Deciphering Monetary Policy Shocks*

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Abstract

We decipher monetary policy shocks by showing that asset price reactions to policy announcements can be directly connected to topic-specific communication by the central bank. The asset price responses to news about topics such as 'rate guidance', 'economic activity', or 'financial and monetary conditions' are economically intuitive but exhibit substantial variation over time. This variation implies that communication is a flexible, state-contingent policy tool, but poses a challenge to the interpretation of monetary policy shocks solely identified from high-frequency asset price changes. Our results suggest that changes in the impact of communication are due to shifts in market perceptions.

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"*As had been suggested by Mr Praet in his introduction, nuances in the communication could convey a more positive tone on the state of the euro area economy, while signalling less urgency for further monetary policy action.*", ECB Monetary Policy Account, April 6^{th}, 2017

1. Introduction

A key question in economics and finance is how monetary policy impacts financial markets and the real economy. In addressing this question, a standard approach is to assess monetary policy shocks based on high-frequency market price reactions around announcements of monetary policy decisions. To give these shocks an economic interpretation, earlier research uses economic intuition and theory to (indirectly) infer what type of news may have plausibly moved asset prices in the observed direction. In this paper, we propose to assess the economic drivers of market responses to monetary policy decisions directly from the communication of central banks. Put differently, our objective is to decipher monetary policy shocks by directly connecting what market participants *hear* to what the central bank *says*.

Nowadays, all major central banks hold press conferences shortly after announcing their policy decisions in press releases, to elaborate on and to contextualize their decisions. We show that market prices respond to such post-announcement communication and, more specifically, that these responses (i) are distinct from market reactions to the announcement of the policy decision; (ii) are driven by news about the central bank's stance towards particular topics; (iii) differ across assets, specific to particular topics; (iv) vary over time.

To motivate that post-announcement communication matters for asset prices over and above the announcement of the policy decision itself, Figure 1 provides evidence for policy meetings of the European Central Bank (ECB).[1] Each panel shows a scatter plot with asset price changes in tight event windows around the monetary policy announcement on the horizontal axis and around the subsequent press conference, which takes place 45 minutes after the announcement, on the vertical axis. Two observations stand out across assets, i.e., interest rates, foreign exchange, equities, and sovereign yield spreads. First, there is sizable variation in asset prices during the press conference, in most cases more than around the announcement of the monetary policy decision. Second, market responses in the two event windows are uncorrelated, even though they take place shortly after one another and provide information about one and the same monetary policy decision. In other words, press conferences reveal additional news which markets obviously perceive as relevant over and above the information in the press release.

What is this incremental news? The post-announcement press conference entails rich verbal com-

[1] As we explain in more detail below, we focus on the ECB because it offers the longest history of communication via press conferences, compared to e.g. the Federal Reserve, which only started holding press conferences after every other meeting of the Federal Open Market Committee (FOMC) in April 2011 and after every meeting in 2019.

munication, which we use to quantify topic-specific news communicated by the ECB in a simple and transparent way. We exploit the structure of the press conferences to isolate distinct topics and use standard approaches of textual analysis to measure the ECB's stance towards five topics: 'rate guidance', 'economic activity', 'inflation', 'fiscal policy', and 'financial and monetary conditions'. We then show that unexpected changes in the ECB's stances are significant drivers of asset prices in a way consistent with economic intuition. Different assets respond to news on different topics, for instance, sovereign yield spreads mostly respond to the ECB's communication about 'fiscal policy' whereas exchange rates are driven by news about 'financial and monetary conditions'.

We also show that the topic-specific effects of post-announcement communication on asset prices varies over time. For instance, the two-year interest rate, which is often considered as a proxy for the path of future monetary policy, is most significantly related to changes in the ECB stance on 'economic activity' in the earlier part of our sample but more to news about 'financial and monetary conditions' in the later part. Several asset prices significantly respond to news about 'fiscal policy' during the European sovereign debt crisis but not at other times. Our results suggest that market participants perceive different topics more or less important at different times, which emphasizes the role of central bank communication as a flexible, state-contingent instrument in the monetary policy toolkit.

Our approach to deciphering monetary policy shocks requires comprehensive, nuanced verbal communication that can be associated with market prices in real time. We focus on the ECB, because it has employed a consistent communication strategy with press conferences after meetings of its Governing Council ever since its inception in 1999, which allows us to build a much longer time series of post-announcement communication than we could for other major central banks.

From the transcripts of the ECB President's introductory statements, we extract discussions on the topics 'rate guidance', 'economic activity', 'inflation', 'fiscal policy', and 'financial and monetary conditions' and measure the ECB's stance towards each topic by textual analysis. For 'rate guidance', we gauge whether the ECB indicates policy easing or tightening (similar to Hansen and McMahon, 2016). To quantify the ECB's stance on the other four topics, we use a financial dictionary to measure the ECB's topic-specific tone, with the goal to capture nuances in the communication of the ECB, such as the ones suggested by the quote presented above at the beginning of the introduction.

To assess market responses, we follow a large literature on measuring monetary policy shocks from high-frequency asset price changes around central bank announcements (see, e.g., Cochrane and Piazzesi, 2002; Gürkaynak et al., 2005). We utilize the Euro Area Monetary Policy event-study Database (EA-MPD) by Altavilla et al. (2019), which provides high-frequency data for tight event windows around the ECB's press releases and press conferences for numerous financial instruments. First, we use individual asset price responses of overnight index swaps, exchange rates, sovereign spreads, and equity index returns.

Second, we follow the literature on structural monetary policy shocks and use the co-movement of more than one asset price to identify distinct measures: shocks based on information from the whole yield curve (specifically, we follow Altavilla et al., 2019; Leombroni et al., 2021), and shocks based on the joint dynamics of interest rates and stock returns (specifically, we follow Cieslak and Schrimpf, 2019; Jarociński and Karadi, 2020). All shocks are estimated over the same sample period and are based on identical high-frequency timing conventions.

We assess market responses to topic-specific news communicated by the ECB by regressing the high-frequency asset price changes on the topic-specific stance changes revealed in the press conference. To ensure that changes in the ECB's topic-specific stances can be interpreted as news, i.e., as surprises conditional on the information available to market participants prior to press conferences, we include a comprehensive set of control variables to net out predictable variation in tone changes. Specifically, we control for asset price changes during the release of the policy decision (45 minutes before the start of the press conference), announcements of unconventional policy actions, current economic and financial market conditions (such as stock returns, interest rate changes, or changes in implied stock market volatility prior to a policy meeting), speeches of ECB Executive Board members between meetings, as well as changes in the ECB's economic projections. Taking all of this into account, any significant relation between high-frequency asset price and topic-specific stance changes should be due to news presented by the ECB in its press conferences.

Our results using the full sample period from 2002 to 2021 show that unexpected communication about 'rate guidance' moves both the short end (three months) and the middle part of the yield curve (two years), unexpected news about 'economic activity' impacts two-year yields, and long-term yields (ten years) respond to an unexpected change in the ECB's stance on 'financial and monetary conditions'. Furthermore, we find that the euro appreciates (against the USD, GBP and JPY) in response to an unexpectedly positive stance on 'financial and monetary conditions'. Sovereign yield spreads between Italian and Spanish versus German government bonds narrow in response to the ECB communicating positive news about 'fiscal policy'.

We then turn to monetary policy shocks constructed from the joint responses of more than one asset. For shocks based on movements of the full term structure of interest rates, we find that factors driving the short end of the yield curve are associated with changes in the 'rate guidance'-stance, the medium-term factor with 'economic activity', and the long-term factor with 'financial and monetary conditions'. These economic topics align well with the respective 'timing', 'forward guidance', and 'quantitative easing' shock interpretations proposed by Altavilla et al. (2019). For 'structural' shocks estimated from the joint response in interest rates and equities, we follow Jarociński and Karadi (2020) and Cieslak and Schrimpf (2019). We show that their respective 'policy' or 'monetary' shocks are associated with

communication news about the 'rate guidance'-stance whereas their 'information' or 'growth' shocks are most significantly related to news about 'economic activity', which aligns well with their original interpretations. Additionally, we find that the Cieslak and Schrimpf (2019) measure for 'risk premium' shocks is negatively related to news about 'financial and monetary conditions', which implies lower risk premia in response to positive news about financial conditions.

Finally, we show that asset price responses to central bank communication exhibit substantial time-variation. Across maturities, interest rates are most strongly driven by news about 'rate guidance', 'economic activity', or 'financial and monetary conditions' but at different points in time. Stocks most significantly respond to news about 'economic activity' in the early part of our sample but to 'fiscal policy' news during the global financial crisis and the European sovereign debt crisis. In that period, 'fiscal policy' news is also particularly relevant for sovereign yield spreads and the topic 'financial and monetary conditions' emerges as the main driver of exchange rates.

Our further analysis suggests that changes in market participants' perceptions and their demand for information are a key driver of the time-variation in communication effects. Specifically, we find that in the crisis period when sovereign yield spreads become significantly related to 'fiscal policy' news, the ECB communication dynamics remain unchanged, in terms of topic coverage and stance variation. This implies that the shift in significance is due to changes in market perceptions about topic-relevance, rather than the ECB altering its communication strategy. Additionally, we provide evidence that time-variation may stem from how informative market participants perceive the ECB's communication. We illustrate how a single instance of miscommunication can lead to a shift in significance, using the response of stock prices to 'economic activity' news, which appears otherwise insignificant.

A direct implication of our findings is that the interpretation of shock measures estimated from the term structure of interest rates and the joint dynamics of interest rates and stock prices should account for the time-varying responses of these assets to different topics. Moreover, our results are in line with a risk-based channel of monetary policy operating via financial intermediaries (e.g., Gilchrist and Zakrajšek, 2012; Bauer et al., 2023). Specifically, the increasing significance of 'financial and monetary conditions' and the heightened relevance of 'fiscal policy' during crisis periods suggest a central role of financial intermediaries in asset pricing (e.g., He and Krishnamurthy, 2013; Adrian et al., 2014; He et al., 2017; Haddad and Muir, 2021), in particular for exchange rates (e.g., Gabaix and Maggiori, 2015; Mueller et al., 2017) and sovereign bonds (e.g., Acharya and Steffen, 2015). Finally, our findings suggest that central bank communication can be an effective state-contingent policy tool. By tailoring topic-specific communication, central banks can strategically influence or mitigate responses in certain asset prices when explaining policy decisions during press conferences.

Related Literature. Our paper shows how topic-specific news communicated by the ECB affect asset prices, connecting three streams of literature. That is, research on central bank communication, the identification of monetary policy shocks, and the application of textual analysis to central bank documents.

The question of whether, and if so to what extent, central banks should engage in communication with outsiders has been a long-standing debate among academics and policymakers, see, e.g., Woodford (2005) who discusses how central bank communication matters for policy effectiveness or Shin (2017) deliberating on whether central banks can talk too much. Early surveys of central bank transparency and communication include Geraats (2002) and Blinder et al. (2008). Over time, central banks have moved towards greater transparency (e.g., Moessner et al., 2017; Blinder, 2018). Recently, communication has expanded to target not just markets but also broader audiences, especially households (e.g., Ehrmann and Wabitsch, 2022; Blinder et al., 2024).

Our paper builds and contributes to the literature on monetary policy shocks, specifically research that aims to measure such shocks from high-frequency market prices in tight windows around policy announcements (e.g. Kuttner, 2001; Cochrane and Piazzesi, 2002; Bernanke and Kuttner, 2005; Gürkaynak et al., 2005). The recent literature proposes a variety of such shocks based on interest rate and/or other asset price responses measured around monetary policy announcements, for instance, Hanson and Stein (2015), Altavilla et al. (2015), Nakamura and Steinsson (2018), Jarociński (2020), Jarociński and Karadi (2020), Cieslak and Schrimpf (2019), Bauer and Swanson (2023b), Leombroni et al. (2021), Swanson (2021), and Bauer and Swanson (2023a). While this literature infers the content of central bank announcements from asset price reactions, we directly link market responses to verbal communication to identify the economic drivers of monetary policy shocks.

Finally, our work is related to research that uses textual data on monetary policy decisions and central bank communication. In one stream of the literature, transcripts related to policy decisions are used to identify monetary policy shocks using the narrative approach of Romer and Romer (1989, 1990, 2004, 2023). Another examines the textual features of central bank documents in more detail, with important studies including Hansen and McMahon (2016) and Hansen et al. (2018, 2019), who explore how forward and economic guidance affect financial markets and the real economy. Schmeling and Wagner (2023) find that the ECB's tone during press conferences influences market participant's risk appetite in the eurozone. For the Fed, Cieslak et al. (2023) analyze FOMC meetings to distinguish sources of uncertainty in policymaking and Cieslak and McMahon (2024) show that a more hawkish stance predicts lower risk premia. Gómez-Cram and Grotteria (2022) document a strong correlation between asset price changes during policy statement releases and press conferences, attributing it to forward guidance and clarifications by the Fed chair. Aruoba and Drechsel (2024) use economic and text data to predict federal fund rate changes, interpreting the residuals as monetary policy shocks.

