers questions from journalists. Until December 2014 the press release referred to the decision on policy rates only, while announcements of unconventional measures were made during the press conference. Since March 2016, all decisions have been included in the press release.

<sup>9</sup>Our approach of assessing the significance of each individual event relative to pre-event market movements allows us to filter out speaking events that may be on topics not relevant for monetary policy.

<sup>10</sup>Using text analysis on the ECB President's introductory statements in parliamentary hearings and press conferences from 1998 to 2021, Fraccaroli et al. (2022) show that the ECB uses parliamentary hearings to discuss topics that are less covered in the ECB GC press conferences.

<sup>11</sup>We include in GC meetings the following three announcements that took place in unscheduled GC meetings: the SMP announcements on 10 May 2010 and on 8 August 2011 and the first announcement of the PEPP on 18 March 2020.

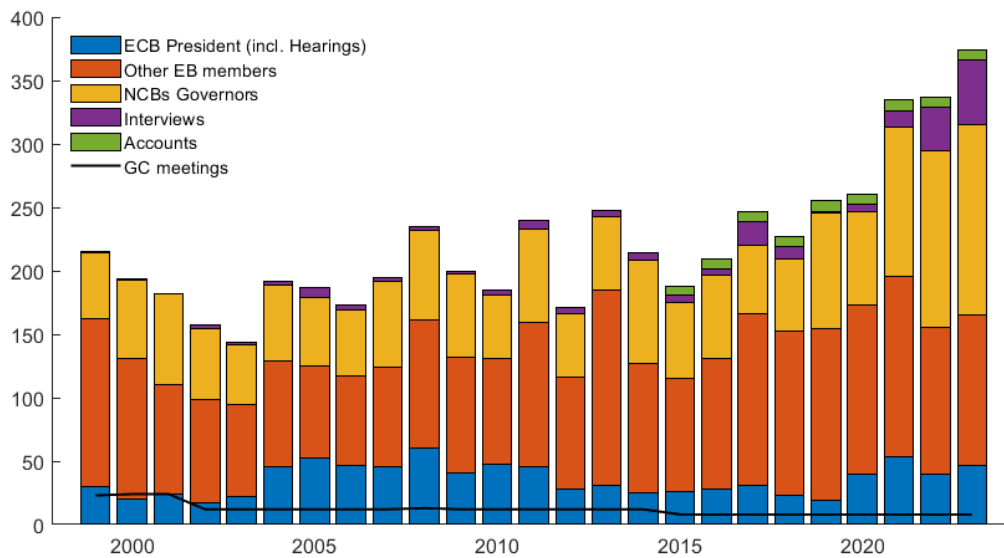


Table 1: Eurosystem Communication Events

Type of event	Sample	Source	Observations
<b>Monetary policy meeting communication</b>			
ECBGC monetary policy meetings	1999-2024	BBG	<b>304</b>
<b>Inter-meeting communication (IMC)</b>			
<b>ECB</b>			<b>3534</b>
Presidents	1999-2024	BBG/ECBDB	775
Presidents' EU Parliament Hearings	1999-2024	BBG/ECBDB	120
Executive Board (excl. president)	1999-2024	BBG/ECBDB	2627
<b>National Central Banks (NCBs)</b>			<b>1789</b>
Bundesbank	1999-2024	BBG	727
Banque de France	1999-2024	BBG	416
Banca d'Italia	1999-2024	BBG	277
Banco de España	1999-2024	BBG	367
<b>Interviews (ECB+NCBs)</b>	1999-2024	Refinitiv Eikon	<b>217</b>
<b>ECB Monetary Policy Accounts</b>	2015-2024	BBG	<b>73</b>

*Note:* The table shows the different types of communication events in our Eurosystem Events database. For each type, we report the sample period, the source, and the number of observations. ECBGC denotes ECB Governing Council monetary policy meeting events, ECBDB denotes the ECB speech database, BBG denotes Bloomberg database.

Figure 1: ECB/Eurosystem communication events



Note: The figure displays the number of IMC events by the ECB president, including EU Parliament Hearings, the number of speeches by other members of the ECB Executive Board and by NCBs Governors (BdF, Buba, BdI, BdE), the number of interviews by ECB and NCB officials, ECB Accounts' publications and ECB Governing Council monetary policy meetings (black line). All events are displayed at an annual frequency.

- Selected major U.S. macroeconomic surprises: real GDP growth, CPI, and Non-Farm Payrolls (NFP).
- Federal Open Market Committee (FOMC) monetary policy decisions days.

The source of the data is BGG. We define macroeconomic data surprises as macroeconomic data releases by official statistical agencies for which the Bloomberg survey-based expectations are different from the actual data release. This implies that we assume that there is no new information for the market if the actual data coincide with the expectations and drop the macroeconomic release. For the US NFP, in addition, we consider only those releases for which the actual value relative to the expectation is outside the 25% to 75% quantiles. These steps allow us to control for potential confounding information releases when using the *Eurosystem Events* study database. From the EA-CED we will exclude events that occur close to a macroeconomic data surprise and FOMC decisions; details are provided in [Section 3](#).

The third dataset, *Financial Markets*, consists of minute-by-minute bid and ask quotes for the following financial variables:

- Euro area OIS forward rates with maturities of one month (1M) to 10 years (10Y).
- Sovereign bond yields of Germany, France, Italy, and Spain for maturities of three months up to 10 years.
- Inflation-linked swap (ILS) rates with maturities of one, two, five, and 10 years.
- Eurostoxx index.
- EUR/USD exchange rate.

In our analysis, we use the mid-quote, i.e., the average of the bid, and ask quote. Minute-by-minute quotes are obtained from Refinitiv Eikon. The starting date on which the different financial instruments are available varies. OIS rates at short- and medium-term maturities, sovereign yields (maturities from two years onward), Eurostoxx, and EUR/USD quotes are available starting in 1999. Short maturities of sovereign bonds are often available only from the mid to late 2000s onwards, the ILS quotes are available starting in July 2008 and the data on OIS rates of longer maturities (five to ten years) starts in June 2011. [Table 2](#) shows the availability of OIS rates and sovereign yields across maturities. The last observation in our database is February 16, 2024.

Table 2: Availability of OIS rates and sovereign yields data — starting month and year

	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
DE	NaN	Oct-2005	Oct-2005	Apr-2000	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999
FR	NaN	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999
IT	NaN	Jul-2009	Jul-2009	Jul-2009	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999
ES	NaN	Oct-2010	Oct-2010	Oct-2010	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Jan-1999
OIS	Jan-1999	Jan-1999	Jan-1999	Jan-1999	Nov-1999	Sep-2002	Jun-2011	Jun-2011	Jun-2011

*Notes:* The table shows the starting month and year from which minute-by-minute quotes of the respective financial instruments are available in our database. DE, FR, IT, and ES denote the sovereign yields, at maturities indicated by the column names, for Germany, France, Italy, and Spain. The OIS are Eonia Overnight Index Swaps until the end of 2019 and €STR since 2020.

The *Eurosystem Events*, *Control Events*, and the *Financial Markets* dataset allow us to construct the *Euro Area Communication Event-Study Database* (EA-CED), which contains intraday changes of 47 financial variables around the GC and inter-meeting communication events. The final set of asset price changes around IMC events reported in our EA-CED is a subset of about 4,400 events out of the 5,600 in [Table 1](#), after dropping IMC events overlapping with macroeconomic data surprises and excluding events on weekends, as explained in the next section.

### 3 Event-study for Eurosystem communication events

In the following, we conduct an event-study analysis to quantify and evaluate the effect that Eurosystem communication events have on financial markets, using information from the *ECB Event* dataset, the *Control Events* database and the minute-by-minute data from the *Financial Markets* dataset. In the first step, we will follow the standard approach in the literature and compute asset price changes over the event window. In the second step, we evaluate whether these high-frequency movements constitute significant (abnormal) market changes. The EA-CED then contains the high-frequency changes constructed in this section.

#### 3.1 Intraday changes around Eurosystem communication events

We compute the changes in asset prices in a narrow window around central bank communication events, similar to the literature focusing on monetary policy announcements ([Kuttner \(2001\)](#); [Gürkaynak et al. \(2005a\)](#), among others). This literature measures the impact of monetary policy announcements as the difference between the quotes right before the start of the event and the

quotes right after the event. The asset price changes are then interpreted to be caused by the event. The identifying assumption is that the event window is sufficiently narrow to exclusively contain the event under consideration while the event window is large enough to capture the potential effect of the event. Therefore, a crucial element of this event study strategy is the length of the event window.

For ECB Governing Council policy meetings, we consider the full monetary policy event window, including both the press release and the press conference. Until April 2022, the ECB GC meeting is followed by a press release published at 1:45 pm and a press conference with the ECB president at 2:30 pm, including a Q&A with journalists. Since June 2022, these events take place at 2:15 pm and 2:45 pm, respectively. To construct surprises over the full monetary policy event window, we largely follow [Altavilla et al. \(2019\)](#), the details of which we describe in [Appendix A](#).

For IMC events, the choice of the length of the event window is more challenging, as different IMC events have different durations and, information about their content, and thus news may reach the financial market immediately or with a delay.<sup>12</sup> We decide the length of the window for IMC events based on anecdotal evidence on how long it takes for a typical IMC event in our database to be reported on BGG news. To this aim, we collect and read news relating to several of the ECB presidents' events, finding that the majority received a news report immediately or within 1.5 to 3 hours from the scheduled start of the event. To be conservative on the length of the event window, we chose 90 minutes as the length for the IMC event window, except for hearings of the ECB president in the European Parliament and the publication of the Accounts of the ECB GC monetary policy meetings.<sup>13</sup> For Parliament hearings, we chose an event window of 180 minutes, reflecting the typically longer duration of these events. For Accounts, we chose 45 minutes, since the event is the publication of a short document, published at the same known time (1:30 pm, CET). Our identifying assumption is that, within this time frame, information from IMC events is conveyed to markets, either by following (reading) the event (speech) directly or indirectly through media news about the event.<sup>14</sup> Further, for all IMC events, we set the pre- and post-event window to 15 minutes, which are standard values in the literature. Concretely, to construct high-frequency price changes around IMC events, we take the difference between the mean of the quotes 15 minutes after the end of the event ("post-event window") and the mean quote over 15 minutes before the event ("pre-event window"), as illustrated in [Figure 2](#).

Another challenge when considering IMC events is that they happen at different times of the day, from early in the morning to late in the evening. Based on the day-time information of IMC events, we distinguish three cases to compute the high-frequency changes around the event. The simplest case is when speeches (or other forms of IMC) are given (published) during regular market hours such that we can compute the quotes before and after them (Case 1). However, some of this communication happens before 9 am, and there might be no or few quotes in the pre-event window (Case 2). Other events happen close to the end of the trading hours or in the evening so that there are no quotes in the post-event window (Case 3) because the market is closed.

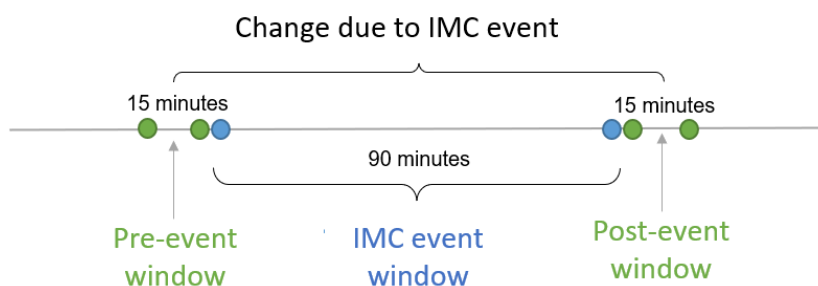
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<sup>12</sup>Often, central banks publish the speech in their website immediately, or news wires have received the speech and have it under embargo until the speech starts.

<sup>13</sup>This window length is similar to [Swanson \(2023\)](#) who considers speeches of Federal Reserve Chairs.

<sup>14</sup>Several papers on central bank communication use the timestamp from news reporting to guide the event-study timeline for IMC events, see [Swanson \(2023\)](#); [Ehrmann et al. \(2023\)](#), among others. Our advantage is that we have the exact time when the event is scheduled to take place.

Figure 2: IMC event-study timeline



*Note:* The start of the event is based on the BBG calendar. We set the pre- and post-event window to 15 minutes and the speaking event window (the speaking event length) to 90 minutes for regular IMC events, 180 minutes for European Parliament hearings of the ECB president, and 45 minutes for the publication of the Accounts.

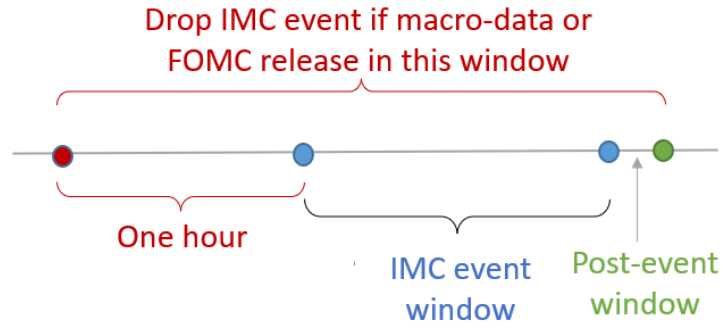
In Case 1 we assign IMC events given between 9 am and 5:45 pm (CET) and asset price changes around these events are calculated as described in Figure 2. To Case 2 we assign IMC events given between 8 am and 9 am. Since there are often fewer quotes before and around 8 am, we define the pre-event window as a two-sided window of 15 minutes around the start of the speech to avoid having no quotes in the pre-event window. To Case 3 we assign speeches given after 5.45 pm. The post-event window for this case is computed based on the quotes of the morning of the next day from 8 am to 8:15 am. If an IMC event occurs after 5:45 pm on Friday, we discard it. IMC events on weekends are also discarded because the pre-event and post-event windows would have to be taken on Friday evening and Monday morning, which would defy the notion of a high-frequency identification. With regard to Case 3 we make two exceptions by considering two ECB president speeches on Friday after 6 pm CET; both from Mario Draghi, at Jackson Hole on 22 August 2014 and in New York on 4 December 2015. These speeches are considered to have had important effects on financial markets (Odendahl et al., 2024).