The remainder of the paper proceeds as follows. Section 2 describes the ECB's communication strategy and explains how we measure its topic-specific stances from press conferences. In Section 3, we link asset price responses to news about the ECB's stances. We expand the analysis to measures of (structural) monetary policy shocks in Section 4. Section 5 examines how asset price responses to ECB communication change over time. Section 6 discusses the key implications of our findings, and Section 7 concludes.

2. Measuring the ECB's monetary policy communication

Since our aim is to 'decipher' monetary policy shocks, we focus on market reactions to central bank announcements accompanied by rich verbal communication. The announcements of the European Central Bank are particularly well-suited for our analysis because the ECB has employed a consistent communication strategy since its inception, which allows us to study a much longer sample period than for any other major central bank. The ECB's Governing Council convenes eight times per year to decide on monetary policy in the euro area.[2] After the meeting, the ECB announces its policy decision to the public through a press release at 13:45 CET. At 14:30, the ECB President and Vice-President hold a press conference to further elucidate the monetary policy decision.[3] This press conference starts with a pre-scripted introductory statement read by the President, followed by a Q&A session with journalists. In line with previous research, we exploit the staggered timing of this communication strategy, i.e., the press release and the subsequent press conference, to distinguish market surprises related to the policy decision itself from surprises related to the ECB's press conference communication (e.g., Ehrmann and Fratzscher, 2009; Cieslak and Schrimpf, 2019; Altavilla et al., 2019; Leombroni et al., 2021; Schmeling and Wagner, 2023). The following section outlines how we measure the ECB's stance on different topics covered during the press conferences.

2.1. ECB press conference topics

In its press conference statements, the ECB addresses several distinct topics with potentially different policy implications, and we use textual analysis to separately measure the ECB's stance towards 'monetary policy tools', 'economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy'. At the outset, it is instructive to lay out the typical structure of an ECB press conference statement. The statement first mentions any policy decisions taken at the meeting and briefly summarizes the underlying rationale. It then elaborates on economic developments, with particular emphasis on the euro area economy and risks to the economic outlook. This assessment is followed by a discussion of inflation

[2] Before 2015, the Governing Council met (almost) every month.

[3] After the end of our sample, the ECB has changed the timing, i.e. the monetary policy decisions is released at 14:15 CET (instead of 13:45) and the press conferences starts at 14:45 CET (instead of 14:30). We document these and other changes in the ECB's communication structure in Appendix A.

developments and the most recent inflation flash estimate. Afterwards, the ECB discusses financial and monetary developments. Before the global financial crisis, the focus was mainly on money supply growth, while during and after the financial crisis, a more detailed analysis of bank lending emerged as an additional component, i.e. this topic covers 'financial conditions' as well. Subsequently, a short summary "cross-checks" the economic and monetary developments with a view to their implications for inflation and the stance of monetary policy. Finally, the president concludes with a statement on fiscal policy and structural reforms, which typically highlights the need for structural reforms or balanced fiscal budgets. In addition, every three months, the introductory statement also incorporates forecasts for inflation and GDP growth from the Eurosystem's macroeconomic projections, with the structure of the statement remaining unchanged.

Assigning different parts of the statement to one of the five topics mentioned above is straightforward, since the ECB uses a coherent structure. Each topic starts with a new paragraph, with the transition to the next topic being explicitly indicated. For example, following the introduction, the in-depth discussion of the economic outlook is introduced with a new paragraph, which opens with a sentence like "*Let me now explain our assessment in greater detail, starting with the economic analysis.*"

Likewise, the transition to the discussion of a different topic is clearly indicated by a sentence such as "*Turning to price developments*" for the discussion of inflation so that assigning paragraphs to the four topics 'economic activity', 'inflation', 'financial & monetary conditions', and 'fiscal policy' is straightforward. For the topic 'monetary policy tools', we consider the introductory and summary paragraphs of the statements. While these paragraphs do not contain any additional information on the other four topics, the ECB uses the beginning and/or the end of the press conference to explicitly refer to the current or future path of monetary policy. Whenever this is the case, we tag these paragraphs as 'monetary policy tools'. Otherwise, we discard them due to the repetitive or irrelevant nature of their contents, as we also do with occasional other communication unrelated to monetary policy, e.g., on the issuance of new banknotes.

[Table 1 about here]

In total, our sample covers 203 ECB press conferences from January 2002 to June 2021.[4] Table 1 provides summary statistics on the ECB's coverage of different topics in its press conference statements. Disregarding stop words, the average ECB statement comprises 840 words.[5] The averages for each of the five topics identified above range from 130 to 162 words, whereas the residual paragraphs (introduction,

[4] We end the sample in June 2021, because the ECB press conference statement does not treat 'fiscal policy' as a separate topic of its own afterwards, as we discuss in our overview of communication changes in Appendix A. While extending the sample does not affect the quality of our results, we prefer to work with a consistent, slightly shorter sample in which the topic-structure remains unchanged.

[5] It is common practice in textual analysis to exclude stop words, i.e., words that frequently occur without adding information, such as 'a' or 'the'.

summary, unclassified) aggregate to an average of 100 words. Relatively speaking, 88% of the statements can be directly associated with the five topics 'monetary policy tools', 'economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy', with average proportions of each topic ranging from 16% and 19%.

2.2. Measuring the ECB's topic-specific stance

Since we want to connect what the ECB *says* to what the market *hears*, we first need to quantify the ECB's stance on each specific topic. For the topics 'economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy', we assess the ECB's stance by the communication *tone* the ECB uses in association with these topics. Similar to other papers that quantify central bank tone, e.g., Aruoba and Drechsel (2024) and Schmeling and Wagner (2023), we use the financial dictionary of Loughran and McDonald (2011) to identify negative words. Using all paragraphs assigned to topic i in press conference t, we measure the ECB's topic-specific tone τ as

$$\tau_{i,t} = 1 - \frac{\#\text{ negative words in topic } i \text{ at press conference } t}{\#\text{ words in topic } i \text{ at press conference } t}. \tag{1}$$

To assess news about the ECB's stance towards these topics, we start from changes in the topic-specific tone from the preceding press conference at time $t-1$ to the current press conference at time t, that is

$$\Delta\tau_{i,t} = \tau_{i,t} - \tau_{i,t-1}. \tag{2}$$

In our empirical analysis, we use a battery of control variables to isolate the surprise component in the communication about a certain topic, as we detail below.

To measure the ECB's stance on 'rate guidance', we construct an indicator based on the discussions classified as 'monetary policy tools'. To indicate possible future policy action, the Governing Council uses subtle changes in language that an algorithm or tone measure is unlikely to detect. In many instances, such changes only affect a single sentence in the statement, and a human observer has a clear edge in interpreting such nuances. For example, to indicate the heightened probability of future policy action, the ECB would often change formulations stating that policymakers would 'monitor closely' certain risks to 'we will remain vigilant', to 'strong vigilance is warranted' or to 'strong vigilance is of the essence'. We follow Hansen and McMahon (2016) and read these paragraphs to manually classify them. Specifically, we distinguish introductory statements with indications of tighter monetary policy (+1), no indications

regarding future monetary policy (0), or monetary easing (−1), i.e.

$$\Delta\tau_{i,t} = \Delta\text{Rate Guidance}_t = \begin{cases} +1 & \text{if indication of future rate hike} \\ 0 & \text{if no indication} \\ -1 & \text{if indication of future rate cute} \end{cases} \tag{3}$$

Figure 2 visualizes the evolution of the ECB's topic-specific stances over our sample period from January 2002 to June 2021. For 'rate guidance', the plot illustrates when the ECB stance indicates policy easing or tightening. For the four tone-based stance measures, we plot their levels, which align well with important events in the euro area. For instance, 'economic activity' reaches its lowest point during the recession accompanying the great financial crisis; the stance towards 'financial & monetary conditions' drops substantially in the aftermath of the financial crisis and at the onset of the European sovereign debt crisis.

[Figure 2 about here]

Table 2 reports summary statistics for changes in topics-specific stances as well as their pairwise correlations.[6] For 'rate guidance', the change in stance is given by the indicator on policy easing or tightening. For the tone-based stance measures, we use standardized changes (i.e., demeaned and scaled to unit variance), for ease of interpretation. The changes in stance on 'economic activity' and 'inflation' exhibit the highest correlation (0.28). 'Economic activity' and 'fiscal policy' are also somewhat positively correlated (0.16). Correlations among other topic-specific stance changes are even lower. The summary statistics also show, in line with the time-series plots above, that changes in topic-specific stance vary substantially, with minimum and maximum values that are up to 5 standard deviations away from the mean.

[Table 2 about here]

3. Market price responses to ECB communication

In this section, we show that financial market responses to ECB announcements, measured from high-frequency asset price changes, are directly related to news communicated by central banks. At the outset, we describe our approach to assess the impact of topic-specific ECB news on asset prices, identified from ECB stance changes controlling for a large set of pre-communication variables. We apply our approach to a broad range of assets, that is, risk-free rates, foreign exchange rates, sovereign yield spreads, as well as equities.

[6] Additionally, Figure IA.1 in the Internet Appendix plots the time series of stance changes.

3.1. Empirical approach

To assess how markets respond to ECB announcements, we now connect what markets *hear* to what the ECB *says*. To quantify market responses, we use data from the Euro Area Monetary Policy event-study Database (EA-MPD) established by Altavilla et al. (2019). With this data, we measure the market response to the ECB press conference (which starts at 14:30) as the yield change or return of an asset from its median quote during the time window 14:15–14:25 to the median quote in the window 15:40–15:50. Then, we relate asset price changes to our text-based measures of the ECB's topic specific stances.

For each press conference (at time t), we have a set of price responses (R_t^k for different assets k) and the changes in stance for five topics as compared to the previous press conference ($\Delta\tau_{i,t}$). Additionally, we account for a comprehensive set of control variables ($C_{j,t}$) to ensure that changes in topic-specific stance revealed during ECB press conferences can be interpreted as news, i.e. as surprises conditional on the information available to market participants prior to press conferences. To do so, we run regressions of the form

$$R_t^k = \alpha + \sum_i \beta_i \Delta\tau_{i,t} + \sum_j \gamma_j C_{j,t} + \epsilon_t, \tag{4}$$

for each asset, as we now discuss for the 3-month OIS rate in detail. Table 3 reports the estimates of the stance coefficients for twelve specifications of Equation (4), Table IA.4 in the Internet Appendix also includes coefficient estimates for all control variables.

[Table 3 about here]

Based on the first six regressions, we emphasize that it is important to consider communication about all topics jointly. The first five columns report estimates from univariate regressions of the high-frequency change in the three-month OIS rate during ECB press conferences on either of the five topic stance changes. The results suggest that the rate changes may be related to ECB communication associated with the topic 'rate guidance' (at the 1% significance level), 'economic activity' (at the 5% level), and 'financial & monetary conditions' (at the 10% level). Once we include all topic stance changes in a multiple regression, 'rate guidance' remains highly significant, 'economic activity' becomes marginally significant, but communication about 'financial & monetary conditions' does not appear to convey any additional information for the three-month OIS rate.

With the remaining regressions, we illustrate the importance of accounting for control variables that proxy for the information set of market participants prior to press conferences. Doing so allows us to interpret the effects in terms of news beyond what market participants already knew or expected prior to the press conference. We now provide a summary of these variables but refer for details on the construction of these variables to Appendix C and for summary statistics to Table IA.1 in the Internet

Appendix. We introduce control variables in six stages. First, we include the press release shock, that is the market response of asset k during the press release 45 minutes prior to the start of the press conference. Including this control is important, because the press conference elaborates on the monetary policy decision announced in the release window, and with that control we account for market participants' expectations shaped by the announcement. We do this despite finding surprisingly low unconditional correlations between asset price changes across the two windows, as shown in Figure 1; however, as we introduce additional variables to the regression, these may affect conditional correlations. Additionally, we include an indicator variable for unconventional monetary policy (UMP) announcements, which is constructed similar to our measure of 'rate guidance' from the discussion on 'monetary policy tools'.

Second, we account for the possibility that the market impact of the ECB's stance on inflation might depend on the current inflation environment by including a dummy variable indicating whether inflation is currently above or below target and an interaction term with the ECB's stance on 'inflation'. Third, we account for topic-specific stance changes revealed during the previous press conference. Fourth, we control for the topic-level stance of over 2,000 inter-meeting speeches given by ECB Executive Board members, to account for market responses between policy meetings (e.g., Istrefi et al., 2024; Swanson and Jayawickrema, 2024; Cieslak and McMahon, 2024). Fifth, to capture changes in general economic and financial market conditions, we include the stock market return (EURO STOXX 50), changes in market volatility (VSTOXX volatility index), and changes in the two-year German sovereign bond yield over the inter-meeting period; such changes may affect, both, market perceptions as well as policy decisions (e.g., Cieslak and Vissing-Jorgensen, 2021). Sixth, we explicitly control for numerical GDP and inflation forecasts released during the press conference to ensure that the ECB's verbal assessment of economic conditions indeed carries additional information beyond these data releases.