We further filter our IMC events with the *Control Events* dataset, to avoid confounding asset price changes due to IMC events and due to the releases of macroeconomic data from the main euro area and the US or FOMC decisions. Concretely, we discard IMC events whose event window overlaps with or occurs less than one hour after a macroeconomic data surprise or an FOMC policy decision (see Figure 3 for an illustration).<sup>15</sup> With regard to ECB GC meetings, the press conference coincides with the release of the Initial Jobless Claims in the US. Nevertheless, Brand et al. (2010) and Altavilla et al. (2019) have shown that movements of European assets are not significantly contaminated by this release. Therefore, we consider all ECB GC meetings in our database.

In summary, after controlling for macroeconomic data surprises, FOMC meetings, and dropping the IMC events occurring between 5:45 pm on Friday and 8 am on Monday, our EA-CED consists of up to 4400 IMC events for which we compute asset price changes. This number changes between financial instruments due to different data availability (as discussed in Section 2) and the actual availability of minute-by-minute quotes in the selected windows.

<sup>15</sup>As noted before, macroeconomic data surprises are defined as macroeconomic data releases for which the Bloomberg survey expectations do not coincide with actual data releases.

Figure 3: Filtering IMC events with the *Control Events* dataset



Note: IMC events for which a macroeconomic data surprise or an FOMC policy decision falls within the red bracket window are dropped from the subsequent analysis.

### 3.2 Abnormal market reactions around Eurosystem communication events

In the following, we evaluate whether high-frequency movements constitute significant or abnormal market changes, following the event-study approach of [MacKinlay \(1997\)](#). This amounts to computing the intraday variance of the process until the event occurs and then, based on the pre-event intraday variance, construct confidence intervals for how much of a price change could have been expected over the respective event window based on the intraday volatility up until the start of the event. This procedure allows us to assess whether asset price changes around the communication events are abnormal, i.e., statistically significantly different from zero.

Following [MacKinlay \(1997\)](#), let the interest rate in basis points (value of the stock index in natural logarithm) on a given day be denoted by  $X_t$  and

$$Y_{t_1} = X_{t_1} - X_{t_0}, \quad (1)$$

where  $Y_{t_1}$  denotes the abnormal return over a given event, occurring during the event window  $t_0$  to  $t_1$  and measures as the difference between  $t_0$ , the start of the event, and  $t_1$ , the end of the event.

Then, under the null hypothesis that the event has no impact on the interest rates (asset price) and (i) some distributional assumptions on the process of  $X_t$  specified below and (ii) the assumption that no other event occurs during the event window,  $Y_{t_i} \sim N(0, \text{var}(Y_{t_i}))$ , where  $\text{var}(Y_{t_i})$  denotes the variance of the interest rate change (asset price return) over the respective event window.

Testing the null hypothesis requires an estimate of the variance  $\text{var}(Y_{t_i})$ . We estimate the intraday variance prior to the central bank communication event using the methodology of [Aït-Sahalia et al. \(2005\)](#), which allows for the data to be sampled at discrete non-equidistant time intervals and controls for the potential presence of market microstructure noise.

In particular, we follow [Aït-Sahalia et al. \(2005\)](#) and model  $X_t$  as

$$X_t = \sigma W_t, \quad (2)$$

where  $W_t$  is a Brownian motion,  $\sigma > 0$ , for  $t = 0, \dots, T$ , with  $X_0 = 0$  and the time-continuous diffusion is then  $dX_t = \sigma dW_t$ .

Since prices are sampled at discrete non-equidistant time-intervals, let  $\tau_j$  denote the observation at time  $j = 1, \dots, N_T$ ,  $\sum_{j=1}^{N_T} \Delta_j = T$ , and let  $\tau_j - \tau_{j-1} = \Delta_j$  denote the sampling interval length; the minimum interval length is one minute and the actual interval length depends on the data. Then, adding market microstructure noise denoted by  $U_{\tau_j}$ , the time-discrete process can be written as (Aït-Sahalia et al., 2005)

$$\tilde{X}_{\tau_j} = X_{\tau_j} + U_{\tau_j}, \quad (3)$$

where  $\tilde{X}_{\tau_j}$  denotes the actual observed transaction price, and  $U_{\tau_j}$  is an independent and identical distributed Normal random variable with mean zero and variance  $a^2$ .

The expected variance of the surprise  $Y_{\tau_j} = \tilde{X}_{\tau_j} - \tilde{X}_{\tau_{j-1}}$  over time interval  $\tau_j - \tau_{j-1} = \Delta_j$  is

$$\widehat{\text{var}}(\tilde{X}_{\tau_j} - \tilde{X}_{\tau_{j-1}}) = \Delta_j \hat{\sigma}^2 + 2\hat{a}^2. \quad (4)$$

where  $\hat{\sigma}$  and  $\hat{a}$  are estimated up until before the event. The estimation is done via maximum likelihood, see Aït-Sahalia et al. (2005) for details. We require at least 10 quotes to be recorded before the start of the event. If there are 10 or fewer quotes available, we do not proceed with the testing procedure for the specific event and drop the event from further analysis. Further, we use at most the last 120 quotes before the start of the event to avoid congesting the variance estimates with data from several hours ago. We always estimate the variance until the start of the event, also if there are multiple events per day, i.e., the potential increase of the volatility of prior events on the same day is taken into account.

Given estimates of  $\sigma$  and  $a$ , we can scale  $\Delta_j$  to the size of the event window and test the null hypothesis of an abnormal return by computing the out-of-sample confidence intervals for  $Y_{\tau_j}$ .

Note that the variance parameters,  $\sigma$  and  $a$ , and subsequently the confidence bands are computed for individual quotes whereas the asset change is computed based on the median of a few pre- and post-event quotes. Since the median of a few quotes has a lower variance than individual quotes, the confidence bands we compute for the asset price changes should be considered an upper bound of the confidence intervals for the asset price changes based on the difference of medians. In other words, our procedure provides conservative confidence bands.

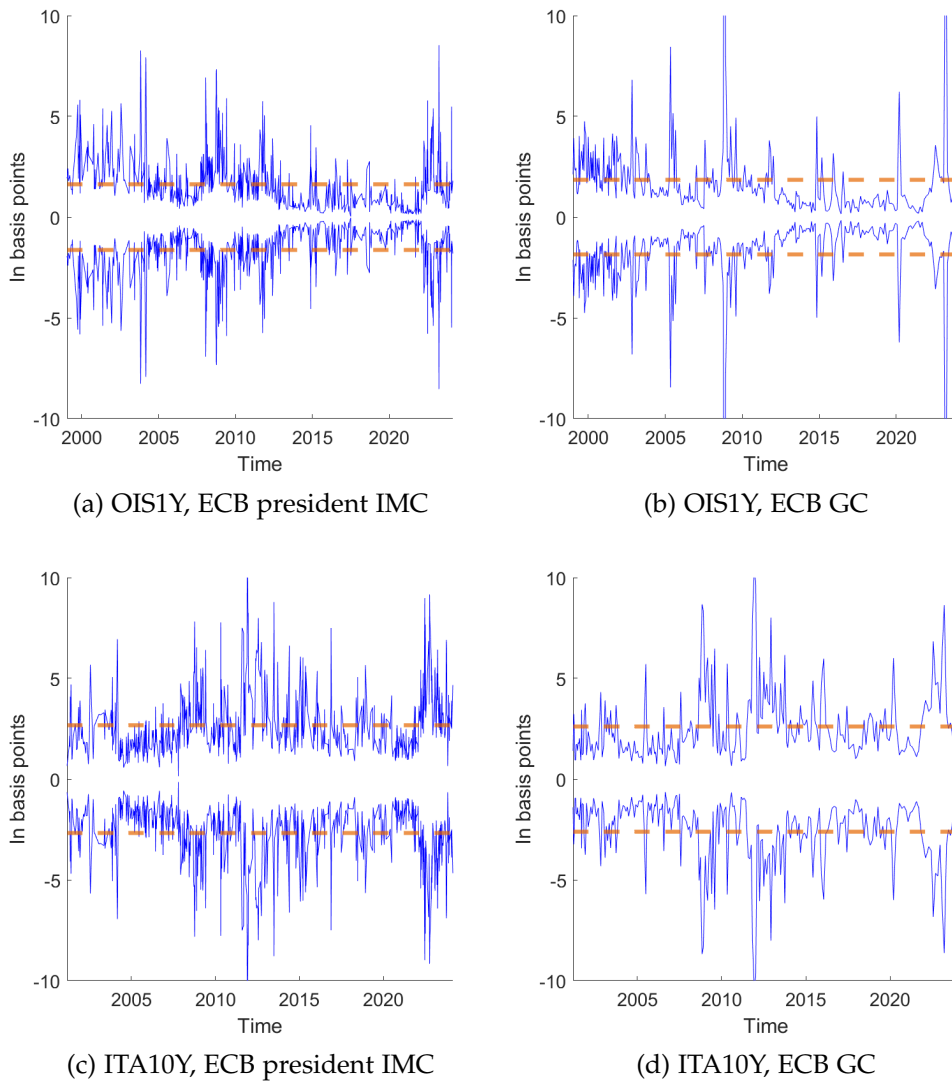
### 3.3 Estimates of abnormal market reactions

Figure 4 illustrates the estimates of the intraday variance for the ECB GC policy announcements and the IMC events of ECB presidents for two representative assets, the 1-year OIS and the 10-year Italian sovereign yield. The figure shows the predicted 90 % confidence bands of both assets over a 90 and 115-minute window for different IMC event days and GC meetings days, respectively, constructed as  $1.65\sqrt{90\hat{\sigma}_i^2 + 2\hat{a}_i^2}$  and  $1.65\sqrt{115\hat{\sigma}_i^2 + 2\hat{a}_i^2}$ .

The intraday confidence bands show considerable variation in both assets, in particular during the early and late parts of our sample, as well as during the Great Financial Crisis and the euro area Sovereign Debt Crisis. Overall, the intraday volatility of OIS1Y appears smaller than the sample average during the years in which the policy rates in the euro area have been close or at the effective lower bound.<sup>16</sup> The sizeable and time-varying market volatility cautions against the

<sup>16</sup>The volatility is outside of the plot's scale for two ECB GC events, November 6, 2008, and March 16, 2023, due to large changes within a few minutes before the publication of the press release.

Figure 4: Confidence bands for intraday changes over a typical event window



*Note:* The blue solid line shows the predicted 90 % confidence bands of OIS1Y and ITA10Y changes over a 90-minute window for different IMC event days and 115 minutes for ECB GC meetings days. The confidence bands are based on intraday volatilities that are estimated on data up until the start of the event. The dashed orange line shows the average over the whole sample of the confidence bands.



common approach in the literature that uses no or constant thresholds throughout the sample to assess the significance of asset movements around central bank communication.<sup>17</sup>

Figure 5 illustrates the estimated confidence bands in the OIS1Y around selected IMC events from different Governing Council members that lead to abnormal returns.<sup>18</sup>

On November 18, 2005, the OIS1Y jumped during the speech of the ECB president Trichet. Landler (2005) writes in the New York Times: "ECB made it clear it will raise rates. [...] "We will remove some of the accommodation which is in the present monetary policy stance," Trichet said in what amounted to a remarkably blunt warning from a normally circumspect central banker...[The remarks reverberated through European markets, briefly reversing the dollar's rally against the euro.]"

In a speech in Madrid on October 27, 2008, Hughes (2008) writes for Reuters News: "ECB President, Jean-Claude Trichet himself declined to comment on the size of any cut after surprising markets during a speech in Madrid on Monday with the blunt hint that a further rate cut is possible at the ECB's November 6 meeting." The market reacted with an approximate drop of 3 basis points of the OIS1Y rate. In contrast, OIS1Y falls during the speech of ECB president Mario Draghi on June 18, 2019. CNBC writes: "Speaking at the ECB Forum in Sintra, Portugal, Draghi gave a defiantly dovish tone, saying that if the economic situation deteriorates in the coming months the bank would announce further stimulus. The euro dropped 0.2% against the dollar in a matter of minutes as Draghi delivered the remarks. The German 10-year bund yield hit -0.30% for the first time ever."

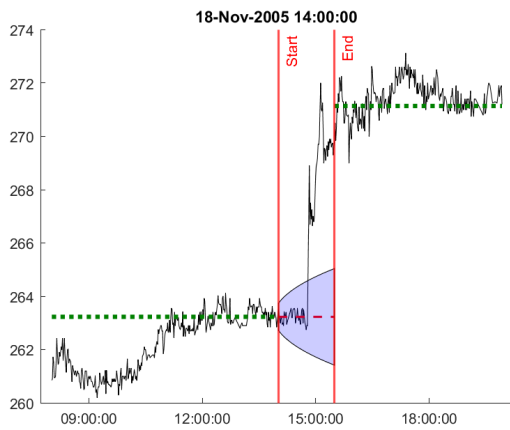
The OIS1Y rate jumped during the speech of Joachim Nagel on March 21, 2022, a period when ECB policy rates were still under forward guidance. Reuters (2022) writes: "The European Central Bank should continue to normalize policy and raise interest rates, possibly as soon as this year, if the inflation outlook warrants it, Bundesbank President Joachim Nagel said on Monday." Conversely, one year after the tightening cycle started, the OIS1Y fell during the speech of Francois Villeroy de Galhau on June 1, 2023. Reuters (2023) comments on the message of the speech as follows: "The increases in interest rates that we still have to do are relatively marginal, most of the work has been done," said Villeroy, who was speaking at an event hosted by various French media organizations and the Toulouse School of Economics." More recently, on January 10, 2024, the OIS1Y jumped during the live interview of Isabel Schnabel on Twitter. Weber and Schroers (2023) write on Bloomberg: "ECB's Schnabel Says Too Early to Discuss Interest-Rate Cuts".