For the three-month OIS rate, the main takeaway is that in any of the (eight) specifications that include changes in the ECB's stance on 'rate guidance', the coefficient estimates are quite similar (between 0.996 and 1.137) and always significant at the 1% level. Thus, we interpret these results as suggesting that the three-month OIS rate reflects news revealed by the ECB's communication associated with 'rate guidance', but not by news on any of the other topics.

In what follows, we extend this analysis to a broad range of assets, that is, risk-free rates (based on overnight index swap rates, OIS), foreign exchange rates, sovereign risk spreads (yields of Italian and Spanish government bonds relative to German bonds), as well as equities (market and bank stock index). We start by reporting summary statistics for these assets in Table 4, with a particular interest in the correlations of market responses to ECB communication.

[Table 4 about here]

Panel A shows that the correlation of asset price changes cannot only be high for instruments within asset classes but in several cases also across asset classes. For instance, market responses in interest rates and EUR exchange rates versus the USD, GBP and JPY have a high positive correlation (between 0.42 and 0.64). By contrast, changes in interest rates have a comparably low correlation with changes in sovereign yield spreads (-0.22 to -0.04) and stock returns (-0.09 to 0.10). Moreover, changes in sovereign yield spreads and stock returns exhibit a pronounced negative correlation (between -0.50 and -0.70). We use these correlation patterns to organize the discussion in two sets of results, that is interest and exchange rates and then sovereign spreads and equities. We present the main regressions results, including all control variables, below. For detailed estimation results of other specifications, asset by asset, see Tables IA.4 to IA.13 in the Internet Appendix.

3.2. Interest rates and exchange rates

We start by analyzing the impact of ECB communication on riskfree rates and Euro exchange rates. Table 5 reports how topic-specific news communicated by the ECB affect overnight index swap (OIS) rates and exchange rates. We regress changes in OIS rates and currency returns on changes in the ECB's topic-specific stances and our most comprehensive set of control variables, as discussed above.

[Table 5 about here]

Traditionally, research on monetary policy shocks assesses how interest rates respond to central bank announcements, with a focus ond the short end of the yield curve but more recently also for rates with longer maturities (e.g., Kuttner, 2001; Cochrane and Piazzesi, 2002; Gertler and Karadi, 2015; Hanson and Stein, 2015). We find that interest rate shocks are significantly related to ECB stance changes with respect to three topics: 'rate guidance', 'economic activity' and 'financial & monetary conditions'. Each of these topics appears to impact a different segment of the yield curve. 'Rate guidance' is mainly reflected in movements at the short end of the yield curve, with significant estimates for the three-month and two-year maturities. Accounting for all other topics and control variables, the impact of news about the 'economic activity' stance materializes further out on the yield curve, in particular for the two-year maturity; we saw above that 'economic activity' is also significantly linked to the very short end of the yield curve in a univariate setup and without control variables, and the same is true for the very long end (see Table IA.6 in the Internet Appendix). Conversely, the stance change on 'financial & monetary conditions' is picked up by the long end of the yield curve but not reflected in shorter maturities. While its level of statistical significance depends on including control variables, it is interesting that communication alone can move long-term yields, which used to be considered out of reach for conventional monetary policy tools.

Our estimates suggest an economically large effect of topic-specific news on interest rates: An unexpectedly hawkish change in 'rate guidance' is associated with a shock of one basis point in the OIS 3-month rate. To put this into perspective, a change of one basis point corresponds to approximately 90% of the average absolute change of three-month rates during ECB press conferences. In addition, our results suggest that other news communicated by the ECB in its press conferences matter for interest rates as well. The stance on 'economic activity' is particularly relevant for the two-year interest rate: a one-standard deviation increase, i.e., the ECB's tone becoming more positive, is associated with a rate increase of 0.84 basis points, which is approximately one-third of the average absolute change of two-year rates in our sample. Finally, a one-standard deviation more positive stance on 'financial & monetary conditions' is associated with a 0.41 basis point shock to the ten-year rate, which again corresponds to around one-fifth of its sample average absolute change. Hence, our results suggest that communication about the health of banks' balance sheets and their ability to keep markets and the economy afloat affect the long end of the yield curve, similar to unconventional policy actions.

Next we turn to reactions of currencies to monetary policy announcements. While early empirical research, such as Eichenbaum and Evans (1995) and Faust and Rogers (2003), focuses on the relevance of monetary policy shocks for deviations from uncovered interest rate parity and exchange rate overshooting, more recent work is interested in the role of financial intermediaries, see, e.g., Gabaix and Maggiori (2015), Bruno and Shin (2015), Mueller et al. (2017), and Ferrari et al. (2021).

The main finding revealed by the results in Table 5 is that positive news about the ECB's stance on 'financial and monetary conditions' is associated with an appreciation of the euro against all three foreign currencies, with different degrees of significance. For example, for the EUR/USD exchange rate, a one standard deviation change in stance leads to a five basis point return, which corresponds to about 17% of the mean absolute return during ECB press conferences, and the effects are even larger for GBP and JPY. These results are in line with models of intermediary asset pricing, which we discuss in more detail in Section 6.

3.3. Sovereign yield spreads and equities

The summary statistics in Table 4 suggest that changes in sovereign yield spreads and stock index returns exhibit a strong negative correlation during ECB press conferences. We now explore how these market responses are linked to topic-specific news communicated by the ECB and report the results in Table 6.

[Table 6 about here]

Several studies show that ECB announcements can have differential effects on the yields of sovereign bonds issued by core and peripheral countries of the euro area (see, e.g., Altavilla et al., 2016; De Santis and Holm-Hadulla, 2020). More specifically, Leombroni et al. (2021) find that the communication shocks they estimate (and which we discuss in Section 4 below as well) are positively associated with the yield spread between peripheral and core countries during the European sovereign debt crisis.

We find that high-frequency changes in the sovereign yield spreads exhibit a negative relation to the ECB changing its stance towards 'fiscal policy'. The estimates are similar for the spreads of Spanish (ES) and Italian (IT) vis-a-vis German (DE) yields, significant at the 10%-level (with t-statistics of 1.92 and 1.68, respectively). These results imply that the ES-DE and IT-DE yield spreads drop when the ECB communicates positive news in terms of a more optimistic assessment of public finances in the euro area. The ECB's take on fiscal policy should matter most for market participants in times when fiscal soundness becomes particularly relevant for monetary policy, and we discuss the time-varying impact of central bank communication below in Section 5 in more detail. During the European sovereign debt crisis, the link between yield spreads and 'fiscal policy news' becomes significant at the 1% level.

Monetary policy announcements may also affect stock prices, via different channels (e.g., Bernanke and Kuttner, 2005; Lucca and Moench, 2015; Gorodnichenko and Weber, 2016; Cieslak et al., 2019; Cieslak and Vissing-Jorgensen, 2021; Ozdagli and Weber, 2023). Interestingly, the results in Table 6 suggest that none of the topic-specific news appear to matter for stocks, neither the broad equity market index (i.e., the Eurostoxx 50 index) nor the index of banks (i.e., the SX7E bank index). At a first glance this may appear surprising given that Schmeling and Wagner (2023) find the ECB's tone of the overall press conference to matter for stock prices, however, as we show in Section 5, this appears to be due to different topics being perceived as relevant at different times. Moreover, stocks will play an important role for the assessment of structural shocks, which we discuss next.

4. Topic-specific news and structural monetary shocks

So far, our results have been concerned with establishing how topic-specific news affect returns of various asset prices individually. However, a growing literature estimates monetary policy shocks from the *joint* response of more than one asset/instrument by imposing additional assumptions. Such "structural shocks", guided by economic intuition or a theoretical model, can be useful for interpreting market reactions around central bank announcements, for example, to distinguish news about economic growth versus news about the central bank's reaction function. Put differently, one can use such shocks to indirectly infer what type of news may have plausibly moved asset prices in the direction observed to give these shocks an economic interpretation. By contrast, our news measures have a clear economic

interpretation, which allows us to benchmark structural shocks and test what type of information they actually respond to.

To do so, we consider four sets of shock measures proposed in the recent literature. Using data from the EA-MPD, we construct shocks based on the term structure of interest rates, as proposed by Altavilla et al. (2019) and Leombroni et al. (2021), as well as shocks estimated from the joint response of interest rates and stock prices, as suggested by Jarociński and Karadi (2020) and Cieslak and Schrimpf (2019). In the Internet Appendix, we summarize the identification assumptions for the shocks and their interpretation in Table IA.14 and provide technical details on the implementation in Section IA.A.

The interest rate factor (IR) of Leombroni et al. (2021) is the first principal component (PC) of the yield curve, thereby reflecting how yield levels respond to ECB announcements. Using the same term structure data, the factors of Altavilla et al. (2019) distinguish effects at the short end of the yield curve (which they interpret as 'Timing'), for medium-term maturities ('Forward guidance'), and on long-term rates ('Quantitative easing'). Jarociński and Karadi (2020) as well as Cieslak and Schrimpf (2019). propose to explot the co-movement of stock prices and interest rates for identification. The common idea of both approaches is that news about future monetary policy (i.e. the ECB's reaction function) in a narrow sense should be associated with a negative co-movement of yields and equity returns whereas news about the general economic outlook should be associated with a positive co-movement of interest rates and stock markets. Additionally, Cieslak and Schrimpf (2019) distinguish between short-term and long-term rates which allows them to quantify risk premium shocks.

The summary statistics in Table IA.15 in the Internet Appendix provide some evidence on how the different shock measures are related to each other. The policy and information shocks of Jarociński and Karadi (2020) are correlated with the monetary and growth Cieslak and Schrimpf (2019) shocks with coefficients of 0.98 and 0.91, respectively. Moreover, these shocks exhibit quite similar correlations with shocks to the short end of the yield curve as well as to medium-term yields. The risk premium shocks of Cieslak and Schrimpf (2019) have a correlation of -0.91 with the QE shocks of Altavilla et al. (2019).

4.1. Shocks estimated from the term structure of interest rates

We start with the shock measures designed to capture the reaction of the term structure of interest rates to monetary policy announcements. Table 7 presents the main regression results, whereas more detailed results, which include coefficient estimates for all control variables, are again delegated to the Internet Appendix; see Tables IA.16 to IA.19.

[Table 7 about here]

The 'interest rate' (IR) shock measure following Leombroni et al. (2021, LVVW) is defined as the first

principal component of interest rate changes across all maturities during the ECB's press conference. We find that IR shocks are significantly related to changes in the ECB's stance towards 'rate guidance' and 'economic activity'. While this result is intuitive, it implies that observing an IR shock might be related to news about policy rates, economic activity, or both and cannot be used to pin down the type of news precisely.

To study whether further dissecting the term structure allows for a tighter connection to text-based topic news, we use the yield curve factors proposed by Altavilla et al. (2019, ABGMR): 'timing', 'forward guidance (FG)', and 'quantitative easing (QE)'.

The interpretation of ABGMR is that 'timing' captures information relevant in the short-run until the next policy meeting that is reflected in short-term rates. Our regression results confirm this intuition by showing that 'timing'-shocks are significantly related to changes in the ECB's stance on 'rate guidance'. Additionally, the coefficient estimate for 'financial and monetary conditions' is significant at the 10% level.

Shocks to the 'FG'-factor, which ABGMR interpret to reflect medium-term interest rate expectations, are significantly related to changes in the 'economic activity' stance and, albeit only at the 10% level, to 'rate guidance'. This suggests that the ECB's assessment of the economic outlook is an important determinant of market participants' medium-term interest rate expectations such that a more positive view of the economy may be interpreted as a signal for future policy tightening and induce higher rates in the center of the yield curve.

The 'QE'-factor, which picks up movements in long-term yields and is constructed to have minimum variance in the pre-crisis period, is significantly related to the ECB's stance on 'financial & monetary conditions'. This link appears intuitive and corroborates the authors' interpretation of the factor, because quantitative easing in the euro area includes asset purchases in order to increase liquidity and to facilitate bank lending, which has been shown to impact the long end of the yield curve (e.g., Krishnamurthy and Vissing-Jorgensen, 2011; Krishnamurthy et al., 2018).

Overall, the results in Table 7 confirm our findings from the previous section that different types of verbal news revealed during ECB press conferences have distinct effects on interest rates with different maturities. Specifically, we show that a systematic approach to decomposing yield curve movements allows to directly connect the behaviour of the term structure to text-based news on 'rate guidance', 'economic activity' and 'financial & monetary conditions'.