Table 3 shows the number of events associated with an abnormal return in the Eurostoxx and in the OIS rate at different maturities. The numbers in parentheses indicate the percentage of events with an abnormal return relative to the total number of events for which we can compute a market reaction for this asset. We observe that about half of the ECB GC meetings lead to abnormal returns in the OIS1Y and OIS2Y; for shorter or longer maturities this number is considerably smaller. This result suggests that not all events that deal with monetary policy lead to relevant market movements, cautioning against assuming they are all important for markets only because they cover a monetary policy decision. Second, interest rate changes

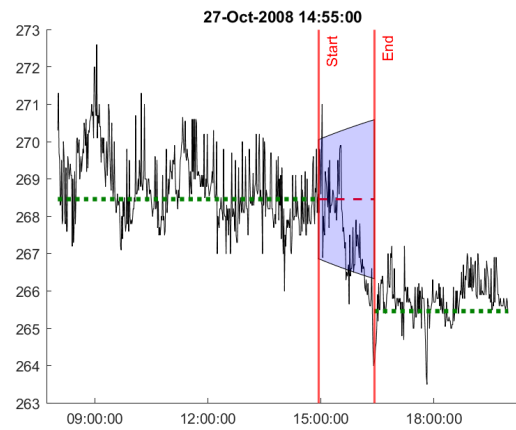
<sup>17</sup>For instance, Bauer and Swanson (2023) consider in their sample of surprises around Fed chair speeches all the events that are easily identified as speaking about monetary policy or that lead to a movement of 3 basis point or more in the two-quarter-ahead Eurodollar futures contracts.

<sup>18</sup>Figure B.1 in the Appendix shows examples of GC meetings and IMC events with returns that are not classified as abnormal.

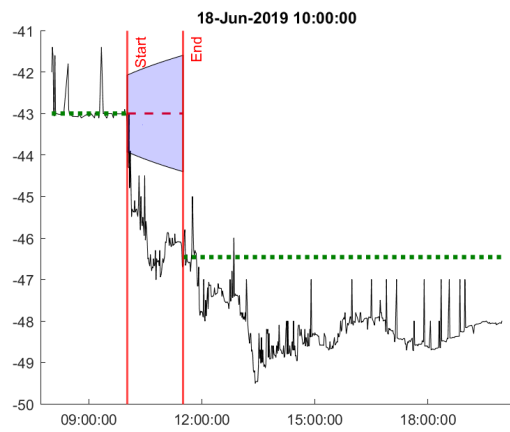
Figure 5: Examples of the effects of inter-meeting communication on OIS1Y



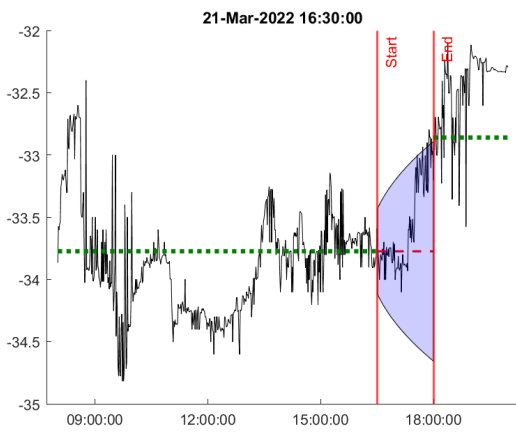
(a) ECB president: J.-C.Trichet, November 18, 2005



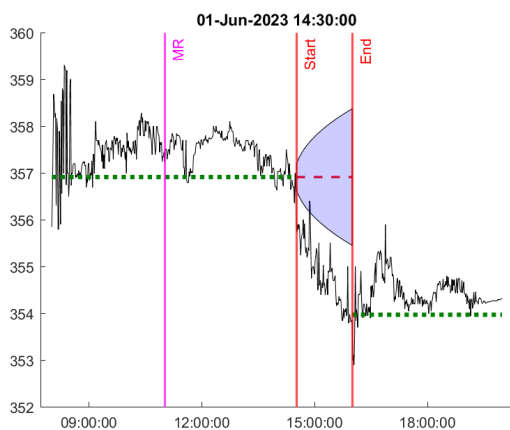
(b) ECB president: J.-C.Trichet, October 27, 2008



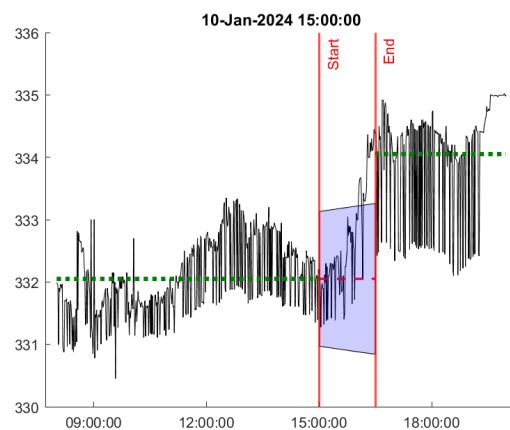
(c) ECB president: M. Draghi, June 18, 2019



(d) NCB: J. Nagel, March 21, 2022



(e) NCB: F. Villeroy de Galhau, June 1, 2023



(f) ECB EB: I. Schnabel, January 10, 2024

*Note:* Note: The green dashed lines show the mean of the quotes in the 15-minute pre-event window and the 15-minute post-event window, respectively. The red solid lines denote the start and end of the 90-minute IMC event window. The shaded areas show the confidence intervals based on the intraday variance estimated on data from 120 minutes before the event up to the event. The vertical magenta line denoted by "MR" shows macroeconomic data surprises. The unit of the y-axis is in basis points.

around GC meetings are often used as instruments to identify the impact of monetary policy on the macroeconomy in VARs or local projections regressions. Our results suggest that the signal-to-noise ratio from ECB GC meeting is higher on the OIS1Y or OIS2Y rate, thus surprises on both could be more suitable for use as instruments.

We also find that the share of ECB GC meetings that significantly affect OIS rates declines as their maturity increases. The opposite holds for the IMC events, whereby a higher share of them are associated with abnormal returns as the maturity increases. We observe similar patterns for sovereign yields and the ILS, as shown in [Table B.3](#) to [Table B.7](#) in the Appendix.

The share of IMC events with abnormal returns is relatively lower than for ECB GC meetings and varies between assets, from 5 to 26%. This suggests that our approach of considering abnormal returns filters out a large number of IMC events that might not have been relevant in terms of market news. However, in absolute numbers, we are left with a considerably higher number of IMC events than ECB GC meetings that lead to abnormal returns in the financial assets we consider. For example, more than 1000 IMC events lead to abnormal returns in the Eurostoxx compared to 117 ECB GC events.<sup>19</sup>

In general, when applied to all communication events in the EA-CED, we find that roughly 60% of the events in the EA-CED lead to abnormal returns on at least one asset.<sup>20</sup>

While [Table 3](#) shows the number of events associated with abnormal returns, [Table 4](#) measures the overall cumulative impact of these events in basis points for the OIS and in percentage points for the Eurostoxx. For OIS short-term maturities, the cumulative absolute impact of ECB GC meetings associated with abnormal returns is about twice that of the cumulative absolute impact of IMC events.<sup>21</sup> However, these effects are relatively similar starting from a maturity of one year (672 vs 648 basis points for ECB GC and IMC, respectively). For longer maturities, the effect of IMC events becomes larger, even double the effect of GC meetings. For the Eurostoxx, the effect of the IMC is three times larger than that of the ECB GC meetings (311pp vs 99pp). Similarly, across the maturities of sovereign yields, IMC events have a larger impact on longer maturities than on shorter maturities (see [Table B.8](#) to [Table B.11](#) in the Appendix).

Across IMC events, we observe that the publication of Accounts has the weakest power in terms of the share of events that move markets significantly. ECB president hearings at the European Parliament and interviews appear important, despite being fewer in number compared to other speaking events. Interestingly, we find that the impact per event from NCB governors is comparable (or even higher) to the effect from the ECB presidents and other members of the Executive Board.

Inflation expectations measured through the ILS are an outlier to these results. [Table B.7](#) in Appendix shows that less than 5% of the ECB GC policy announcements lead to abnormal movements in the ILS. Similarly, around 5 to 10% of the IMC events of ECB presidents, EB members, NCB governors, and interviews, respectively, lead to abnormal returns in the ILS.

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<sup>19</sup>We also show these statistics in the case of using a fixed threshold of 3bp change or more, as in [Swanson \(2023\)](#), to distinguish events with important effects for market (see [Table B.2](#) in the Appendix). We find that under this approach, more events would falsely drop as insignificant compared to ours. This was already evident in [Figure 4](#), as there are times when the market volatility is low and movements smaller than 3bp would be abnormal.

<sup>20</sup>Most of these events have a significant effect on only a few assets and/or maturities. Therefore, the number of events with abnormal returns varies for each speaking category and asset class.

<sup>21</sup>The average impact per communication event that leads to abnormal return is higher than the same effect when considering all our events in EA-CED without filtering for market volatility prior to the event, see for comparison [Table B.1](#) in Appendix.

Table 3: Number of communication events that lead to abnormal returns - OIS and stocks

Events	OIS									Eurostoxx 1999-2024
	1999-2024				2002-2024			2011-2024		
	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	
GC	105 (34 %)	124 (41 %)	135 (44 %)	144 (47 %)	140 (46 %)	110 (36 %)	69 (23 %)	63 (21 %)	66 (22 %)	117 (38 %)
President	25 (7 %)	37 (8 %)	36 (6 %)	49 (8 %)	58 (10 %)	47 (9 %)	34 (12 %)	38 (13 %)	35 (12 %)	73 (18 %)
Exec-Board	76 (6 %)	81 (5 %)	85 (5 %)	106 (5 %)	128 (7 %)	125 (8 %)	99 (8 %)	101 (9 %)	119 (10 %)	225 (15 %)
NCBs	63 (7 %)	72 (6 %)	85 (7 %)	112 (8 %)	128 (10 %)	114 (10 %)	76 (10 %)	84 (10 %)	80 (10 %)	124 (13 %)
Hearing	4 (8 %)	4 (5 %)	16 (18 %)	25 (26 %)	22 (23 %)	16 (22 %)	7 (15 %)	5 (11 %)	5 (11 %)	9 (19 %)
Accounts	0 (0 %)	0 (0 %)	3 (5 %)	4 (6 %)	4 (6 %)	2 (3 %)	4 (6 %)	4 (6 %)	4 (6 %)	4 (6 %)
Interview	9 (9 %)	8 (7 %)	8 (6 %)	17 (13 %)	18 (14 %)	15 (13 %)	11 (11 %)	14 (14 %)	19 (18 %)	12 (17 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns across all events of each type, for which we can compute a price change. ECB GC refers to ECB Governing Council monetary policy announcement events. Rows from ECB president to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interview to the communication through interviews of ECB Executive Board members (including the ECB president) and selected NCB governors.

In terms of the average impact per event, the IMC events have a larger impact than ECB GC meetings. Note that ILS is the financial instrument for which we have few asset price changes, for both ECB GC meetings and IMC events (about 100 and 530, on average across all maturities). Independently from the number of observations, their low sensitivity to communication may also reflect anchored inflation expectations for most of the sample (2008-2024).