4.2. Structural shocks identified from the joint dynamics of interest rates and equities

We now turn to shocks that exploit the co-movement of interest rates and stocks. We start with the set of two shocks proposed by Jarociński and Karadi (2020) and then explore the three shocks suggested

by Cieslak and Schrimpf (2019). We report our main findings in Table 8 and delegate detailed regression results including estimates of all control variables to Tables IA.20 to IA.24 in the Internet Appendix.

[Table 8 about here]

According to Jarociński and Karadi (2020, JK), 'policy' shocks that capture information relevant for future monetary policy in a narrow sense (i.e., the ECB's reaction function) can be identified via negative co-movement of yields and equity returns. By contrast, 'information' shocks due to news about the general economic outlook should be reflected in a positive co-movement of interest rates and stock markets. The results in Table 8 show that these interpretations of the JK shocks are supported by our text-based stance measures. 'Policy' shocks are driven by unexpected news regarding the monetary policy stance, as measured from the topic 'rate guidance', which implies that hawkish news is accompanied by a positive shock. 'Information' shocks are significantly related to changes in the ECB's stance on 'economic activity', such that a surprisingly more positive view of the ECB on the economy is associated with a positive shock. Our results suggest that the JK approach indeed allows for a concise distinction between news on monetary policy and news on the economy, as judged by the topic-specific stance changes that we estimate from the ECB transcripts.[7] On the one hand, this suggests that the economic interpretation of these asset price-based shocks corresponds to the respective ECB communication. On the other hand, the ECB's communication about other topics such as 'fiscal policy' or 'financial and monetary conditions' does not appear to be captured by the JK shocks.

The approach suggested by Cieslak and Schrimpf (2019, CS) also exploits the co-movement between stocks and interest rates, but by additionally distinguishing between short-term and long-term rates they can measure three types of shocks. Their 'monetary' and 'growth' shocks are (empirically) very similar to the JK 'policy' and 'information' shocks and highly correlated, as discussed above. Hence, in line with the JK-shock results, Table 8 shows that the CS 'monetary' shock is significantly related to a change in the 'rate guidance' topic stance. Their 'growth' shock is significantly related to news about 'economic activity' but also captures information about 'rate guidance'. The CS 'risk premium' shock provides an additional dimension and we find that it significantly responds to news about 'financial & monetary conditions', i.e. a more positive tone on financial conditions is associated with a lower risk premium. We discuss the implications of this finding for the transmission channel of monetary policy as well as for asset pricing in Section 6.

[7] This result does not preclude the possibility that information shocks might also capture the central bank's response to recent macro news, as suggest by Bauer and Swanson (2023b).

5. Time-variation in the impact of ECB communication

The results in the previous sections suggest that market perceptions as reflected in asset prices respond to the ECB's communication of topic-specific news. The full sample responses of different assets to different topics are economically intuitive, yet, there is good reason to expect variation in these communication effects over time. That is, market participants may perceive certain topics as more relevant during specific periods (e.g., the financial crisis) than they may at other times.

For our analysis of the time-varying impact of ECB communication, we split the sample period into six-year rolling window periods, the first being 2002 to 2007 and the last being 2016 to June 2021. Sections 5.1 to 5.3 document that the time-variation in communication effects is substantial and Section 5.4 explores potential drivers of such time-variation.

5.1. Market responses to policy announcements and to press conferences

At the outset of the paper, we have presented evidence showing that the unconditional correlations between asset price responses to the ECB's policy announcement at 13:45 and to the subsequent press conference at 14:30 are very low (see Figure 1). We now explore whether these correlations vary over time, as combining the evidence from recent studies on the Federal Reserve's press conferences appears to suggest. That is, on the one hand, Gómez-Cram and Grotteria (2022) find a significantly positive correlation between asset price responses around the FOMC statement and during the subsequent press conference in a sample of 41 press conferences from April 2011 to January 2020. On the other hand, Cieslak et al. (2024) document that average interest rate responses to the statement and to the press conference have opposite signs in the sample from August 2020 to August 2023, which includes 24 press conferences.

Our data cover 203 press conferences between 2002 and 2021 and are thus well suited to examine potential time-variation in the link between announcements and press conference returns. We use six-year rolling windows to compute correlations between asset price changes in the press release (PR) and press conference (PC) windows for the same assets as in Figure 1 and present the time-series in Figure IA.3 in the Internet Appendix. Our findings indicate that the response correlations indeed vary over time, to different extents for different assets.

For example, the PR-PC-correlations of surprises in the three-month interest rate are close to zero throughout the sample (between -0.09 and 0.10, with an average of 0.03), correlations for the two-year rate are almost always positive but the magnitude varies over time (between -0.05 and 0.35, with an average of 0.13), whereas the correlations for ten-year rates change sign over time, with the most positive value at the beginning of the sample (0.19) and the most negative at the end (-0.36) with an average of

-0.06; the pattern for the EURUSD exchange rate looks similar, i.e. 0.31 at the beginning, −0.31 at the end, and 0.03 on average. For equities, we find that the correlations are negative for most of the earlier part of our sample, i.e. from 2003 to 2014 between −0.33 and −0.08, afterwards they are close to zero or slightly positive, i.e. between −0.09 and 0.14. The PR-PC-correlations for the sovereign spread between Spanish and German bonds exhibits the largest variation over time, although one should be careful with the interpretation at the beginning of the sample, because there is almost no variation in spreads at all, as we discuss below. During the global financial crisis (GFC), the correlation is somewhat negative (between −0.22 and −0.08) but increases to become positive from the 2013-2018 sub-period onwards, reaching its highest value (0.50) at the end of the sample.

The lack of a consistent pattern of correlations between market price responses to press releases and press conferences represents a challenge to existing models in the literature. For example, Gómez-Cram and Grotteria (2022) interpret the positive correlation in their sample based on models such as those proposed by Banerjee et al. (2009) and Banerjee and Kremer (2010), which predict positive autocorrelation in returns due to the slow aggregation of heterogeneous beliefs following sequential signals. Conversely, a negative correlation as in Cieslak et al. (2024) may be indicative of a central bank put (e.g., Cieslak and Vissing-Jorgensen, 2021) in that a central bank attempts to mitigate potentially negative market reactions to a press release during the press conference. Potentially, time-variation in correlations could suggest that different mechanisms may dominate at different points in time, however, together with the lack of consistent cross-asset patterns and the largely uncorrelated responses across the full sample, our results appear closer to a fully rational setting without informational frictions such that market responses to the press release do not forecast responses to the subsequent press conference. In any case, our results show that ECB press conferences represent an independent source of news for market participants.

5.2. Interest rates and exchange rates

To study the time-varying impact of topic-specific news on interest rates, recall that in the full sample the short-term OIS rate responds to news about 'rate guidance', the medium-term rate to news about 'rate guidance' and 'economic activity', and the long-term rate to news about 'financial and monetary conditions'. Figure 3 illustrates the time-variation in the responses of the 3-month, 2-year, and 10-year rates to news in the three topics significantly related to at least one of the rates over the full sample.

[Figure 3 about here]

In Panel A, we find that rates of all maturities respond to news about 'rate guidance', but to a different extent and during different periods. We find the most significant response for the short-term rate, and the corresponding full sample result is driven by the earlier part of our sample, specifically the

sub-periods starting from 2004 and ending in 2013. For the two-year rate, we find the that full sample significance is mostly driven by the sub-periods starting from 2006 and ending in 2013. Contrary to the full sample evidence, we also find the 10-year rate to be significantly related to news about 'rate guidance' in the 2009-14 sub-sample. Taken together, it appears that over time and with the approach of the zero lower bound, 'rate guidance' news have become more relevant for longer maturities.

Panel B shows that the full sample link between the 2-year rate and news about 'economic activity' exists in almost all sub-samples from 2002 to 2016, then it disappears. For the 10-year rate, we also find a positive link to 'economic activity' news in the early part of our sample up to 2013, whereas there appears to be none for the 3-month rate.

Finally, Panel C shows that for rates of all maturities a positive link to news about 'financial and monetary conditions' becomes statistically significant from the 2009-14 sub-period, the sub-period that includes the first year when the zero lower bound is hit and undercut by the ECB, and most pronounced for all in the 2011-16 period. This positive link persists with varying degrees of statistical significance for all maturities and is most pronounced for the 10-year rate in the sub-samples from 2014 to 2020.

For exchange rates, the full sample results in Table 5 revealed a clear picture that the ECB's stance on 'financial and monetary conditions' is important. Positive news on that topic are associated with a significant appreciation of the Euro against the US dollar, the British pound, and the Japanese yen around ECB press conferences. Figure 4 shows that this result is due to the (post-)GFC period in our sample. This finding provides new evidence on the transmission of monetary policy to asset prices through intermediaries, which we discuss in Section 6.

[Figure 4 about here]

5.3. Sovereign yield spreads and equities

First, we revisit the results on the spread in the ten-year yields of Italian and Spanish versus German government bonds. Over the full sample, there appears to be a (somewhat) significant link to news about 'fiscal policy', as we reported in Table 6. It is reasonable to presume that market participants may perceive news about the ECB's stance on 'fiscal policy' as particularly relevant during episodes such as the GFC and the European sovereign debt crisis.

[Figure 5 about here]

Figure 5 shows that this is indeed the case. ECB communication about 'fiscal policy' becomes a significant driver of sovereign spreads during the crisis periods such that surprisingly positive news communicated by the ECB are associated with a narrowing of the spreads. There was no such communication

effect prior to the GFC or after the sovereign debt crisis. During the most recent subsample, from 2016 to June 2021, the effect has become significant again, a period which is dominated by the COVID19 shock and the associated concerns about fiscal relief packages and their impact on national debt burdens.

The full sample results for equities in Table 6 appeared to suggest that there is no significant link between stock market returns during ECB press conferences and the topic-specific news communicated by the ECB. Figure 6 shows that this is not the case and that different topics matter for stock markets at different times.

[Figure 6 about here]

At the beginning of our sample, the stock market as a whole as well as an index of bank stocks, respond to news about 'economic activity'. A surprisingly positive ECB stance on 'economic activity' is associated with an increase in stock prices around the press conference in which the news is revealed. Over time, however, stock market responses to economic news appear to have become insignificant. During the GFC and the European sovereign debt crisis, news about 'fiscal policy' communicated by the ECB became a significant driver of stock returns, and this effect is more pronounced for bank stocks than for the overall market. The latter result extends prior evidence on the importance of bank balance sheets for financial markets as we discuss in Section 6.

5.4. Why do communication effects vary over time?

Turning to the potential drivers of the time-variation in communication effects, we provide evidence for two mechanisms. First, we use sovereign spreads and their relation to 'fiscal policy' news to argue that time-variation is mostly driven by changes in market demand for information rather than changes in the central bank's supply. Second, we provide evidence that miscommunication (as perceived by market participants) can contribute to the time-variation in asset prices responses to news revealed in the ECB press conferences.

Market perceptions of topic relevance. Whether asset prices react to the ECB's topic-specific stance changes depends on how relevant market participants perceive that news to be. Their demand for news on certain topics likely varies over time and, therefore, may act as a driver of the time-variation in the impact of the ECB's communication on asset prices documented in the previous section. To provide evidence that this is indeed the case, we turn to the European Sovereign Debt Crisis as a natural laboratory. Three features of this laboratory are important. First, the crisis represents a large shock to market participants and fuels their demand for related news. Second, at the same time, the ECB follows a rigid communication strategy, with a fixed supply of information in terms of the range of topics it covers

in press conferences. Third, sovereign spreads offer a unique perspective on the evolution of the crisis in general and with regards to their response to 'fiscal policy' news documented above.

[Figure 7 about here]

We present our results in Figure 7, starting with a plot of the spread between Spanish and German government bond yields on ECB meeting days (Panel A).[8] In the first five years of our sample, the sovereign spread was essentially zero, with minimal variation. In other words, Spanish government bonds are valued to equal the German benchmark and, apparently, market participants did not deem any information relevant enough to affect the valuation of Spanish versus German bonds during this period. The absence of any response to the ECB's announcements and press conferences is not due to a shortage of ECB communication about 'fiscal policy'; on average the ECB dedicates 20% of its press conference to that topic and frequently changes it stance, as quantified by our topic-specific tone measure (Panel B).[9]

The spread began to rise in 2007, reaching 1% by 2009, and 2% by early 2010, at which point we observe some spread movements during post-announcement press conferences. The spread peaks at around 6% in 2012, with the largest changes occurring during ECB press conferences, before reverting to a range between 80 and 180 basis points from the beginning of 2015 to the end of our sample.

Figure 5 in the previous section shows that the large variation in spread changes during the 2010-2014 period is significantly related to news about the ECB's stance towards 'fiscal policy'. At the same time, we note that there are no discernible changes in the (dynamics of the) ECB's 'fiscal policy' communication over the 2010-14 period, that is, the level of communication (total words and share of press conference) as well as the volatility of stance changes is very similar to before. Taken together, these results suggest that the variation in the significance of 'fiscal policy' news for sovereign spreads is driven by changes in the market's perception of the relevance of fiscal policy news.