Table 4: Importance of events that lead to abnormal returns - OIS and stocks

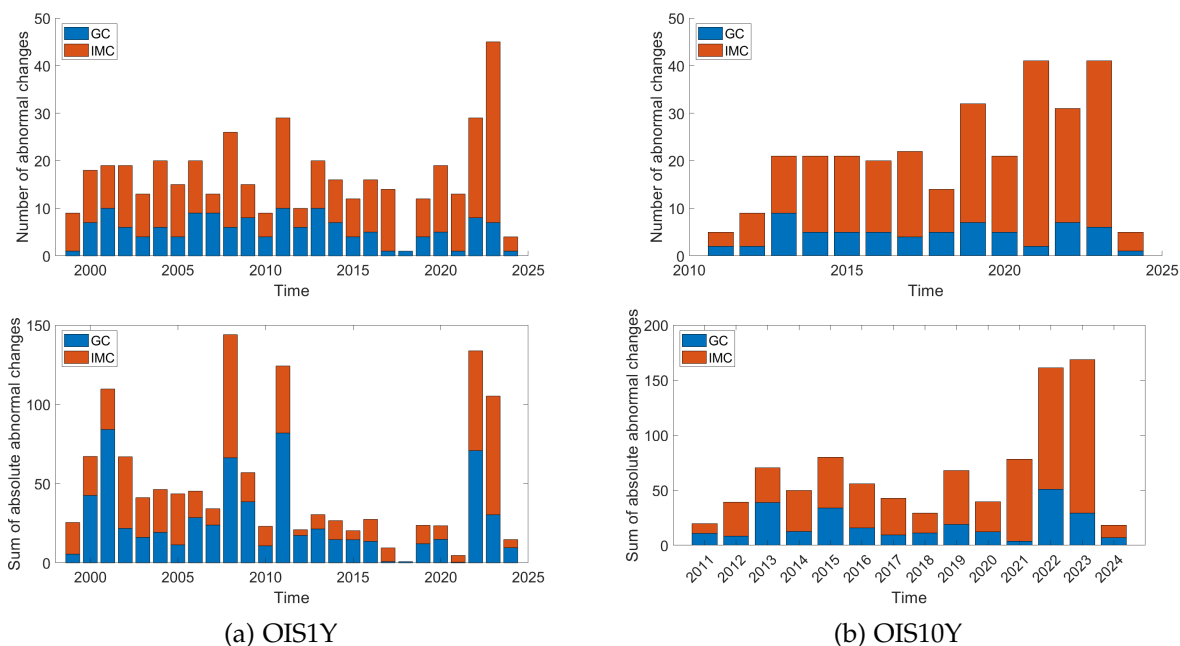
Events	OIS									Eurostoxx 1999-2024
	1999-2024				2002-2024			2011-2024		
	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	
Panel A: cumulative impact										
ECBGC	486	480	526	672	712	566	320	279	263	99
All IMC	219	236	339	648	952	956	597	657	737	311
ECB President	30	43	57	103	156	140	85	110	103	53
ECB EB	88	98	104	196	285	324	223	238	308	153
NCBs	87	81	121	236	372	378	216	233	234	90
EP hearing	5	2	39	61	69	44	12	10	10	7
Accounts	NaN	NaN	2	5	9	5	13	12	11	2
Interviews	8	13	16	47	60	65	49	53	70	7
Panel B: impact per event										
ECBGC	4.67	3.87	3.90	4.66	5.09	5.14	4.70	4.50	4.05	0.85
ECB President	1.21	1.15	1.59	2.11	2.70	2.98	2.51	2.90	2.94	0.73
ECB EB	1.16	1.21	1.22	1.85	2.23	2.59	2.25	2.36	2.59	0.68
NCBs	1.39	1.12	1.42	2.11	2.91	3.32	2.84	2.78	2.92	0.73
EP hearing	1.18	0.61	2.43	2.42	3.15	2.76	1.69	2.04	2.09	0.73
Accounts	NaN	NaN	0.75	1.28	2.17	2.73	3.23	2.98	2.68	0.38
Interviews	0.94	1.58	2.00	2.76	3.34	4.30	4.42	3.81	3.71	0.58

*Note:* Panel A shows the cumulative impact of absolute asset price changes for all events that represent abnormal changes on the OIS rate, from 1-month to 10-year maturity, and in the Eurostoxx returns. Panel B shows the average absolute impact of the events. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB president to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members (including the ECB president) and selected NCB governors. All numbers denote basis point changes for the OIS and percentage points in the case of Eurostoxx. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

Finally, we find considerable time variation on the power of our communication events in terms of how many of them lead to abnormal returns and their size effects. [Figure 6](#) demonstrates this evolution for the OIS rate at 1- and 10-year maturity. We find peak effects occurring predominantly in years with hiking cycles and turning points in policy (around 2008, 2011, 2022-2023). Interestingly, since 2022, both the number and the impact of IMC events with abnormal returns has more than doubled compared to the ECB GC policy announcements, for

both maturities.

Figure 6: Number and impact of communication events with abnormal returns over time



Note: The top panel shows the number of communication events with abnormal returns over time and the bottom panel shows the sum of absolute abnormal changes. GC stands for ECB Governing Council policy meeting events and IMC. Abnormal returns are calculated as described in the text. Results for 2024 are until February.

### 3.4 Abnormal returns by speaker

So far, we have shown that markets move significantly not only because of the IMC of the ECB president but also around the IMC of other Executive Board members and NCB governors. In our sample, we have 40 individual speakers for which we also measure their individual impact. However, since they served on the Governing Council at different time periods and they vary in the number of communication events, a direct comparison of all members is not meaningful. In addition, some assets are traded only in the last part of the sample, and there will be zero impact from members that served before that period.<sup>22</sup>

Figure 7 shows the cumulative absolute impact of IMC events from specific GC members on various assets. The first group of speakers corresponds to all ECB presidents in our sample and for the two other groups, the remaining Executive Board members and the governors of the four NCBs, we show only those with a larger impact overall. Cells in darkest colors highlight the highest values (10th highest percentile) within each asset.

Overall, we see that some members affected strongly rates at short- to long- term maturities, i.e., the ECB presidents but also Banque de France governor F. Villeroy de Galhau and Bundesbank president A. Weber. Clearly, for all speakers, the effects are larger as the maturity of the asset increases. While the absolute numbers mask the direction of the net impact of members, we notice for ECB presidents that the cumulative sign effect broadly matches the monetary policy

<sup>22</sup>For instance, J. Stark, A. Weber, L. Bini-Smaghi served on the Governing Council before the start of available OIS10Y data and have, therefore, by construction a zero impact on this asset.

cycle under their presidency. This is especially evident for J. C. Trichet and M. Draghi, which on average moved rates at short- and the long-term maturities in opposite directions.

Figure 7: Absolute cumulative impact of IMC per speaker

	OIS_6M	OIS_1Y	OIS_2Y	OIS_10Y	DE_2Y	DE_10Y	FR_2Y	FR_10Y	IT_2Y	IT_10Y	ES_2Y	ES_10Y	€STOXX	EURUSD
Duisenberg (1998-2003)	33,0	50,4	49,0	0,0	61,4	61,8	64,6	62,9	54,3	41,9	57,8	53,0	16,1	2,6
Trichet (2003-11)	39,1	78,6	122,7	1,9	132,8	131,5	128,3	126,8	126,4	133,6	118,1	131,6	20,7	21,6
Draghi (2011-19)	14,4	19,9	28,0	59,5	41,0	76,0	52,9	111,1	249,1	204,0	172,4	255,3	12,8	15,5
Lagarde (2019-)	9,7	15,0	26,1	53,5	31,0	71,3	33,5	63,4	48,3	125,3	42,0	87,7	10,5	8,8
Constancio (2010-18)	1,0	5,5	9,3	32,3	10,3	56,5	13,3	53,0	38,2	67,0	76,6	83,8	8,6	5,9
de Guindos (2018-)	9,7	15,3	19,0	43,4	25,8	44,3	22,7	45,1	91,1	81,2	22,8	71,9	7,2	5,7
Stark (2006-11)	11,5	11,3	33,5	0,0	14,9	50,3	29,9	41,3	23,4	33,0	85,7	31,9	4,6	2,7
Praet (2010-19)	3,9	7,4	14,0	19,3	25,0	23,7	10,5	21,5	79,2	112,6	45,6	70,6	8,0	5,9
Lane (2019-)	6,2	17,0	23,3	49,9	45,5	60,9	20,7	49,2	75,1	94,0	38,8	96,7	7,7	2,7
Gonzales-Paramo (2004-12)	5,3	8,8	11,9	7,3	37,2	30,7	12,4	21,4	34,3	36,7	36,4	41,7	5,7	3,7
Panetta (2020-23)	0,2	4,8	5,3	25,0	17,3	49,4	9,8	36,2	32,9	58,5	20,0	49,1	5,3	1,2
Smaghi (2005-11)	7,7	22,1	27,5	0,0	17,9	23,1	28,0	12,7	70,2	28,8	80,5	53,1	10,7	7,6
Coeuré (2012-19)	4,0	3,4	9,2	37,8	25,0	40,9	14,7	48,8	90,7	113,8	17,0	113,8	10,1	6,5
Schnabel (2020-)	7,5	11,1	17,9	29,5	26,6	37,4	21,1	35,2	25,6	56,2	26,4	56,1	4,4	3,7
Villeroy (2015-)	15,2	22,9	49,6	91,5	66,3	136,7	61,6	92,6	116,6	157,2	56,5	128,9	8,2	7,1
Weber (2004-11)	22,2	47,3	60,5	0,0	44,6	83,1	81,2	89,5	67,9	72,4	56,5	91,3	10,8	9,9
Weidmann (2011-21)	3,0	11,2	16,7	21,2	18,4	39,2	28,5	39,6	116,8	129,6	85,9	130,8	11,2	11,8
Visco (2011-23)	6,3	10,5	7,2	34,2	26,6	42,3	19,7	42,4	130,2	71,4	68,2	105,2	3,4	7,0
Hernández de Cos (2018-24)	11,7	13,4	22,4	31,3	29,3	39,1	31,1	39,7	37,8	78,3	32,4	66,2	7,4	3,8

Note: The table shows the absolute cumulative sum of the impact of IMC events by selected speakers. Dark blue implies largest values. For the OIS and the sovereign yields, the unit is basis points. For the Eurostoxx and the EURUSD exchange rate, the unit is percentage points. The numbers in parenthesis after the name of the speaker denote the years in office, for instance, Peter Praet was in office from 2010 to 2019.

## 4 Information in IMC events with abnormal returns

So far, we have shown that our inter-meeting communication events lead to significant market movements. In this section, we examine the information content of the Eurosystem inter-meeting communication as perceived by the financial market, guided by the literature on monetary policy announcements. We focus on events leading to abnormal returns, as defined in Section 3.2, and conduct three types of exercises. First, we investigate policy signals in IMC ahead of policy meetings that lead to changes in the monetary policy stance. In a second exercise, we assess the information effect of IMC events by looking at the joint reaction of several financial indicators to communication. To do so, we follow the literature that identifies monetary policy surprises by extracting common factors from changes in risk-free interest rates and sovereign yields around monetary policy decisions (Gürkaynak et al., 2005a; Altavilla et al., 2019) and adapt their approach to our IMC events. Third, we study the comovements of changes in the risk-free yield curve and the stock market to disentangle surprises about the state of the economy from monetary policy surprises around IMC events.

### 4.1 Do IMC events signal future monetary policy?

In the following, we investigate to what extent the direction of abnormal returns of inter-meeting communication is in line with the subsequent meeting decision.

Media coverage of public remarks by ECB GC members often suggests the presence of clear policy signals in speeches. For example, Randow and Thesing (2011) reports as follows in

Bloomberg after a speech by the ECB president on June 2011, “We are taking the decision progressively to anchor inflation expectations, Trichet said at a [non-GC meeting] press conference in Amsterdam today “. “As far as we’re concerned, we’re in strong vigilance mode,” he said, repeating a phrase the ECB uses to indicate a rate increase is imminent. The euro rose more than a cent after the comment to \$1.435 at 1:50 p.m. in New York.” Indeed, the ECB GC raised the policy rate of the Eurosystem by 25 basis points at its next meeting on July 7, 2011.<sup>23</sup>

We proceed as follows. First, we distinguish between ECB GC meetings with conventional and unconventional monetary policy announcements. For periods with conventional monetary policy, we categorize meetings into decisions of policy easing, policy tightening, or no change if the ECB GC decided to lower, increase, or keep the deposit facility rate (DFR) unaltered. For periods with unconventional monetary policy, we use meetings with all announcements related to the implementation and recalibration of different types of asset purchase programs (SMP, APP, PEPP), the OMTs, and long-term refinancing operations (LTRO, TLTRO).<sup>24</sup> In the latter group we also include three announcements that took place outside of regular monetary policy meeting days, following unscheduled GC meetings, such as the SMP announcements on 10 May 2010 and on 8 August 2011 and the first announcement of the PEPP on 18 March 2020.<sup>25</sup> Although these measures were different in scope and design, they were adopted overall to provide liquidity to the banking sector, to ease the monetary stance and/or to enhance the transmission of the ECB monetary policy, and to exert downward pressures on long-term yields, especially those of peripheral countries.<sup>26</sup>

Then, we calculate the cumulative impact of the abnormal returns related to the IMC ahead of the three types of ECB GC meetings defined previously. Given the nature of the policy tools under conventional and unconventional periods, we expect to see abnormal returns of the OIS rates at shorter maturities, for periods with conventional policy and, of the OIS rates and sovereign yields at longer maturities, for periods characterized by unconventional policy.

Figure 8 shows that IMC events ahead of *tightening* decisions move the short end of the OIS curve in the same direction as future policy decisions. In magnitude, across all tightening decisions, this movement is larger than the movement caused by the actual ECB GC policy decisions for maturities above one month. Second, the overall effects of IMC events ahead of policy *easing* decisions also show the same sign as forthcoming policy, except for the OIS1M, albeit modest in size. In other words, on a cumulative basis, IMC “talks markets” into the direction of the upcoming policy decision. However, although the cumulative effect of IMC before tightening decisions is large, there is considerable uncertainty around the cumulative impact, i.e., not all speakers and remarks move rates up.

The difference between the results of easing and tightening may indicate that there is communication of “vigilance” through speeches to keep inflation expectations anchored in times of mounting inflationary pressures, while policymakers wait for more supporting evidence to

<sup>23</sup>More recently, on May 11, 2022, Weber et al. (2022) write on Bloomberg, “Lagarde joins ECB officials signaling July as rate liftoff [...] Elderson, Nagel, Villeroy show rising support for July move [...]”.

<sup>24</sup>Securities Markets Programme (SMP), Asset Purchase Programme (APP), Pandemic Emergency Purchase Programme (PEPP), Outright Monetary Transactions (OMTs).