Miscommunication. An important objective of central bank communication is to guide market expectations, and the evidence presented in this paper shows that market prices respond to news communicated by the ECB. The flip side is that communication failures can have a significant impact on financial markets as well (e.g., Blinder et al., 2008; Bernanke, 2016; Cieslak et al., 2024), and they may contribute to the time-variation in communication effects on asset prices.

We illustrate this by revisiting the relation between stock returns and news about 'economic activity'. Recall from Table 6 that this relation is insignificant over the full sample and from Figure 6 that the link is significant early in the sample, but not later. We now provide evidence that the change in significance

[8] For a plot of the daily ES-DE sovereign yield spread time-series in our sample and before, see Figure IA.2 in the Internet Appendix. The results for IT-DE spreads are similar to those for ES-DE spreads.

[9] It may be that the amount of 'fiscal policy' communication during the Q&A after the statement changed due to journalist questions. If this is the case, it does not alter the interpretation of our findings; rather, it would provide further evidence of a higher demand for information.

over time is largely driven by the December 2015 ECB meeting, for which market participants viewed the ECB's communication as inadequate.

To test for the importance of a particular ECB meeting, we run the regression of stock market returns on stance change and our most comprehensive set of control variables leaving out one meeting date at a time, following a similar analysis in Bauer and Swanson (2023b). Figure 8 shows that the December 2015 meeting is a notable outlier; excluding this single observation from the sample increases the t-statistic from 1.22 to 2.31, an effect unmatched by any other observation. Hence, excluding the December 2015 press conference, stock markets exhibit a significantly positive response to good news about 'economic activity'.

[Figure 8 about here]

Including the December 2015 press conference overshadows the otherwise significantly positive relationship because, on that day, stock markets experienced large losses, despite the ECB's change in the 'economic activity' stance being positive. Based on the extensive media coverage of the ECB's policy decision and its post-announcement communication, the market reaction can be assessed along three aspects. First, markets had expected a bigger rate cut and this surprise is reflected in a drop of stock prices at the announcement, which we control for in our analysis.[10] Second, the ECB announced extensions of its asset purchase programme along several dimensions (duration, reinvestments, eligibility of assets) but maintained the volume at 60bn per month. Market participants had expected an increase in the volume and viewed the ECB's post-announcement communication as insufficiently clear on why this did not occur, leading to speculation about potential reasons, as e.g. reported by the Financial Times,[11]

> *The modest package, including an extension of QE to at least six months, and the tone of Mr Draghi's press conference suggested the ECB Council was "not in one place".*
>
> *"There also is the suspicion that Mr Draghi may have felt unable to deliver as much stimulus as he really wanted to due to objections from a significant faction within the ECB led by the German contingent. It may also be that the ECB wants to keep some ammunition up its sleeve should eurozone inflation fail to see any significant pick-up over the coming months."*

Third, more specifically, markets suspected that the ECB's economic outlook influenced its decisions,

> *"Looking at the ECB's macro assessment, it looks as if almost unchanged growth and inflation forecasts, as well as a positive assessment of the impact from QE up to now, laid the grounds for the ECB's rather reserved policy reaction."*

[10] The ECB decided to decrease the deposit rate by 10 basis points to -0.30% while keeping rates on the main refinancing operations and on the marginal lending facility unchanged at 0.05% and 0.30%, respectively.

[11] All quotes below are from the Financial Times articles 'Modest ECB moves dash investor hopes and wrongfoot markets' and 'Euro jumps as ECB underwhelms markets', published on 3 December 2015.

These quotes suggest that market participants struggled to reconcile the ECB's post-announcement communication with its policy decisions and pre-announcement management of expectations. Their genuine surprise is reflected in quotes such as,

> *"... whether or not the new package was appropriate, Mr Draghi had led the market to believe more was expected."*
>
> *"... the market was too optimistic on what the ECB would deliver today and the ECB, perhaps in a rare mis-step, should have leaned against these expectations beforehand."*

Overall, our detailed account of the ECB meeting in December 2015 illustrates how successful versus unsuccessful communication, as perceived by market participants, can affect asset prices differently and contribute to the time-variation in communication effects.

6. Discussion and implications

We now summarize the implications of our findings for the interpretation of measures of monetary policy shocks, the transmission channel of monetary policy into asset prices, as well as the use of communication as a policy tool.

Interpretation of market price responses and shock measures. An important implication of our results above is that the interpretation of (single-asset) market responses and (multi-asset) structural shocks can change over time. Thus, caution is needed when using short samples to interpret asset price changes around monetary policy events.

The four sets of shock measures used in Section 4 are based on the term structure of interest rates (i.e., Altavilla et al., 2019; Leombroni et al., 2021) or the joint response of interest rates and stock prices (i.e., Jarociński and Karadi, 2020; Cieslak and Schrimpf, 2019). The results in Section 5 show that the topic-specific news which matter for the asset prices underlying the estimation of all these shock measures change over time. For interest rates, we find, for example, that news about 'rate guidance' as well as news about 'financial and monetary conditions' matter for short-, medium-, and long-term maturities, but at different points in time, as shown in Figure 3. Similarly, stock returns may reflect news on 'economic activity' or 'fiscal policy' to a varying degree at different points in time, as shown in Figure 6. Any such time-variation complicates the economic interpretation of monetary policy announcements. In other words, one cannot necessarily infer the type of news from asset prices alone, in particular in short samples.

Transmission to asset prices. Our findings also provide insights into the transmission of monetary policy to asset prices, suggesting a risk-based channel with an important role for financial intermediaries.

First, we find that communication about 'financial and monetary conditions' significantly relates to price responses across most asset classes. This aligns with models of intermediary asset pricing, where the health of financial intermediaries is central to asset prices (e.g., He and Krishnamurthy, 2013; Adrian et al., 2014; He et al., 2017). Additionally, Table 8 shows a strong link between news about 'financial and monetary conditions' and risk premium shocks, as identified by Cieslak and Schrimpf (2019). These findings support the view that central bank news can directly affect risk premia (e.g., Kroencke et al., 2021; Bauer et al., 2023), with news about financial conditions being a key driver.

Second, the impact of such news on asset prices is most pronounced in the post-GFC period, in particular for interest rates (Figure 3) and exchange rates (Figure 4). This finding is consistent with recent studies showing that highly intermediated asset classes, such as foreign exchange, are especially sensitive to shocks in the intermediary sector, which faced increased restrictions and regulations as a consequence of the GFC (see, e.g., Gabaix and Maggiori, 2015; Mueller et al., 2017; Haddad and Muir, 2021).

Moreover, our finding that bank stocks react more strongly to 'fiscal policy' news than the overall stock market during the GFC and the European sovereign debt crisis further emphasizes the role of financial intermediaries. This is consistent with prior evidence on the importance of bank balance sheets for financial markets and the sovereign-bank nexus. For instance, Acharya and Steffen (2015) document a carry trade in sovereign debt by European banks, suggesting that news about the ECB's stance towards 'fiscal policy' was of particular importance to them.

Monetary policy and central bank communication. Our results show that ECB press conferences convey market-relevant information beyond policy announcements. The topic-specific news revealed in the press conferences matter for asset prices, with communication effects varying across assets and over time, depending on how relevant market participants deem particular topics at a given moment. These findings suggest that post-announcement communication is a flexible, state-contingent instrument in the monetary policy toolkit. It serves to explain policy decisions, communicate the ECB's assessments of future conditions, and shape market expectations. However, it has to be managed with care to avoid unintended consequences of miscommunication.

The focus of this paper is to demonstrate that high-frequency asset price responses can be directly linked to topic-specific central bank communication. Our motivation arises from the extensive literature that uses these price reactions to gauge monetary policy shocks, but the potential applications are much broader. For example, recent research suggests that high-frequency price changes may not only reflect unexpected changes in the policy stance but also reflect discrepancies between the market's perceived and the central bank's actual policy rule (see, e.g., Bauer et al., 2024). Within such a framework, analyzing

topic-specific news communicated by the central bank, as proposed in this paper, should provide insights with regards to the inputs to the central bank's reaction function. We leave a detailed exploration of this and related topics for future research.

7. Conclusion

This paper shows that asset prices responses to central bank announcements can be directly linked to verbal news communicated by the central bank. We establish this finding by relating high-frequency asset price movements in euro area financial markets to text-based measures of the ECB's stance towards the topics discussed in its press conferences.

By directly connecting what the ECB says to what the market hears, we show that asset prices respond to news about 'rate guidance', 'economic activity', 'inflation', 'fiscal policy', and 'financial and monetary conditions', with sizeable variation both in the cross-section of assets as well as across time. For example, short-term rates respond to 'rate guidance', sovereign yield spreads to 'fiscal policy', and exchange rates to 'financial and monetary conditions'. For the full sample period from 2002 to 2021, we also find that structural shocks based on interest rates and stock prices align with topic-specific news in a way consistent with their standard interpretations in the literature.

However, our findings highlight significant time-variation in asset price responses. For example, we observe a secular shift in the importance of 'financial and monetary conditions' for euro area asset prices. In addition, there is strong time-variation in the importance of other topics as well but these are more transitory in nature. For example, 'fiscal policy' emerged as a key topic during the European debt crisis with almost no relevance in other time periods.

This time-variation seems closely related to changes in market perceptions about the relevance of topics and the effectiveness of ECB communication. We first document that sovereign bond spreads responded to 'fiscal policy' news during the crisis, even though the amount of the ECB's communication on this topic remained largely unchanged. This suggests an important role for the topic-specific information demanded by market participants. Second, we show that when market participants perceive a lack of adequate communication, this strongly affects asset price responses to topic-specific communication.

Our findings have implications for policymakers and researchers. For policymakers, post-announcement communication is a flexible, state-contingent instrument in the monetary policy toolkit that allows for targeting individual asset prices. For researchers, though, this flexibility poses a challenge because it complicates the inference of monetary news from high-frequency asset prices alone, as is standard in the recent literature on monetary policy shocks. Our results suggest that this type of inference is only valid for long sample periods but should be applied with caution when interpreting asset price responses to

individual policy announcements or in short sample periods.

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Appendix

A. Communication of ECB policy decisions

Since June 9^{th}, 1998, the ECB holds regular press conferences to elaborate on its policy decisions. All press conferences can be found at ECB's website. Our sample covers 207 press conferences between January 2002 and December 2021, that is, all press conferences except for one unscheduled press conference on 2^{nd} of August 2007.[12] The following paragraphs give an overview of the ECB communication policy changes from the sample beginning to the sample end.

The chronological structure of topics outlined in Section 2.1 was first adopted for the press conference on May 8^{th}, 2003. Before May 8^{th}, 2003, the topics discussed were the same, but 'financial & monetary conditions' were discussed before 'economic activity' and 'inflation', i.e. only the *ordering* of topics within the press conference changed. See the following press briefing and presentation for more information on this change. Furthermore, the ECB includes quarterly announcements of macroeconomic projections in the introductory statements since June 2004. Before, the ECB published the Eurosystem staff projections only biannually (June and December) in the Monthly Bulletin. In June 2004 the ECB announced that it would also publish the ECB staff projections from then on (March and September) in the Monthly Bulletin. In addition, they started to make them public in the press conference. The change of communication was announced in this press conference.

In 2015, the Governing Council changed the frequency of policy meetings – and therefore also subsequent press conferences – to eight times a year. Previously, the ECB a press conference (almost) every month. Since February 2015, the ECB also releases the Monetary Policy Accounts four weeks after the Governing Council meeting, which provides additional insights regarding the considerations and the deliberative process within the ECB Governing Council's underlying policy decisions; these are available here. Until March 10^{th}, 2016, the press release only contains the interest rate decision (i.e., unconventional monetary policy instruments were announced during the press conference), from then on the press release also contains all monetary policy decisions. From July 21^{st} 2016 onwards, the ECB also started to include rate guidance in the press release, e.g., "*The Governing Council continues to expect the key ECB interest rates to remain at present or lower levels for an extended period of time, and well past the horizon of the net asset purchases.*" (see here).

With the outbreak of the Covid19 pandemic, the length of the press release increased considerably due to a large number of policy decisions passed during the pandemic and the press release is nearly

[12] This press conference only contained 3 paragraphs with less than 500 words and, thus, diverges decisively from all other press conferences. Furthermore, to the best of our knowledge, it was not scheduled as you can see here

identical to the paragraphs about 'monetary policy tools' in the press conference. Later in July 2021, the ECB added headlines above paragraphs indicating that they belong to a specific topic (see here). The headlines are 'economic activity', 'inflation', 'risk assessment', 'financial and monetary conditions', and 'conclusion'. Simultaneously, they also moved the paragraphs about 'fiscal policy', previously indicated with 'fiscal policy' in bold font, to the paragraphs belonging to the headline 'economic activity'. We still classify these paragraphs as 'fiscal policy' since they clearly address fiscal policy and structural reforms. The new topic 'risk assessment' outlines potential risks to the economic outlook and was previously part of the topic 'economic activity'. While this paragraph is now placed after the topic 'inflation', we still code it as 'economic activity' since the main information conveyed is about the economy. The headline 'conclusion' corresponds to the previous 'summary' paragraphs and we discard them as we did previously due to their repetitive nature. Given these changes, we end our sample in June 2021.