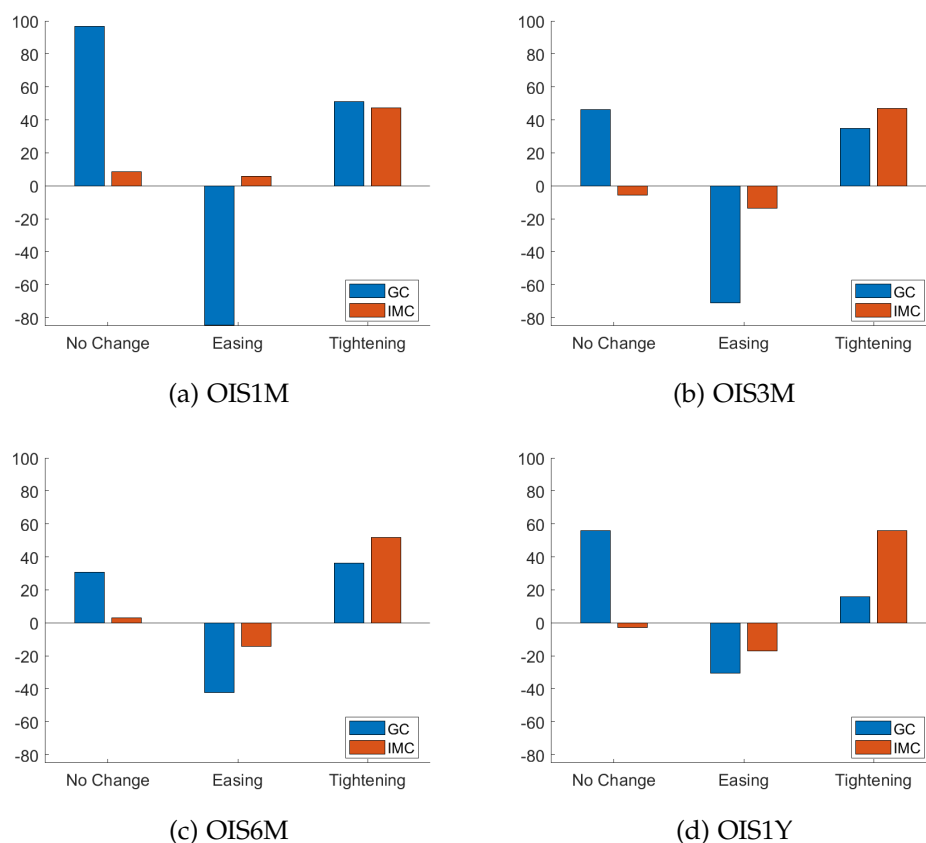
<sup>25</sup>In total we have 19 meetings with unconventional monetary policy decisions, some of which include announcements of multiple unconventional measures. We do not consider announcements of the withdrawal of such measures or the recalibration of parameters that are intended to provide less stimulus to the economy, such as the announcements of tapering and termination of the asset purchase programs.

<sup>26</sup>See Odendahl et al. (2024) for a description of these tools and their impact on the OIS and sovereign yields.



tighten policy. The smaller effect of IMC events ahead of easing decisions may reflect less of a concern to communicate "vigilance" toward deflationary pressures, in line with the perceived asymmetric approach of the ECB to the inflation objective, at least until 2021.<sup>27</sup>

Figure 8: Cumulative abnormal returns during and before ECB conventional announcements



*Note:* The figure shows the sum of abnormal returns of IMC and ECB GC events before and on decisions days, respectively, where the conventional monetary policy decision implied a reduction in the DFR (easing), an increase in the DFR (tightening) or no change in the DFR (no change). The units of the y-axis are basis points.

Figure 8 also shows that meetings with no change in the policy rate lead to abnormal changes. The fact that the cumulative impact of ECB GC events of this type is positive suggests that, on average, markets have been surprised on the upside and repriced their rate expectations accordingly. However, note that this effect is driven by just a few events, which took place one or two meetings ahead of an easing announcement or the start of an easing cycle, e.g., April 11, 2001, November 7, 2002, and October 6, 2011, and the ECB GC of March 12, 2020.

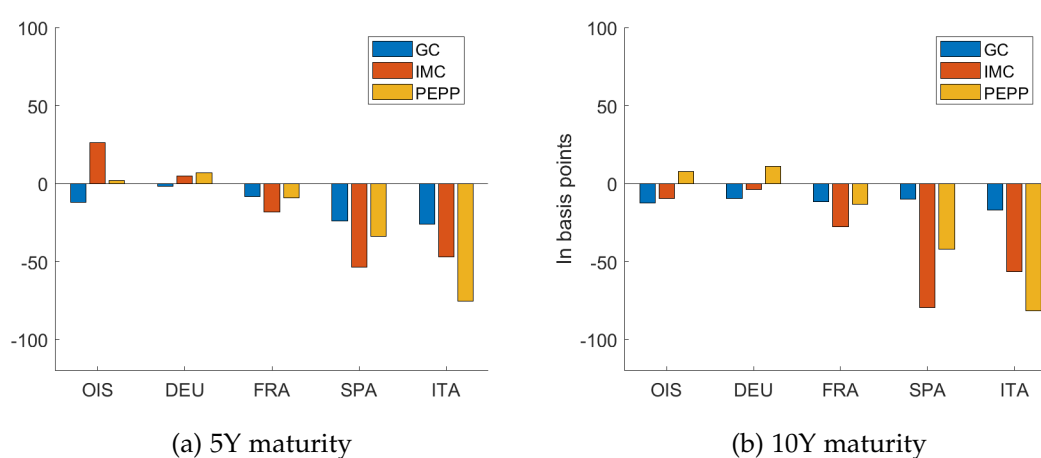
Figure 9 shows that IMC events ahead of unconventional monetary policy easing announcements lead to significant negative effects on sovereign yields at long maturities, especially on Italian and Spanish yields. Again, these effects are higher on average for the IMC events than for the ECB GC upcoming announcements. Effects on the German yields are modest and ambiguous in sign, which may reflect a scarcity effect induced by ECB asset purchases on German bonds but also a differentiated effect of different unconventional measures. As illustrated in Odendahl

<sup>27</sup>On 8 July 2021, the ECB announced its new monetary policy strategy. This strategy implements the price stability objective in terms of an unambiguous and symmetric target, which means that the GC considers negative and positive inflation deviations from the target 2% as equally undesirable.

et al. (2024), while the APP announcement has decreased long-term OIS and sovereign yields in a very similar way - in line with the stance nature of this measure - other measures, like the SMP and the PEPP, had very different effects on core vs. peripheral countries through their effects on risk premia. For comparison, in Figure 9 we show the large effect on Italian and Spanish sovereign yields from the three announcements related to the PEPP (March 18, 2020, June 4, 2020, and December 10, 2020).

Overall, these results suggest that there is a policy signal in the inter-meeting communication ahead of policy meetings (conventional and unconventional) and speak to the importance of considering IMC to measure and assess the overall effects of monetary policy.

Figure 9: Cumulative abnormal returns during and before ECB unconventional policy announcements



Note: The figure shows the sum of abnormal returns of IMC and ECB GC events before and on decisions days on which new accommodative unconventional monetary policy measures were announced. The units of the y-axis are basis points.

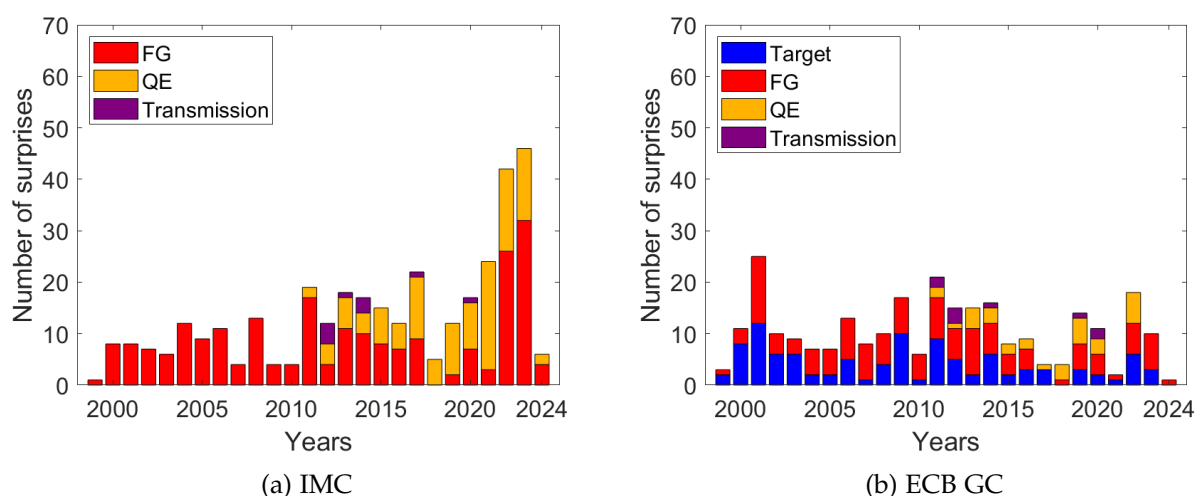
## 4.2 Decomposing IMC surprises in factor-like movements

To understand why markets move significantly around IMC events, it is important to keep in mind the context in which communication evolved over the past two decades. A defining moment for central bank communication in this period was the global financial crisis, which served as a catalyst for profound changes in the communication of monetary policy (Assenmacher et al., 2021). Several new and complex tools have been introduced to cope with policy rates near the effective lower bound (ELB) and an impaired monetary policy transmission mechanism. These measures required extensive communication from ECB Governing Council members beyond what can be explained on policy meeting days.

So far, the literature has mainly used market responses of specific financial indicators on monetary policy announcement days to infer the news perceived by the market. Gürkaynak et al. (2005a) found that monetary policy announcements are perceived to be multi-dimensional, containing news on current policy but also its future path. The follow-up literature (see Altavilla et al. (2019); Swanson (2021); Motto and Ozen (2022), among others) has also shown that as policy tools expand, so does the dimension of policy surprises. We follow this literature to categorize

also IMC events into surprises and compare them with respective ones from ECB GC policy meetings.

Figure 10: Number of factor-like surprises over time



Note: The figures show the number of factor-like surprises for IMC events, panel (a), and GC meetings, panel (b), over time. Note that in these charts there is not necessarily a one-to-one correspondence between a surprise and a single event; one communication event can generate several factor-like surprises simultaneously if it affects different assets/maturities at the same time. Results for 2024 are until February.

We proceed as follows. In the spirit of [Gürkaynak et al. \(2005a\)](#), we distinguish communication events leading to a "Target" surprise when they are associated with abnormal returns in the one-month OIS. We classify events as leading to a policy path (or forward guidance, "FG") surprise when they lead to abnormal returns in at least two OIS rates for maturities between three months and two years. Moreover, we classify as events leading to a QE-like surprise those that lead to abnormal returns of the same sign in the 10-year OIS and in the 10-year sovereign yields of at least two of the euro area countries in our sample.<sup>28</sup> Finally, following [Motto and Ozen \(2022\)](#), we distinguish events associated with a "MP Transmission" surprise as those that lead to abnormal returns with opposite signs in the 10-year sovereign yields of Germany and the 10-year yields of the two periphery countries; e.g., an increase in the German 10-year yield and a decrease in the Italian and Spanish 10-year yield.<sup>29</sup> Note that while we group our communication events in these four categories, we do not assume that the identified surprises are orthogonal to each other. In addition, for IMC events we do not compute a Target group as IMC events do not contain an actual policy decision. That is, if an IMC event moves the OIS 1-month that would also reflect news on future policy. However, for comparison with the ECB GC meetings, for IMC we consider as FG only those that lead to abnormal returns in at least two OIS rates for maturities between three months and two years.

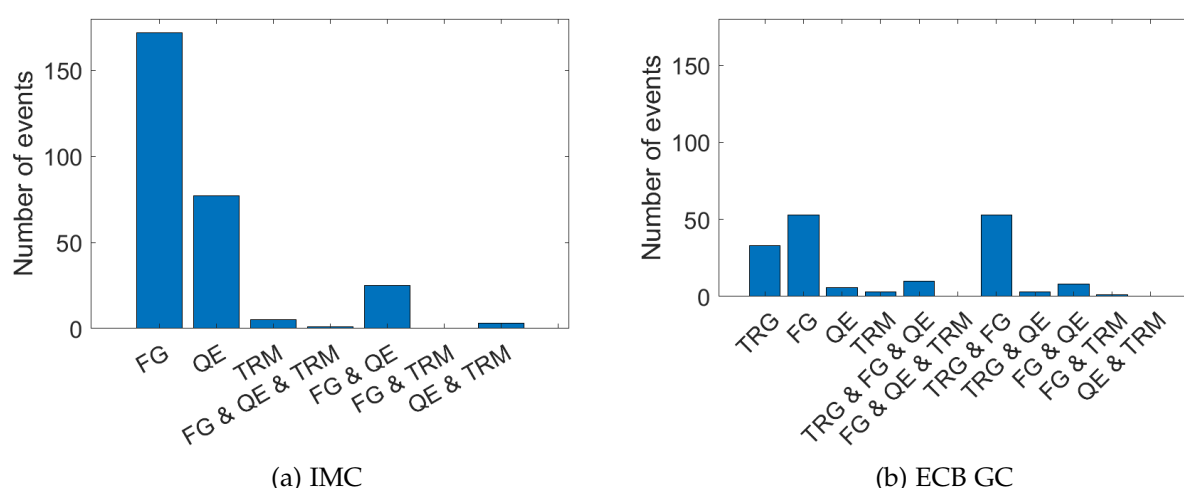
Once we apply these definitions, we find that 345 IMC events and 150 ECB GC events satisfy at

<sup>28</sup>For ECB GC policy announcements, [Altavilla et al. \(2019\)](#) identify a "Target" factor loading mostly on short-term OIS yields, a "FG" factor, loading mainly on the one and two-year OIS rate and a "QE" factor, loading on the 10-year OIS and German sovereign yields.

<sup>29</sup>For ECB GC policy announcements, [Motto and Ozen \(2022\)](#) identify a "market-stabilization QE" factor, which either does not load on risk-free rates or it does with an opposite sign compared to the loading on sovereign yields of periphery countries. They relate this factor to ECB nonstandard measures aiming at safeguarding the monetary policy transmission and reversing flight-to-safety dynamics, such as SMP, OMT and PEPP.

least one of the "surprise" conditions. We summarize the evolution of these surprises in Figure 10, for the IMC and the ECB GC policy announcements, respectively. Several results stand out. First, we find multiple surprises in both IMC events and ECB GC policy announcements. For IMC events, we find that FG-like surprises are the most common ones over time, corroborating our previous results that there is a policy signal in inter-meeting communication. Second, unsurprisingly, "QE" surprises occur in the second part of the sample, post-Great Financial Crisis.<sup>30</sup> Interestingly, a larger number of them is found in IMC events compared to ECB GC meetings. Fourth, we also uncover a few "Transmission" like surprises in IMC events. Among speeches leading to these surprises, we have the "Whatever it takes" speech of ECB President Draghi on July 26, 2012. Finally, the COVID crisis in 2020-21 and the recent tightening cycle of 2022-2023 stand out for IMC events in terms of "FG" surprises. This corroborates our previous finding of a strong policy signal in IMC events prior to tightening decisions.

Figure 11: Number of events leading to factor-like surprises, by type



Note: The figures show the number of events generating factor-like surprises, by type of surprise. We distinguish events leading to a single-type of surprise and those leading to co-occurrences of surprises, i.e. events that satisfy several factor restrictions at once. TRG stands for "Target" and TRM for "Transmission".

Figure 11 shows the number of events associated to factor-like surprises, distinguishing between those associated to one type of surprise and to a co-occurrence of surprises. The latter are communication events that satisfy several of our restrictions at once. We observe that most IMC and GC lead to one type of surprise, mostly "FG" and "QE" surprises for IMC events and "Target" and "FG" for GC meetings. Fewer events lead to multiple surprises at once. Most co-occurrences relate to events generating "Target" and "FG" surprises for ECB GC and "FG" and "QE" surprises for IMC events.

### 4.3 Central bank information effect vs. monetary policy surprises in IMC events

Market movements around central bank communication can also be due to newly revealed information about the central bank's view on the state of the economy, instead of news on

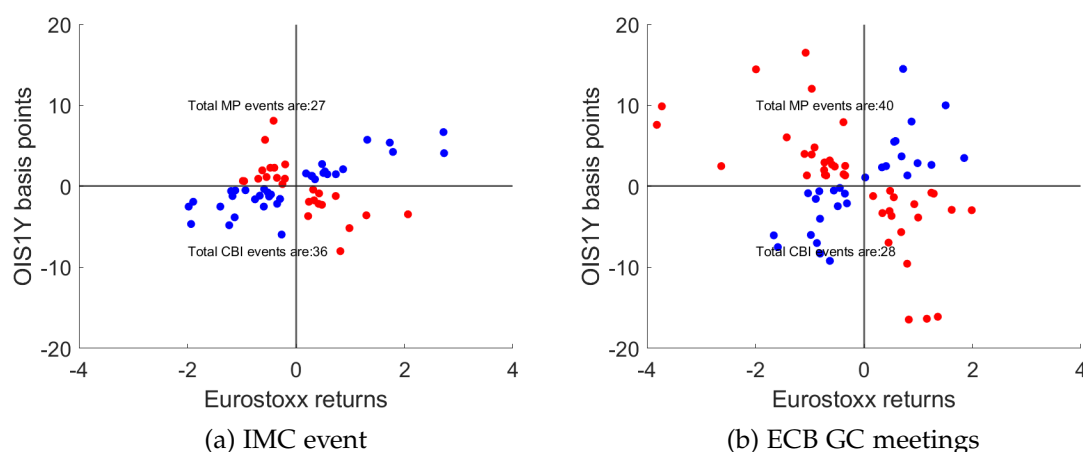
<sup>30</sup>OIS10Y are available only from 2011, thus by construction, we do not have a "QE" surprise before that date. However, as the ECB implemented QE measures in a strict sense only since 2014, this labeling is appropriate only from then onwards.

monetary policy itself (Jarociński and Karadi (2020); Andrade and Ferroni (2021); Cieslak and Schrimpf (2019)). Distinguishing the type of news is important as different types may affect the economy differently, see Jarociński and Karadi (2020) for instance. Therefore, in the following, we disentangle IMC and GC high-frequency movements into news about monetary policy and news about the central bank’s assessment of the economic outlook, following Jarociński and Karadi (2020). With this approach, a monetary policy surprise moves interest rates and stock prices in opposite directions, while a central bank information (CBI) surprise, i.e., news about the state of the economy, moves rates and stock prices in the same direction.

Figure 12 shows the scatter plot of OIS1Y and Eurostoxx changes, for IMC events in panel (a) and ECB GC meetings in panel (b). The plot is computed using events that lead to abnormal returns in both the OIS1Y and the Eurostoxx. About one third of IMC events can be classified as monetary policy surprises (red dots) and two thirds as containing news about the state of the economy (blue dots). For GC meetings, the ratio of the events that lead to monetary policy news versus CBI surprises is higher than for the IMC events, as shown in panel (b). This is unsurprising, as monetary policy is decided on the GC meeting days.

It is well known that policy announcements are weak instruments when estimating the macroeconomic effects of monetary policy shocks (see the discussion in Ramey (2016)). In fact, Figure 12 suggests that IMC events lead to a considerable number of monetary policy and CBI surprises and that only considering GC meetings misses about 40% of the relevant monetary policy surprises and more than half of the relevant CBI surprises.

Figure 12: Monetary policy vs central bank information surprises



Note: The figures show the subset of IMC and GC events with abnormal returns in both the OIS1Y and the Eurostoxx. The x-axis shows returns in percentage points. The y-axis shows the interest rate surprise in basis points. Red dots, i.e., dots in the upper left or lower right square are IMC event which move the stock market and the OIS1Y in the opposite direction. Blue dots, i.e., dots in the upper right or lower left square are IMC events which move the stock market and the OIS1Y in the same direction.

## 5 Concluding remarks

This paper presents the *Euro Area Communication Event-Study Database* (EA-CED), which we make available to researchers. The database consists of Eurosystem inter-meeting communication events and their impact, measured using high-frequency data on financial market variables. for the 1999 to 2024 period. In addition, the database contains the impact of ECB Governing Council meetings.

Overall, we document that markets react not only to ECB Governing Council policy announcements but also to inter-meeting communication of Governing Council members, in the form of speeches and interviews. The overall impact of IMC on rates is comparable in size to the impact of Governing Council policy announcements. Our paper therefore contributes to understanding the importance of central bank communication in shaping the effects of monetary policy and to the literature that aims to measure the impact of monetary policy on financial markets and the real economy. Studying the information content of the IMC events by dissecting the market response, we find that the impact of IMC events in many ways resembles the impact that Governing Council policy announcements have. Given the importance of inter-meeting communication, our work shows that any study that aims to measure the effect of monetary policy in the euro area misses policy variation by solely focusing on Governing Council policy announcements.

In addition, the EA-CED provides many opportunities for researchers who work on topics related to central bank communication. For example, since the EA-CED allows one to combine the IMC timestamp with the speech text from the ECB database, the researcher can study the content of communication, the role of specific topics and tone, as well as potential strategic communication of different GC members for market movements.

## References

- Aït-Sahalia, Y., Mykland, P. A., and Zhang, L. (2005). How Often to Sample a Continuous-Time Process in the Presence of Market Microstructure Noise. *The Review of Financial Studies*, 18(2):351–416.
- Altavilla, C., Brugnolini, L., Gürkaynak, R., Motto, R., and Ragusa, G. (2019). Measuring euro area monetary policy. *Journal of Monetary Economics*, 108:81–98.
- Andrade, P. and Ferroni, F. (2021). Delphic and odyssean monetary policy shocks: Evidence from the euro area. *Journal of Monetary Economics*, 117:816–832.
- Assenmacher, K., Glockler, G., Holton, S., Trautmann, P., Ioannou, D., Mee, S., Alonso, C., Argiri, E., Arigoni, F., Bakk-Simon, K., and Bergbauer (2021). Clear, consistent and engaging: ECB monetary policy communication in a changing world. Occasional Paper Series 274, European Central Bank.
- Bauer, M. D. and Swanson, E. T. (2023). A reassessment of monetary policy surprises and high-frequency identification. *NBER Macroeconomics Annual*, 37(1):87–155.
- Belly, G., Boeckelmann, L., Caicedo Graciano, C. M., Di Iorio, A., Istrefi, K., Siakoulis, V., and Stalla-Bourdillon, A. (2023). Forecasting sovereign risk in the euro area via machine learning. *Journal of Forecasting*, 42(3):657–684.
- Blinder, A., Ehrmann, M., de Haan, J., and Jansen, D.-J. (2017). Necessity as the mother of invention: monetary policy after the crisis. *Economic Policy*, 32(92):707–755.
- Brand, C., Buncic, D., and Turunen, J. (2010). The impact of ecb monetary policy decisions and communication on the yield curve. *Journal of the European Economic Association*, 8(6):1266–1298.
- Cieslak, A. and McMahon, M. (2023). Tough talk: The fed and the risk premium. *SSRN Electronic Journal*.
- Cieslak, A. and Schrimpf, A. (2019). Non-monetary news in central bank communication. *Journal of International Economics*, 118:293–315.
- Ehrmann, M. and Fratzscher, M. (2007). Communication by central bank committee members: Different strategies, same effectiveness? *Journal of Money, Credit and Banking*, 39:509–541.
- Ehrmann, M., Gnan, P., and Rieder, K. (2023). Central Bank Communication by ??? The Economics of Public Policy Leaks. CEPR Discussion Papers 18152, C.E.P.R. Discussion Papers.
- Ehrmann, M., Osbat, C., and Strýský, J. (2014). The euro exchange rate during the European sovereign debt crisis - Dancing to its own tune? *Journal of International Money and Finance*, 49:319–339.
- Fadda, P., Hanifi, R., Istrefi, K., and Penalver, A. (2022). Central Bank Communication of Uncertainty. Discussion Paper 17728, CEPR.
- Fraccaroli, N., Giovannini, A., Jamet, J.-F., and Persson, E. (2022). Does the European Central Bank speak differently when in parliament? Working Paper Series 2705, European Central Bank.

- Gertler, P. and Horvath, R. (2018). Central bank communication and financial markets: New high-frequency evidence. *Journal of Financial Stability*, 36:336–345.
- Gürkaynak, R. S., Sack, B., and Swanson, E. (2005a). Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements. *International Journal of Central Banking*, 1(1).
- Gürkaynak, R. S., Sack, B., and Swanson, E. (2005b). The sensitivity of long-term interest rates to economic news: Evidence and implications for macroeconomic models. *American Economic Review*, 95(1):425–436.
- Hughes, K. (2008). Trichet flags ECB rate cut, issue is how much. <https://www.reuters.com/article/markets/stocks/trichet-flags-ecb-rate-cut-idUSLNE49R00S/>. Accessed: 2024-06-19.
- Istrefi, K., Odendahl, F., and Sestieri, G. (2023). Fed communication on financial stability concerns and monetary policy decisions: Revelations from speeches. *Journal of Banking and Finance*, 151:C.
- Jarociński, M. and Karadi, P. (2020). Deconstructing monetary policy surprises -the role of information shocks. *American Economic Journal:Macroeconomics*, 12:1–43.
- Kliesen, K. L., Levine, B., and Waller, C. J. (2019). Gauging market responses to monetary policy communication. *Federal Reserve Bank of St. Louis Review*, Second Quarter 2019:69–91.
- Kohn, D. L. and Sack, B. (2004). Central bank talk: Does it matter and why? In *Macroeconomics, Monetary Policy, and Financial Stability*, pages 175–206. Ottawa: Bank of Canada.
- Kuttner, K. N. (2001). Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *Journal of Monetary Economics*, 47(3):523–544.
- Landler, M. (2005). ECB makes clear it will raise rate. <https://www.nytimes.com/2005/11/18/business/worldbusiness/ecb-makes-clear-it-will-raise-rates.html>. Accessed: 2024-06-19.
- Leombroni, M., Vedolin, A., Venter, G., and Whelan, P. (2021). Central bank communication and the yield curve. *Journal of Financial Economics*, forthcoming.
- MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, 35(1):13–39.
- Motto, R. and Ozen, K. (2022). Market-stabilization QE. Working Paper Series 2640, European Central Bank.
- Mumtaz, H., Saleheen, J., and Spitznagel, R. (2023). Keep it Simple: Central Bank Communication and Asset Prices. Working Papers 960, Queen Mary University of London, School of Economics and Finance.
- Nakamura, E. and Steinsson, J. (2018). High-frequency identification of monetary non-neutrality: The information effect. *The Quarterly Journal of Economics*, 133(3):1283–1330.