After the end of our sample, from 21^{st} of July 2022, the ECB changed the timing of the press release and press conference (see here). They moved both to 14:15pm and 14:45pm respectively. Furthermore, the press release includes the Eurosystem staff projections of GDP and inflation from July 2022 onward (see here).

B. Examples for stance changes in 'rate guidance'

As described in Section 2.2 in the paper, we assess the change in the ECB's stance for 'rate guidance', i.e. Δ*Rate Guidance* similar to Hansen and McMahon (2016). We identify (and code) indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). Below, we provide an example for an indication of monetary easing (−1) and an example for an indication of monetary tightening (+1).

- On 7^{th} November 2002 the first paragraph stating the monetary policy decision included explicitly that the Governing Council discussed rate cuts today:

  > *In view of the high uncertainty on future growth, and its implication for medium-term inflationary developments, the* ***Governing Council has discussed extensively the arguments for and against a cut in the key ECB interest rates****. The view has prevailed to keep interest rates unchanged.* (Governing Council of the European Central Bank, 2002, para. 2)

- On 4^{th} May 2006 the ECB changed the following sentence of the paragraph stating their policy decision from "*We will continue to* ***monitor very closely*** *all developments to ensure that risks to price stability over the medium term do not materialise.*" (Governing Council of the European

Central Bank, 2006b, para. 2) to "*Against this background, the Governing Council will exercise* ***strong vigilance*** *in order to ensure that risks to price stability over the medium term do not materialise.*" (Governing Council of the European Central Bank, 2006a, para. 2)

C. Definitions and construction of control variables

This section details the construction of the control variables used in the regressions presented in Section 3.1 in the paper. Table IA.1 in the Appendix presents summary statistics.

Press release shocks. All press release shocks are constructed in the same way as for the press conference, but using the time window from 13:35 to 14.00 CET.

UMP announcements. The introductory statement included announcements of unconventional monetary policy instruments until 10^{th} March, 2016 and they were then moved to the press release. On 2^{nd} October 2013 the ECB changed the last sentence of the 'monetary policy tools' paragraph from "*We will remain particularly attentive to the implications that these developments may have for the stance of monetary policy.*" (Governing Council of the European Central Bank, 2013b, para. 2) to "*With regard to money market conditions, we will remain particularly attentive to developments which may have implications for the stance of monetary policy* ***and are ready to consider all available instruments.***"(Governing Council of the European Central Bank, 2013a, para. 2)

Therefore, we manually code two additional dummy variables 'asset purchase programs' and 'non-app unconventional monetary policy'. They capture the change from the last press conference to the next in terms of formulations that give insights into the ECB's policy intentions. We then summarize 'asset purchase programs' and 'non-app unconventional monetary policy' to one category called 'unconventional monetary policy' by taking the sum of both dummy variables and recoding them accordingly:[13]

$$\Delta UMP = \begin{cases} 1 & \text{if } APP + NON\ APP\ UMP > 0 \\ -1 & \text{if } APP + NON\ APP\ UMP < 0 \\ 0 & otherwise \end{cases} \tag{C.1}$$

ΔUMP then serves as a control variable and is added together with the press release shock to our empirical specifications.

[13] The dummy variables are coded as following: -1 indicates an easing while 1 indicates a tightening, 0 indicates no change. Moreover, we choose to code a renewal of LTROs as no change to UMP and only count the introduction of LTRO with a longer maturity as an easing.

Current inflation. We account for a possible state dependent effect of the inflation stance. It could be that a positive inflation stance has a distinctively different effect when inflation is below the target compared to inflation above the target. We take the vintage flash estimate from the Real Time Database available at the ECB's Statistical Data Warehouse. For a press conference in month t we use the flash estimate from month $t-1$ and create a dummy variable that takes the value 1 when the announced inflation estimate was below 2%. The variable, called *Inflation* $<$ *2%*, is then interacted with the inflation tone.

Past communication. In order to control for the auto-correlation of changes in communication, we include lagged changes in stance of 'economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy'. The appropriate control variable 'rate guidance' is the press release shock since any new information on policy measures is announced during the press release.

Financial market conditions. Changes of financial market conditions are based on the return of the EUROSTOXX 50, the change of the VSTOXX, and the change of the two-year German yield between press conferences. All data is obtained from Thomson Reuters Eikon.

Macro forecasts. We consider changes in one-year-ahead GDP and inflation forecasts from macroeconomic projections announced during press conferences. In December, we consider the change from the previous 1Y forecast to the December 1Y forecast. For the first macroeconomic projections of the new year, we compute the difference between the 1Y forecast and the previous projections' two-year forecast. Since macroeconomic projections prior to 2004 were not released as part of the introductory statement, changes are set to 0 for this period.

Inter-meeting communication. It could be the case that the ECB provides information about her updated stance during speeches that take place in between two press conferences. Therefore, we utilize a rich data set of ECB's executive board members speeches in order to account for communication between press conferences. This data set includes 2403 speeches starting from 2^{nd} June 1997 to 16^{th} December 2021. Given the large number of texts, we draw on a standard machine learning technique called LDA (Blei et al., 2003) in order identify topics (see subsection C.1 for a short overview of this method) . Our goal is to extract topics that are closely related to the topics discussed in the ECB's introductory statement and measure the ECB's stance on this topics between press conferences.

First of all, we identify multi-word expressions in the ECB's speech corpus. For example, consider the multi-word expression 'price stability'. While it is clear to a human reader that this particular word combination has a distinct meaning and that both 'price' and 'stability' can separately co-occur with

other words in different contexts, the standard LDA does not take this into account. In order to better identify multi-word expressions we merge the press conferences corpus with the executive board members' speeches of executive board members. The augmentation of the text data set substantially improves the precision in finding multi-word expression frequently used by central bankers. We automatically remove certain parts of these speeches such as the introductory paragraph, paragraphs that start with 'Chart', 'Source', 'Slides' or 'Note' as well the references of speeches. We also run a language detection algorithm and remove speeches that are not identified as English. Furthermore, we convert all words from American to British English. In addition, we drop all speeches and press conferences that have less than 500 words.

We then POS-tag words and lemmatize them. Part-of-speech-tagging (POS-tagging) means that words are assigned a part of speech – e.g. verb, noun, pronoun, adverb or adjective. Lemmatization determines the root of each word e.g. the noun 'policies' will be altered to 'policy'. For a more detailed explanation of both concepts we refer to Jurafsky and Martin (2020). Part-of-speech-tagging increases the ability to find multi-word expression, while lemmatization is a form of information reduction. Different word forms are unified to a common root which increases the frequency of this word and, thus, helps the clustering of topics. We set the POS-tag for each lemma to the most common POS-tag in the data and unify pronoun POS-tags to noun POS-tags. We then remove all stop words (except for 'of'), numbers and punctuation. Afterwards, we search for all nouns that are connected through 'of' and manually verify whether these are multi-word expression. For example, 'cost of funding' is recast to 'funding cost'. Subsequently, we remove all remaining incidences of the stop word 'of' from our text. In order to build multi-word expressions we only keep words that have been POS-tagged as nouns and adjectives.

We start identifying multi-word expression with 5-grams and move downwards to 2-gram multi-word expressions. For this purpose we use a method readily implemented in quanteda.[14] However, this unsupervised method is purely based on statistical measures. Therefore, we manually check each proposed multi-word expression and decide whether it is a true multi-word expression. After each n-gram we compound all identified multi-word expressions. Overall, we detect 2321 multi-word expressions. Finally, we only keep nouns and multi-word expressions, remove all POS-tags and replace abbreviations with lemmatized versions of the full expression (e.g. SMP is replaced with security_market_programme). Hence, we are left with a corpus that consists of paragraphs with nouns and multi–word expression from ECB speeches and press conferences. We split the corpus into a speeches and press conference corpus and continue to work with the former.

Subsequently, we impose the condition that the minimum occurrence of words has to be above the 75% quantile and that a word is allowed to appear only in 4% of the paragraphs. Afterwards, we fit

[14] We refer to the reference manual of the quanteda R-package for a detailed explanation of statistical procedure. The function is called 'textstat_collocation'.

a topic model with $K = 40$, reweigh the top terms and label the topics. Reweighing means that we normalize the posterior probability of a word given a topic by its posterior distribution over all topics. Hence, words that have high probability of occurring in several topics will be down weighted and, thus, the interpretation of topics for a human reader should become easier (see Table IA.2 for the top 30 keywords of the matched topics). We then match the topics of the speeches to the press conference topics (see Table IA.3 for the exact matching of topics).

Afterwards we use the top 30 keywords of each of these topics and impose that a paragraph belongs to the topic with the majority of keyword counts. If two keywords have the same count, the algorithm classifies the paragraph as belonging to both topics. In order to measure the topic specific stance of the ECB in the inter-meeting speeches, we again use the dictionary based method outlined in Section 2. Therefore, we aggregate the word counts of all paragraphs belonging to a specific topic i in the *inter-press conference* time window, i.e., the time between two subsequent press conferences, and calculate the topic-specific tone $\tau_{i,t}^{IPC}$ as

$$\tau_{i,t}^{IPC} = 1 - \frac{\#\text{ negative words in topic } i \text{ between press conferences at time } t \text{ and } t-1}{\#\text{ words in topic } i \text{ between press conferences at time } t \text{ and } t-1}. \tag{C.2}$$

Finally, for a press conference at t we calculate the change in the inter-press conference time window, $\Delta\tau_{i,t}^{IPC}$, as the differences of the inter-meeting tone in the time window before the press conference at t and the inter-meeting tone in the window before the press conference at $t-1$.

C.1. Latent Dirichlet Allocation

The intuition behind LDA is that words that frequently co-occur in a document belong to the same topic. The researcher a priori has to specify the number of topics K she expects in the text. Consider a corpus of D documents on K different topics, where each document d consists of n_d individual words from a common vocabulary of V possible terms.[15] The data generating process for our corpus of text data can then be written in the following way:

1. Choose $\theta_d \sim Dir(\alpha)$ where $d \in \{1, \ldots, D\}$ and θ_d a K-dimensional vector of probabilities
2. Choose $\phi_k \sim Dir(\beta)$ where $k \in \{1, \ldots, K\}$ and ϕ_k a V-dimensional vector of probabilities
3. For each word w_{di}, $i \in \{1, \ldots, n_d\}$ in document d:
   - draw a topic $z_{di} \sim$ multinomial(θ_d)
   - draw a word $w_{di} \sim$ multinomial$(\phi_{k=z_{di}})$

[15] Individual words in our application include multi-word expressions and documents correspond to paragraphs in our corpus. For a more detailed treatment of LDA we refer to Blei et al. (2003).

Table 1: Summary statistics for ECB introductory statements

This table presents summary statistics for the ECB press conference introductory statements. The left part of the table displays word counts (after removing stop words) for the press conference statements as well as its components, that is the different topics discussed in the statement. The right part provides summary statistics for the topics as a proportion of the total statement. The first row presents summary statistics for the whole introductory statement. The next five rows contain summary statistics for our five topics of interest, as outlined in Section 2.1. The last three rows present summary statistics for the residual topics.

	Word Count					% of Press Conference				
	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max
Press Conference	840.4	802	186.95	482	1388					
Monetary Policy Tools	162.37	153	91.28	27	564	18.97	17.47	8.89	4.67	42.5
Economic Activity	158.73	154	41.04	79	289	19.16	18.91	4.15	9.44	36.29
Inflation	130.10	122	47.86	43	325	15.7	14.45	5.2	6.13	31.94
Financial and Monetary Conditions	144.59	142	52.53	42	288	17.09	17.15	4.86	5.87	34.17
Fiscal Policy	142.42	138	46.85	60	280	17.43	16.36	6.06	5.62	34.21
Introduction	37.73	22	38.43	0	293	4.49	2.88	4.42	0	41.44
Summary	54.80	31	43.54	0	160	6.07	4.2	4.1	0	16.03
Unclassified	9.66	3	28.01	0	307	1.09	0.39	2.58	0	22.12

Table 2: Summary statistics for changes in the ECB's topic-specific stances

This table presents summary statistics and pairwise correlations of changes in the ECB's topic-specific stances. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. Changes in the tone-based stances are standardized, i.e. demeaned and scaled to unit variance. Panel A reports the pairwise correlations of changes in topic-specific stance. Panel B reports descriptive statistics and the unit in which changes are measured, i.e. standardized (std) or values $\in \{-1, 0, 1\}$.