- Neuhierl, A. and Weber, M. (2019). Monetary policy communication, policy slope, and the stock market. *Journal of Monetary Economics*, 108:140–155.
- Odendahl, F., Pagliari, M. S., Penalver, A., Rossi, B., and Sestieri, G. (2024). Euro Area Monetary Policy Effects. Does the Shape of the Yield Curve Matter? *Journal of Monetary Economics* (forthcoming).
- Ramey, V. (2016). Chapter 2 - macroeconomic shocks and their propagation. volume 2 of *Handbook of Macroeconomics*, pages 71–162. Elsevier.
- Randow, J. and Thesing, G. (2011). ECB’s Trichet says ‘strong vigilance’ warranted on inflation. <https://www.bloomberg.com/news/articles/2011-06-09/ecb-s-trichet-says-strong-vigilance-warranted-on-inflation>.
- Reuters (2022). ECB should keep 2022 rate hike on agenda, if inflation warrants it — Nagel. <https://www.reuters.com/business/ecb-should-keep-2022-rate-hike-agenda-if-inflation-warrants-it-nagel-2022-03-21/>. Accessed: 2024-06-19.
- Reuters (2023). ECB’s villeroy: upcoming rate hikes will be marginal. <https://www.reuters.com/markets/europe/ecbs-villeroy-upcoming-rate-hikes-will-be-marginal-2023-06-01/>. Accessed: 2024-06-19.
- Rosa, C. and Verga, G. (2008). The Impact of Central Bank Announcements on Asset Prices in Real Time. *International Journal of Central Banking*, 4(2):175–217.
- Swanson, E. T. (2021). Measuring the effects of federal reserve forward guidance and asset purchases on financial markets. *Journal of Monetary Economics*, 118(C):32–53.
- Swanson, E. T. (2023). The importance of fed chair speeches as a monetary policy tool. *AEA Papers and Proceedings*, 113:394–400.
- Swanson, E. T. and Jayawickrema, V. (2024). Speeches by the fed chair are more important than fomc announcements: An improved high-frequency measure of u.s. monetary policy shocks. mimeo.
- Tillmann, P. and Walter, A. (2019). The effect of diverging communication: The case of the ECB and the Bundesbank. *Economics Letters*, 176(C):68–74.
- Weber, A., Look, C., and Bratanic, J. (2022). Lagarde joins ecb officials signaling july as rate liftoff. <https://www.bloomberg.com/news/articles/2022-05-11/lagarde-says-ecb-hike-may-follow-weeks-after-bond-buying-ends>.
- Weber, A. and Schroers, M. (2023). ECB’s Schnabel says too early to discuss interest-rate cuts. <https://www.bloomberg.com/news/articles/2024-01-10/ecb-s-schnabel-says-euro-area-faces-weak-outlook-in-near-term>. Accessed: 2024-06-19.

## Appendix A Surprises around ECB GC monetary meetings

In the construction of the high-frequency movements around monetary policy meetings, we follow the methodology of [Altavilla et al. \(2019\)](#) when applicable. Different from their paper, our database consists of minute-by-minute quotes instead of tick-by-tick. Hence, we proceed as follows. We clean the quotes for misquotes and outliers on the days of the monetary policy events that we consider. Misquotes are defined by quotes with a negative bid-ask spread or a bid-ask spread that is 50 times larger than the median bid-ask spread on that day; we additionally identify and clean a few hand-selected misquote instances where, for example, the quotes changed by several hundred basis points (bps) from one minute to the other.

We construct surprises over the full monetary policy event window, as in [Altavilla et al. \(2019\)](#) as follows. Typically until April 2022, after an ECB Governing Council (GC) meeting, there is a press release published at 1:45 pm, which contains the monetary policy decisions. This is followed by a press conference at 2:30 pm, which lasts for about an hour and includes time for Q&A with financial journalists.<sup>31</sup> The overall monetary event surprises are computed as the difference between the median quote from 1.25pm to 1.35pm and the median quote from 3:40 to 3:50 pm, i.e. covering the entire time period from before the press release to after the end of the press conference. We define the beginning and end of the time windows of press releases or press conferences that were published or occurred at a different time by following the same logic explained above.

Working with minute-by-minute quotes means that there can be at most 11 quotes for the pre-event window from 1.25pm to 1.35pm, which we use to compute the pre-event median. Sometimes there are few or no quotes in the time window from 1.25pm to 1.35pm. Therefore, if  $Q$  denotes the number of quotes available between 1.25pm to 1.35pm, then  $X = 11 - Q$  denotes the number of missing quotes. If  $Q < 4$ , i.e. if there are fewer than four quotes in the pre-event window, we search in the two hours before 1.25pm and take at most the  $X$  last quotes before 1.25pm that are available. If  $Q \geq 4$ , i.e. if there are four or more quotes in the 1.25pm to 1.35pm window, we take the median of these quotes and do not search for additional quotes in the time period before 1.25pm.

We proceed similarly for the post-event window. If  $Q$  denotes the number of quotes available between 3:40 pm to 3:50 pm, then  $X = 11 - Q$  denotes the number of missing quotes. If  $Q < 4$ , we look in the two hours after 3:50 pm and take at most the  $X$  first quotes after 3:50 pm that are available. If  $Q \geq 4$ , i.e. if there are four or more quotes in the 3:40 pm to 3:50 pm window, we take the median of these quotes and do not search for additional quotes in the time period after 3:50 pm.

In our database, we include three special announcements following unscheduled governing council meetings (the SMP announcement of 5 October 2010, the SMP activation of 8 July 2011 and the PEPP announcement of 18 March 2020) and two speeches by president Draghi who took place on a Friday evening (CET), one at Jackson Hole on 22 August 2014 and one in New York on 4 December 2015. For those events, we compute the surprises as follows. The pre-event price

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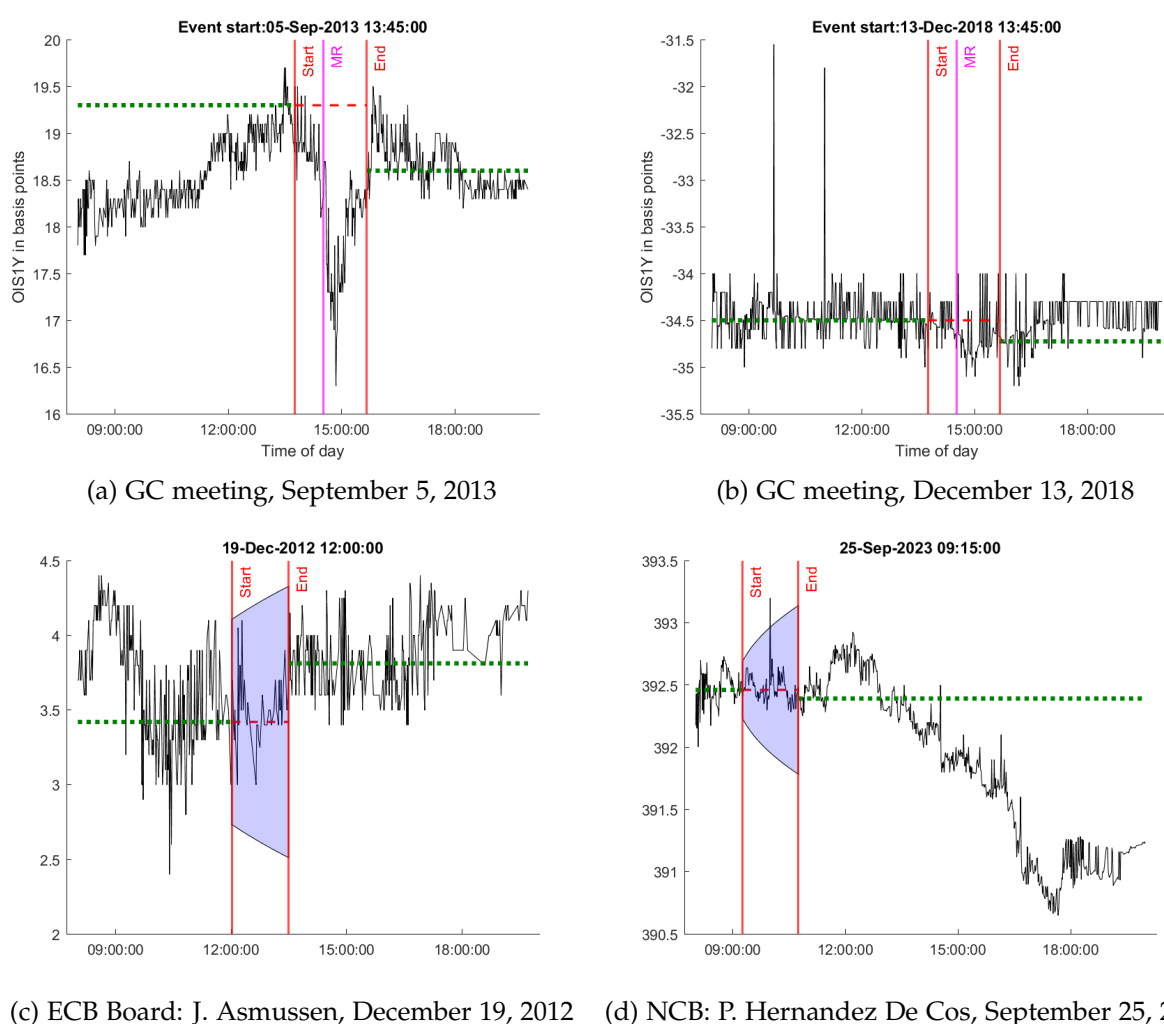
<sup>31</sup>Note that for several ECB Governing Council meetings, these times are different and we use the comprehensive list of ECB GC press release and press conference times provided in the Appendix of [Altavilla et al. \(2019\)](#) to account for those exceptions. Notice also that the time of the press release and press conference has changed since June 2022, taking now place at 2:15 pm and 2:45 pm, respectively. In the computation of asset price returns, we modified the pre- and post-event windows accordingly.

is computed by taking the median of the quotes from 5:45pm to 6:00 pm of the last trading day before the event. The post-event price is computed by taking the median of the quotes from 5:45 pm to 6:00 pm on the first trading day after the event. The surprise is then the difference between the post- and pre-event price. For those events we do not compute confidence intervals to assess their significance but rather we assume that they lead to abnormal returns due to the fact that they are found to be important events in the literature (see for instance [Odendahl et al. \(2024\)](#)).

## Appendix B Additional results

### B.1 Events with insignificant returns

Figure B.1: Examples of events with non-abnormal returns



*Note:* Note: The green dashed lines show the mean of the quotes in the 15-minute (10-minute for GC) pre-event window and the 15-minute (10-minute for GC) post-event window, respectively. The red solid lines denote the start and end of the 90-minute IMC event window. The shaded areas show the confidence intervals based on the intraday variance estimated on data from 120 minutes before the event up to the event. The vertical magenta line denoted by "MR" shows macroeconomic data surprises. The unit of the y-axis is in basis points.

### B.2 Impact of events without controlling for significance of returns

Table B.1: Importance of Eurosystem communication events - OIS and EuroStoxx

Events	OIS									Eurostoxx
	1999-2024				2002-2024			2011-2024		1999-2024
	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	
Panel A: cumulative impact										
ECBGC	495	521	599	770	840	686	360	339	313	136
ECB President	129	180	262	405	569	555	313	346	370	139
ECB EB	349	506	712	1131	1572	1549	1114	1208	1367	463
NCBs	267	382	573	922	1345	1254	831	882	958	317
EP hearing	16	30	75	106	124	85	39	41	47	21
Accounts	5	9	9	17	29	35	42	42	46	9
Interviews	25	35	69	117	166	169	173	171	181	23
Panel B: impact per event										
ECBGC	1.97	2.00	2.28	2.93	3.32	3.19	3.13	2.90	2.68	0.52
ECB President	0.34	0.35	0.45	0.67	0.95	1.08	1.05	1.15	1.21	0.33
ECB EB	0.26	0.30	0.36	0.55	0.79	0.91	0.89	0.96	1.07	0.31
NCBs	0.30	0.33	0.43	0.66	0.97	1.08	1.01	1.06	1.13	0.32
EP hearing	0.32	0.41	0.82	1.09	1.28	1.16	0.85	0.88	1.00	0.45
Accounts	0.08	0.14	0.15	0.27	0.45	0.54	0.64	0.65	0.71	0.14
Interviews	0.24	0.30	0.54	0.87	1.26	1.45	1.73	1.71	1.76	0.32

*Note:* Panel A shows the cumulative impact of absolute asset price changes for respective communication events on the OIS, 1-month to 10-year maturity and on the Eurostoxx. Panel B shows the average absolute impact. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB president to EP hearing, refer to speaking events in the inter-meeting period, for the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members (including the ECB president) and selected NCB governors. All numbers denote basis point changes for the OIS and returns in the case of the Eurostoxx. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

### B.3 Number of abnormal returns with fixed threshold

Table B.2: Number of communication events that lead to abnormal returns - threshold of 3bp

Events	1999-2024				OIS 2002-2024			2011-2024		Eurostoxx 1999-2024
	1M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	
GC	48 (16 %)	52 (17 %)	65 (21 %)	83 (27 %)	95 (31 %)	80 (26 %)	47 (15 %)	45 (15 %)	45 (15 %)	106 (35 %)
President	5 (1 %)	6 (1 %)	9 (2 %)	14 (2 %)	29 (5 %)	34 (7 %)	16 (6 %)	16 (6 %)	20 (7 %)	55 (14 %)
Exec-Board	6 (0 %)	12 (1 %)	10 (1 %)	38 (2 %)	71 (4 %)	80 (5 %)	53 (4 %)	46 (4 %)	73 (6 %)	219 (15 %)
NCBs	7 (1 %)	5 (0 %)	14 (1 %)	41 (3 %)	85 (6 %)	81 (7 %)	47 (6 %)	48 (6 %)	53 (6 %)	154 (16 %)
Hearing	0 (0 %)	1 (1 %)	4 (4 %)	8 (8 %)	12 (12 %)	6 (8 %)	1 (2 %)	1 (2 %)	2 (4 %)	10 (21 %)
Accounts	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	1 (2 %)	1 (2 %)	2 (3 %)	2 (3 %)	2 (3 %)	1 (2 %)
Interview	1 (1 %)	2 (2 %)	3 (2 %)	8 (6 %)	13 (10 %)	16 (14 %)	16 (16 %)	13 (13 %)	18 (17 %)	14 (19 %)

*Note:* The selection of what constitutes an abnormal return is based on a fixed threshold of three bps. For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns across all events of each type. ECB GC refers to ECB Governing Council monetary policy announcement events. Rows from ECB president to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interview to the communication through interviews of ECB Executive Board members (including the ECB president) and selected NCB governors.