	Δ RG	Δ EA	Δ INF	Δ FMC	Δ FP
Panel A. Pairwise correlations					
Δ Rate Guidance	1.00				
Δ Economic Activity	0.05	1.00			
Δ Inflation	-0.04	0.28	1.00		
Δ Financial & Monetary Cond.	0.10	0.00	0.12	1.00	
Δ Fiscal Policy	-0.10	0.16	-0.05	-0.09	1.00
Panel B. Summary statistics					
	Δ RG	Δ EA	Δ INF	Δ FMC	Δ FP
Mean	0.04	0.00	0.00	0.00	0.00
Median	0.00	-0.12	-0.10	0.02	0.01
SD	0.45	1.00	1.00	1.00	1.00
Min	-1.00	-4.43	-3.35	-2.71	-2.98
Max	1.00	3.46	5.47	3.76	2.83
Meanabschange	0.20	0.73	0.71	0.71	0.73
Unit	$\in \{-1, 0, 1\}$	std	std	std	std

Table 3: Topic-specific ECB communication and the three-month OIS rate

This table summarizes how the three-month OIS rate responds to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in the OIS rate, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). We regress these rate changes on changes in the ECB's topic-specific stances and on a large set of control variables. First, we report results from univariate regressions of rate changes on changes in the ECB's stance on 'rate guidance', 'economic activity', 'inflation', 'fiscal policy', and 'financial & monetary conditions'. Next, we report results for a regression including all stance changes jointly. In the remaining specifications, we subsequently add the control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. Standard errors in parentheses are corrected for heteroscedasticity based on White (1980).

Δ Stance	OIS 3M											
Rate Guidance	1.147***					1.087***	1.067***	1.116***	1.137***	1.103***	0.996***	0.996***
	(0.369)					(0.351)	(0.355)	(0.345)	(0.369)	(0.374)	(0.313)	(0.305)
Economic Activity		0.252**				0.213*	0.193	0.196	0.174	0.168	0.198	0.206
		(0.109)				(0.120)	(0.125)	(0.127)	(0.137)	(0.137)	(0.137)	(0.136)
Inflation			0.099			0.035	0.033	0.144	0.005	−0.031	−0.040	−0.034
			(0.092)			(0.100)	(0.101)	(0.124)	(0.193)	(0.200)	(0.200)	(0.204)
Financial & Monetary Cond.				0.253*		0.205	0.198	0.203	0.217	0.226	0.188	0.185
				(0.153)		(0.145)	(0.143)	(0.144)	(0.142)	(0.146)	(0.148)	(0.149)
Fiscal Policy					−0.012	0.023	0.036	0.050	0.077	0.086	0.086	0.090
					(0.134)	(0.141)	(0.138)	(0.137)	(0.164)	(0.165)	(0.167)	(0.166)
Press Release Shock & UMP							✔	✔	✔	✔	✔	✔
Inflation Interaction								✔	✔	✔	✔	✔
Previous Stance Changes									✔	✔	✔	✔
Inter-PC Communication										✔	✔	✔
Financial Market Conditions											✔	✔
Macroeconomic Projections												✔
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.062	0.011	-0.002	0.011	-0.005	0.067	0.062	0.059	0.054	0.024	0.029	0.019
Note:												*p<0.1; **p<0.05; ***p<0.01

Table 4: Summary statistics for asset prices changes during ECB press conferences

This table presents descriptive statistics and pairwise correlations for monetary policy shocks, based on asset price changes, during the ECB press conference window. All shocks are based on high-frequency market data available from the Euro Area Monetary Policy event-study Database (EA-MPD), see Altavilla et al. (2019). We measure interest rate shocks as changes in overnight index swap rates with maturities of three months (OIS 3M), two years (OIS 2Y) and ten years (OIS 10Y). FX rates include the return of the Euro against eh US Dollar (EUR/USD), British Pound Sterling (EUR/GBP) and Japanese Yen (EUR/JPY). Sovereign spreads are measured as the change in the spread between Spanish and German ten year (ES-DE 10Y) or Italian and German ten year yields (IT-DE 10Y). For equities, we use returns of the Eurostoxx 50 index (STOXX50) and the Eurostoxx Banks index (SX7E). Panel B reports descriptive statistics and the unit in which shocks are measured, i.e. we indicate whether shocks are measured in basis points (bps) or percent (pct). Our sample covers 203 ECB press conferences from January 2002 to June 2021.

	Interest rate shocks			FX Rates			Sovereign Spreads		Stocks	
	3M	2Y	10Y	EUR/USD	EUR/GBP	EUR/JPY	ES-DE 10Y	IT-DE 10Y	STOXX50	SX7E
Panel A. Pairwise shock correlations										
OIS 3M	1.00									
OIS 2Y	0.75	1.00								
OIS 10Y	0.46	0.74	1.00							
EUR/USD	0.42	0.50	0.56	1.00						
EUR/GBP	0.45	0.50	0.53	0.9	1.00					
EUR/JPY	0.46	0.54	0.64	0.86	0.78	1.00				
ES-DE 10Y	-0.06	-0.08	-0.22	-0.22	-0.14	-0.21	1.00			
IT-DE 10Y	-0.04	-0.06	-0.20	-0.20	-0.11	-0.14	0.92	1.00		
STOXX50	-0.03	-0.09	-0.05	-0.30	-0.38	-0.17	-0.50	-0.55	1.00	
SX7E	-0.02	-0.07	0.10	-0.05	-0.16	0.03	-0.63	-0.70	0.86	1.00
Panel B. Summary statistics										
Mean	-0.10	-0.25	-0.06	-0.75	0.84	-0.15	0.18	0.42	-0.10	-0.21
Median	0.00	-0.16	-0.05	-3.09	0.00	-1.28	0.00	-0.05	-0.09	-0.13
SD	1.99	4.15	2.71	42.84	32.13	43.08	4.05	5.16	0.61	1.08
Min	-10.60	-22.50	-8.74	-133.02	-91.34	-130.30	-9.40	-10.80	-3.00	-7.08
Max	10.80	19.40	8.75	168.35	123.04	133.38	39.5	46.55	2.04	2.77
Meanabschange	1.07	2.54	2.00	32.35	24.03	30.94	1.65	2.15	0.42	0.68
Unit	bps	bps	bps	bps	bps	bps	bps	bps	pct	pct

Table 5: Shocks in interest and exchange rates to topic-specific news communicated by the ECB

This table summarizes how interest rates and exchange rates respond to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in asset prices, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). For interest rates, we use the three-month, two-year, and ten-year OIS rates. For exchange rates, we use the Euro against the US dollar, the British pound, and the Japanese yen. We regress changes in these rates on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. Standard errors in parentheses are corrected for heteroscedasticity based on White (1980).

	Interest rates			Exchange rates		
$\Delta Stance$	OIS 3M	OIS 2Y	OIS 10Y	EUR/USD	EUR/GBP	EUR/JPY
Rate Guidance	0.996***	1.598**	0.358	7.041	4.994	−2.492
	(0.305)	(0.646)	(0.407)	(6.095)	(4.840)	(5.858)
Economic Activity	0.206	0.838***	0.365	1.310	1.452	5.976
	(0.136)	(0.313)	(0.258)	(3.943)	(2.648)	(4.214)
Inflation	−0.034	−0.058	0.206	−4.348	−3.198	−7.752**
	(0.204)	(0.511)	(0.303)	(3.744)	(3.157)	(3.847)
Financial & Monetary Cond.	0.185	0.101	0.408*	5.409*	6.513***	7.035**
	(0.149)	(0.355)	(0.235)	(2.840)	(2.088)	(3.097)
Fiscal Policy	0.090	0.113	0.189	−0.189	−0.393	1.383
	(0.166)	(0.344)	(0.211)	(3.693)	(2.680)	(3.767)
Press Release Shock & UMP	✔	✔	✔	✔	✔	✔
Inflation Interaction	✔	✔	✔	✔	✔	✔
Previous Stance Changes	✔	✔	✔	✔	✔	✔
Inter-PC Communication	✔	✔	✔	✔	✔	✔
Financial Market Conditions	✔	✔	✔	✔	✔	✔
Macroeconomic Projections	✔	✔	✔	✔	✔	✔
Observations	203	203	203	203	203	203
Adjusted R^2	0.019	0.015	0.001	0.045	0.081	0.104
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 6: Shocks in sovereign spreads and equities to topic-specific news communicated by the ECB

This table summarizes how sovereign yield spreads and stock prices respond to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in asset prices, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). We measure changes in sovereign spreads from the difference in the ten-year yields of Spanish and Italian versus German government bonds. To assess equity returns, we use the Eurostoxx 50 index and the Eurostoxx bank index. We regress spread changes and equity index returns on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. Standard errors in parentheses are corrected for heteroscedasticity based on White (1980).

	Sovereign yield spreads		Equity markets	
	ES-DE 10Y	IT-DE 10Y	STOXX50	SX7E
Rate Guidance	0.145	0.071	−0.103	−0.194
	(0.514)	(0.570)	(0.089)	(0.142)
Economic Activity	−0.029	−0.200	0.061	0.030
	(0.236)	(0.299)	(0.050)	(0.076)
Inflation	−0.566	−0.597	0.018	0.076
	(0.372)	(0.423)	(0.055)	(0.085)
Financial & Monetary Cond.	−0.269	−0.329	0.025	0.080
	(0.299)	(0.390)	(0.047)	(0.083)
Fiscal Policy	−0.575*	−0.604*	0.045	0.086
	(0.300)	(0.360)	(0.043)	(0.075)
Press Release Shock & UMP	✔	✔	✔	✔
Inflation Interaction	✔	✔	✔	✔
Previous Stance Changes	✔	✔	✔	✔
Inter-PC Communication	✔	✔	✔	✔
Financial Market Conditions	✔	✔	✔	✔
Macroeconomic Projections	✔	✔	✔	✔
Observations	203	203	203	203
Adjusted R^2	0.019	0.093	-0.004	0.018
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7: Term structure shocks and topic-specific news communicated by the ECB

This table summarizes how the term structure of interest rates responds to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in the term structure, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). First, we estimate the 'interest rate' factor of Leombroni et al. (2021), which we denote by 'IR'. Second, we estimate the 'timing', 'forward guidance' and 'quantitative easing' factors by Altavilla et al. (2019), which we denote by 'Timing', 'FG' and 'QE'. We regress factor changes on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. Standard errors in parentheses are corrected for heteroscedasticity based on White (1980).

Δ*Stance*	IR (LVVW)	Timing (ABGMR)	FG (ABGMR)	QE (ABGMR)
Rate Guidance	1.816***	0.980***	1.032*	−0.338
	(0.663)	(0.345)	(0.560)	(0.271)
Economic Activity	0.666**	0.093	0.630**	−0.031
	(0.302)	(0.159)	(0.269)	(0.181)
Inflation	−0.010	−0.058	−0.085	0.307
	(0.469)	(0.206)	(0.428)	(0.194)
Financial & Monetary Cond.	0.209	0.297*	−0.357	0.394***
	(0.346)	(0.172)	(0.310)	(0.152)
Fiscal Policy	0.168	0.094	−0.024	0.141
	(0.340)	(0.182)	(0.282)	(0.145)
Press Release Shock & UMP	✔	✔	✔	✔
Inflation Interaction	✔	✔	✔	✔
Previous Stance Changes	✔	✔	✔	✔
Inter-PC Communication	✔	✔	✔	✔
Financial Market Conditions	✔	✔	✔	✔
Macroeconomic Projections	✔	✔	✔	✔
Observations	203	203	203	203
Adjusted R^2	0.029	0.016	0.030	0.033
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 8: Structural shocks based on the co-movement of interest rates and stock prices

This table summarizes how structural shocks estimated from the joint dynamics of interest rates and stock prices respond to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency shocks, we use interest rate and stock price data available in the Euro Area Monetary Policy event-study Database (EA-MPD). First, we estimate the estimate the 'policy' and 'information' shocks proposed by Jarociński and Karadi (2020). Second, we estimate the 'monetary', 'growth' and 'risk premium' shocks introduced by Cieslak and Schrimpf (2019). All shocks are measured over the ECB press conference event window and scaled to unit variance. We regress these shocks on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. Standard errors in parentheses are corrected for heteroscedasticity based on White (1980).