## B.4 Abnormal returns for sovereign yields, FX and ILS

Table B.3: Communication events that lead to abnormal returns - DEU

Announcement	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
GC	26 (9 %)	55 (18 %)	94 (31 %)	149 (49 %)	148 (49 %)	164 (54 %)	156 (51 %)	147 (48 %)
President	15 (10 %)	17 (7 %)	27 (7 %)	64 (12 %)	84 (14 %)	82 (14 %)	88 (15 %)	85 (15 %)
Exec-Board	30 (5 %)	45 (6 %)	65 (5 %)	189 (10 %)	213 (11 %)	245 (12 %)	226 (11 %)	233 (12 %)
NCBs	24 (6 %)	44 (8 %)	60 (7 %)	139 (11 %)	156 (11 %)	194 (14 %)	197 (14 %)	188 (14 %)
Hearing	1 (11 %)	2 (10 %)	5 (10 %)	27 (34 %)	25 (25 %)	24 (24 %)	24 (24 %)	23 (24 %)
Accounts	1 (3 %)	1 (2 %)	3 (6 %)	6 (10 %)	7 (11 %)	7 (11 %)	10 (15 %)	10 (15 %)
Interview	1 (2 %)	1 (2 %)	7 (9 %)	8 (7 %)	12 (9 %)	16 (12 %)	17 (13 %)	17 (13 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns of all events.

Table B.4: Communication events that lead to abnormal returns - FRA

Announcement	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
GC	69 (23 %)	93 (30 %)	126 (41 %)	136 (45 %)	145 (48 %)	160 (52 %)	148 (49 %)	152 (50 %)
President	11 (7 %)	24 (8 %)	40 (12 %)	62 (11 %)	79 (13 %)	74 (13 %)	85 (14 %)	86 (15 %)
Exec-Board	31 (6 %)	57 (6 %)	96 (8 %)	150 (8 %)	201 (10 %)	234 (12 %)	241 (12 %)	215 (11 %)
NCBs	25 (7 %)	38 (6 %)	72 (9 %)	126 (9 %)	144 (11 %)	177 (13 %)	166 (12 %)	171 (13 %)
Hearing	0 (0 %)	6 (16 %)	15 (33 %)	22 (22 %)	22 (22 %)	22 (24 %)	26 (26 %)	23 (24 %)
Accounts	0 (0 %)	0 (0 %)	3 (7 %)	4 (6 %)	7 (11 %)	6 (9 %)	8 (12 %)	8 (12 %)
Interview	1 (2 %)	3 (5 %)	4 (6 %)	8 (6 %)	15 (12 %)	15 (12 %)	19 (15 %)	14 (11 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns of all events.

Table B.5: Communication events that lead to abnormal returns - ITA

Announcement	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
GC	17 (6 %)	35 (11 %)	48 (16 %)	127 (42 %)	127 (42 %)	140 (46 %)	129 (42 %)	130 (43 %)
President	10 (7 %)	15 (9 %)	18 (8 %)	73 (14 %)	78 (15 %)	98 (18 %)	105 (19 %)	107 (20 %)
Exec-Board	37 (6 %)	45 (7 %)	62 (8 %)	192 (11 %)	239 (14 %)	289 (17 %)	298 (17 %)	267 (15 %)
NCBs	19 (4 %)	25 (5 %)	43 (8 %)	137 (11 %)	164 (14 %)	217 (18 %)	233 (18 %)	207 (17 %)
Hearing	0 (0 %)	2 (13 %)	6 (27 %)	19 (24 %)	21 (27 %)	22 (27 %)	20 (24 %)	23 (27 %)
Accounts	0 (0 %)	1 (3 %)	1 (2 %)	8 (12 %)	9 (14 %)	14 (22 %)	14 (22 %)	12 (18 %)
Interview	2 (3 %)	1 (2 %)	2 (3 %)	13 (11 %)	15 (13 %)	16 (14 %)	18 (15 %)	20 (17 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns of all events.

Table B.6: Communication events that lead to abnormal returns - ESP

Announcement	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
GC	24 (8 %)	37 (12 %)	37 (12 %)	120 (39 %)	151 (50 %)	147 (48 %)	144 (47 %)	149 (49 %)
President	4 (4 %)	9 (6 %)	15 (8 %)	62 (11 %)	85 (15 %)	103 (18 %)	119 (20 %)	119 (21 %)
Exec-Board	19 (4 %)	51 (8 %)	63 (8 %)	170 (9 %)	238 (12 %)	309 (16 %)	339 (17 %)	321 (17 %)
NCBs	16 (5 %)	28 (7 %)	43 (8 %)	133 (10 %)	160 (12 %)	236 (18 %)	228 (17 %)	241 (18 %)
Hearing	0 (0 %)	2 (18 %)	3 (14 %)	21 (23 %)	26 (29 %)	25 (28 %)	24 (26 %)	20 (22 %)
Accounts	1 (4 %)	1 (3 %)	4 (11 %)	5 (8 %)	6 (9 %)	12 (18 %)	14 (22 %)	12 (19 %)
Interview	0 (0 %)	2 (3 %)	5 (7 %)	16 (12 %)	13 (10 %)	21 (17 %)	20 (15 %)	19 (15 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns of all events.



Table B.7: Communication events that lead to abnormal returns - ILS

Announcement	FX	1Y	2Y	5Y	10Y
Panel A: total impact					
GC	153 (50 %)	11 (4 %)	12 (4 %)	18 (6 %)	16 (5 %)
President	91 (15 %)	9 (12 %)	6 (8 %)	5 (7 %)	5 (9 %)
Exec-Board	255 (12 %)	14 (6 %)	12 (5 %)	11 (5 %)	9 (5 %)
NCBs	171 (12 %)	9 (6 %)	9 (6 %)	9 (7 %)	12 (10 %)
Hearing	23 (21 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)
Accounts	10 (15 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)
Interview	11 (8 %)	1 (7 %)	1 (6 %)	0 (0 %)	0 (0 %)

*Note:* For each event type, the first row shows the total number of events with abnormal changes, that is, events that we consider to have actually surprised markets, and the second row shows the percentage of events with abnormal returns of all events.

Table B.8: Importance of events that lead to abnormal returns - DEU

Event	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
Panel A: total impact								
ECBGC	385	228	403	808	789	797	680	581
ECB President	43	59	94	176	247	260	269	278
ECB EB	131	145	111	456	498	666	643	694
NCBs	82	104	156	416	461	602	570	576
EP hearing	4	3	14	90	80	74	69	61
Accounts	2	1	7	17	19	18	23	21
Interviews	1	4	23	29	41	51	54	53
Panel B: impact per event								
ECBGC	15.41	4.14	4.29	5.42	5.33	4.86	4.36	3.95
ECB President	2.88	3.48	3.47	2.75	2.94	3.17	3.06	3.27
ECB EB	4.37	3.23	1.71	2.41	2.34	2.72	2.85	2.98
NCBs	3.42	2.36	2.61	2.99	2.95	3.10	2.89	3.06
EP hearing	4.45	1.51	2.79	3.33	3.18	3.10	2.89	2.67
Accounts	1.63	0.65	2.24	2.88	2.76	2.60	2.28	2.09
Interviews	0.60	3.75	3.23	3.58	3.42	3.19	3.16	3.14

*Note:* Panel A shows the cumulative impact of absolute surprises for all events with abnormal changes in the German government bond yield, for maturities of three months up to 10 years. Panel B shows the average absolute impact. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB President to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members and selected NCB governors. All numbers denote basis point changes. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

Table B.9: Importance of events that lead to abnormal returns - FRA

Event	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
Panel A: total impact								
ECBGC	362	385	522	762	800	814	694	651
ECB President	24	52	90	194	219	231	264	281
ECB EB	83	140	173	350	480	633	674	642
NCBs	74	99	152	435	467	581	532	555
EP hearing	NaN	23	55	86	95	86	87	83
Accounts	NaN	NaN	3	14	21	19	21	18
Interviews	3	9	11	30	50	58	66	52
Panel B: impact per event								
ECBGC	5.33	4.14	4.18	5.60	5.52	5.09	4.69	4.29
ECB President	2.21	2.16	2.26	3.12	2.78	3.12	3.11	3.27
ECB EB	2.68	2.45	1.80	2.34	2.39	2.71	2.80	2.99
NCBs	2.97	2.60	2.11	3.45	3.24	3.28	3.21	3.24
EP hearing	NaN	3.80	3.65	3.89	4.31	3.93	3.34	3.61
Accounts	NaN	NaN	1.02	3.44	2.99	3.13	2.58	2.29
Interviews	3.25	2.98	2.64	3.69	3.31	3.88	3.46	3.72

*Note:* Panel A shows the cumulative impact of absolute surprises for all events with abnormal changes in the French government bond yield, for maturities of three months up to 10 years. Panel B shows the average absolute impact. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB President to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members and selected NCB governors. All numbers denote basis point changes. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

Table B.10: Importance of events that lead to abnormal returns - ITA

Event	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
Panel A: total impact								
ECBGC	63	128	412	958	999	1050	932	895
ECB President	52	77	78	366	369	414	431	412
ECB EB	192	183	272	820	1075	1121	1072	959
NCBs	92	100	191	745	741	908	931	833
EP hearing	NaN	20	36	112	111	119	95	93
Accounts	NaN	1	4	19	22	33	37	36
Interviews	16	3	6	50	56	59	66	76
Panel B: impact per event								
ECBGC	3.92	3.77	8.57	7.55	7.86	7.50	7.22	6.89
ECB President	5.24	5.14	4.33	5.02	4.73	4.23	4.10	3.85
ECB EB	5.18	4.06	4.39	4.27	4.50	3.88	3.60	3.59
NCBs	4.85	4.00	4.45	5.43	4.52	4.19	4.00	4.02
EP hearing	NaN	10.00	5.98	5.87	5.28	5.40	4.73	4.05
Accounts	NaN	0.75	3.95	2.42	2.42	2.34	2.65	2.96
Interviews	7.84	3.30	2.79	3.87	3.75	3.68	3.64	3.78

*Note:* Panel A shows the cumulative impact of absolute surprises for all events with abnormal changes in the Italian government bond yield for maturities of three months up to 10 years. Panel B shows the average absolute impact. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB President to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members and selected NCB governors. All numbers denote basis point changes. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

Table B.11: Importance of events that lead to abnormal returns - ESP

Event	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y
Panel A: total impact								
ECBGC	117	248	198	743	890	846	813	787
ECB President	6	60	50	274	348	410	438	453
ECB EB	75	224	228	708	832	1060	1077	1011
NCBs	84	102	152	528	619	798	779	809
EP hearing	NaN	7	41	116	141	77	94	75
Accounts	4	NaN	10	8	12	23	31	25
Interviews	NaN	14	14	57	44	68	68	70
Panel B: impact per event								
ECBGC	5.31	7.07	5.66	6.19	5.90	5.76	5.65	5.28
ECB President	1.41	6.71	3.31	4.42	4.09	3.98	3.68	3.80
ECB EB	4.17	4.38	3.62	4.16	3.50	3.43	3.18	3.15
NCBs	5.24	3.63	3.53	3.97	3.87	3.38	3.42	3.36
EP hearing	NaN	3.65	13.58	5.53	5.42	3.09	3.91	3.76
Accounts	4.40	0.30	2.39	1.60	2.01	1.95	2.18	2.11
Interviews	NaN	7.15	2.86	3.57	3.40	3.25	3.41	3.68

*Note:* Panel A shows the cumulative impact of absolute surprises for all events with abnormal changes in the Spanish government bond yield, for maturities of three months up to 10 years. Panel B shows the average absolute impact. ECBGC refers to ECB Governing Council monetary policy announcement events. Rows from ECB President to EP hearing, refer to speaking events in the inter-meeting period, from the ECB president, the ECB Executive Board (EB) members, the governors of the national central banks (NCBs) of Germany, France, Italy and Spain, and the European Parliament (EP) hearings of the ECB president. Accounts refers to ECB Monetary Policy Accounts and Interviews to the communication event through interviews of ECB Executive Board members and selected NCB governors. All numbers denote basis point changes. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.

Table B.12: Importance of events that lead to abnormal returns - ILS

Announcement	FX	1Y	2Y	5Y	10Y
Panel A: total impact					
ECBGC	100	37	42	54	57
ECB President	38	78	11	21	16
ECB EB	102	169	69	69	39
NCBs	70	59	70	45	51
EP hearing	11	NaN	NaN	NaN	NaN
Accounts	3	NaN	NaN	NaN	NaN
Interviews	5	10	2	NaN	NaN
Panel B: impact per event					
ECBGC	0.65	3.41	3.47	2.97	3.56
ECB President	0.41	9.73	2.11	5.34	3.91
ECB EB	0.40	12.04	5.75	6.23	4.32
NCBs	0.41	7.31	7.77	4.99	4.26
EP hearing	0.47	NaN	NaN	NaN	NaN
Accounts	0.32	NaN	NaN	NaN	NaN
Interviews	0.48	10.13	2.13	NaN	NaN

*Note:* Panel A shows the cumulative impact of absolute surprises for all events that represent abnormal changes (returns). Panel B shows the average absolute impact of the events. All numbers are in basis points and denote basis point changes in the case of the ILS and returns in the case of Stoxx50. Numbers are rounded to the nearest integer in Panel A and rounded to the second decimal in Panel B.