	JK		CS		
	Policy	Information	Monetary	Growth	Risk Premium
$\Delta Stance$	(JK)	(JK)	(CS)	(CS)	(CS)
Rate Guidance	0.381**	0.182	0.329**	0.312**	0.128
	(0.155)	(0.149)	(0.152)	(0.144)	(0.137)
Economic Activity	0.074	0.233***	0.037	0.238***	−0.072
	(0.079)	(0.075)	(0.084)	(0.079)	(0.089)
Inflation	−0.021	0.018	−0.013	−0.038	−0.117
	(0.112)	(0.109)	(0.107)	(0.114)	(0.099)
Financial & Monetary Cond.	−0.008	0.045	0.002	−0.036	−0.199**
	(0.082)	(0.080)	(0.082)	(0.079)	(0.080)
Fiscal Policy	−0.033	0.073	−0.036	0.037	−0.096
	(0.083)	(0.070)	(0.081)	(0.070)	(0.071)
Press Release Shock & UMP	✔	✔	✔	✔	✔
Inflation Interaction	✔	✔	✔	✔	✔
Previous Stance Changes	✔	✔	✔	✔	✔
Inter-PC Communication	✔	✔	✔	✔	✔
Financial Market Conditions	✔	✔	✔	✔	✔
Macroeconomic Projections	✔	✔	✔	✔	✔
Observations	203	203	203	203	203
Adjusted R^2	-0.003	0.018	-0.014	0.018	0.034
Note:					*p<0.1; **p<0.05; ***p<0.01

Figure 1: High-frequency asset price responses to ECB announcements: Press release vs press conference

This figure summarizes how asset prices respond to ECB communication after meetings of the ECB Governing Council. First, the policy decisions are announced in a press release (PR) at 13:45 CET. Later, the post-announcement press conference (PC) starts at 14:30 CET. In the scatter plots, each dot represents a meeting of the ECB Governing Council, with the asset price PR response (measured from 13:35 to 14.00 CET) on the horizontal axis and the corresponding PC response (measured from 14:25 to 15:40 CET) on the vertical axis. All market responses are based on high-frequency data available from the Euro Area Monetary Policy event-study Database (EA-MPD) established by Altavilla et al. (2019). We measure interest rate responses as changes in overnight index swap rates with maturities of three months (OIS 3M), two years (OIS 2Y), and ten years (OIS 10Y); the exchange rate response as the return of the Euro against the US Dollar (EURUSD); the equity market response as the return of the Eurostoxx 50 index (STOXX50); the response in sovereign spreads as the change in the spread between the Spanish and German ten-year government bond yields (ES-DE 10Y). The sample period is January 2002 to June 2021.

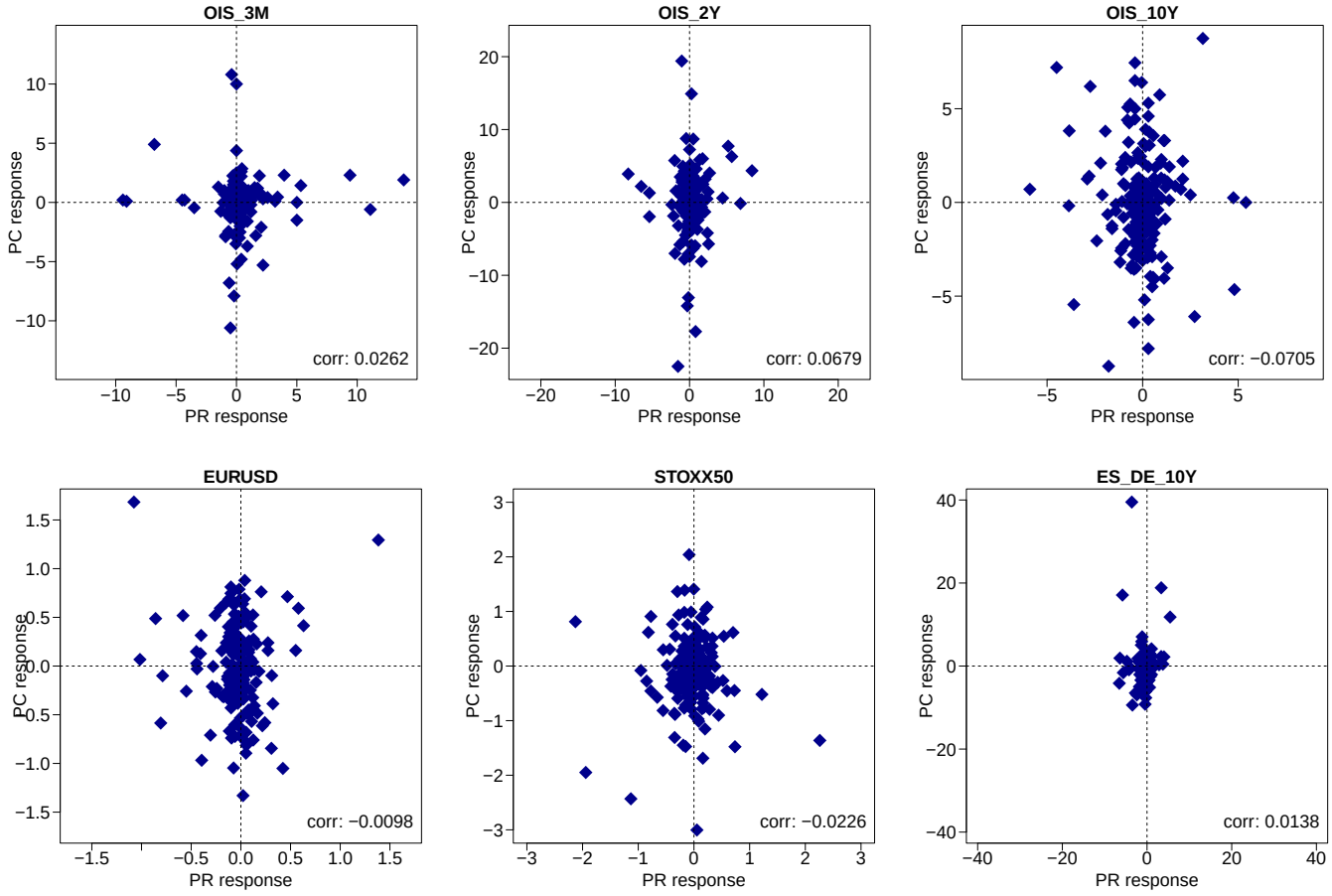


Figure 2: ECB's topic specific stance over the sample

This figure illustrates the time-variation in the ECB's stance towards the topics 'rate guidance', 'inflation', 'economic activity', 'fiscal policy', and ' financial and monetary conditions'. We measure topic-specific stances from the introductory statements of the ECB's press conferences from 2002 to 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t.

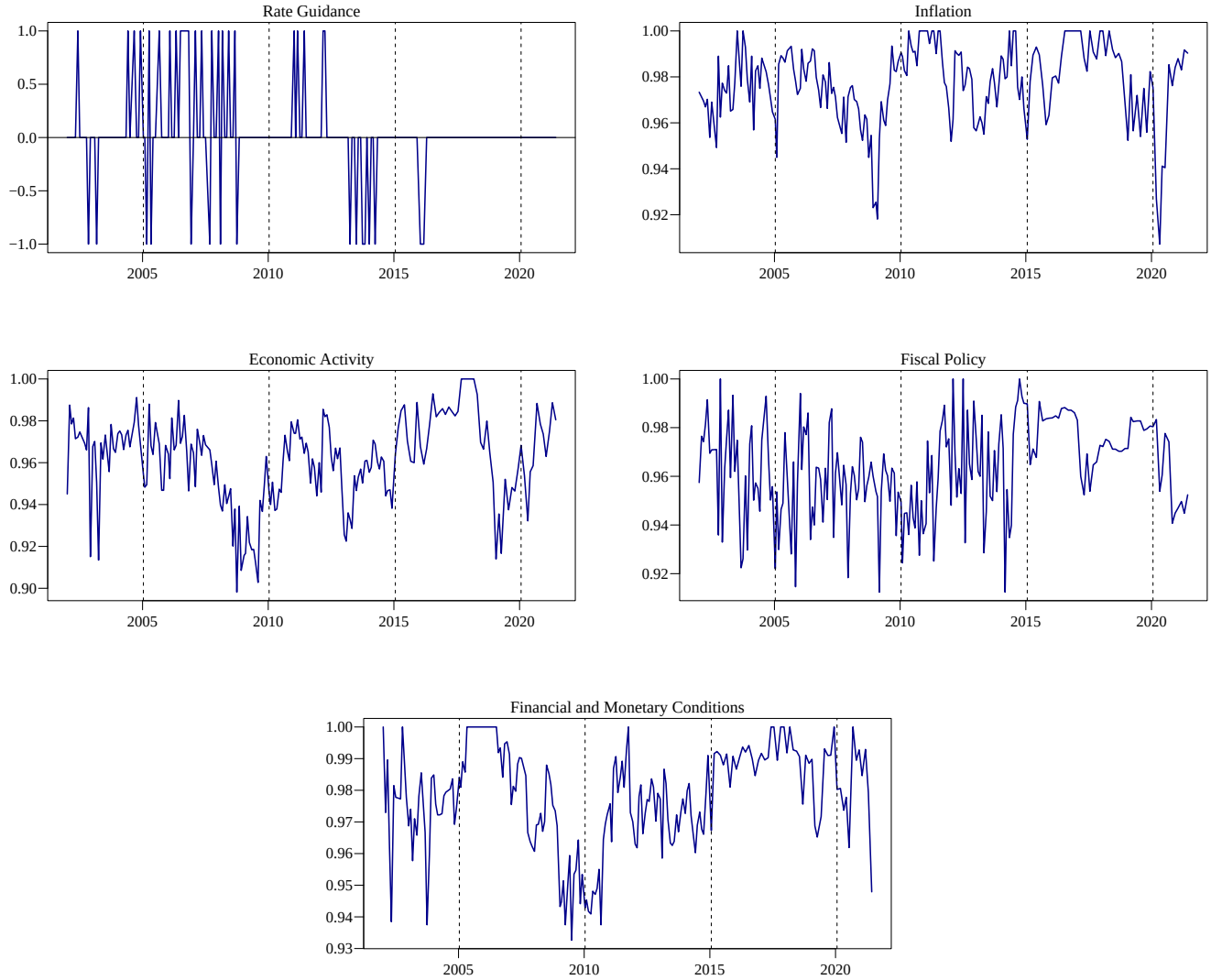
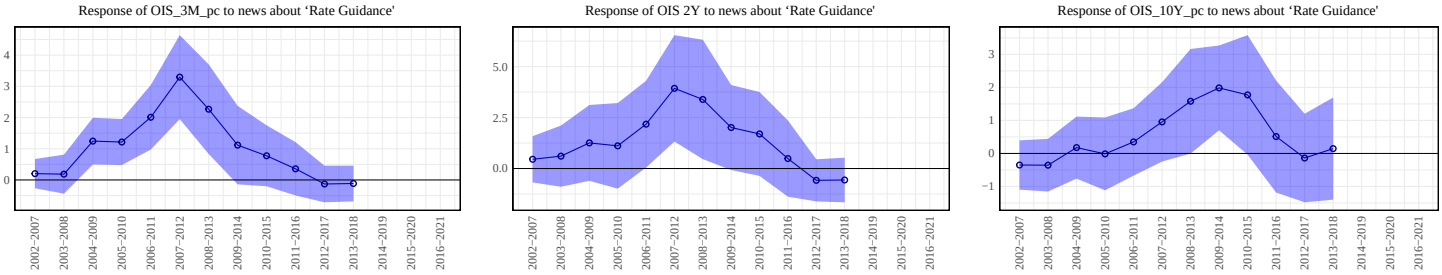


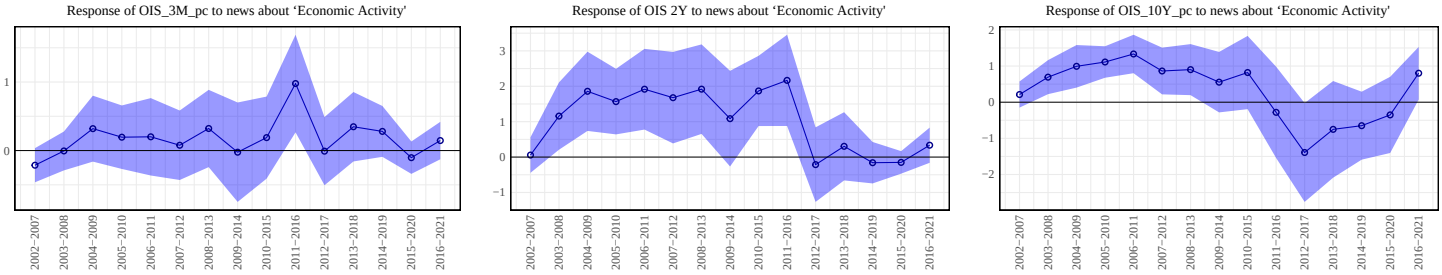
Figure 3: Time-variation in interest rate responses to topic-specific news

This figure illustrates the time-variation in the response of the three-month, two-year, and ten-year OIS rates to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021 and present results for six-year rolling window subsamples. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in the two-year OIS rate, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). We regress OIS rate changes on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. We report coefficient estimates for the topics 'rate guidance' (Panel A), 'economic activity' (Panel B), and 'financial and monetary conditions' (Panel C) along with 90% confidence interval based on standard errors corrected for heteroscedasticity following White (1980).

Panel A: News about 'rate guidance'



Panel B: News about 'rate economic activity'



Panel C: News about 'financial and monetary conditions'

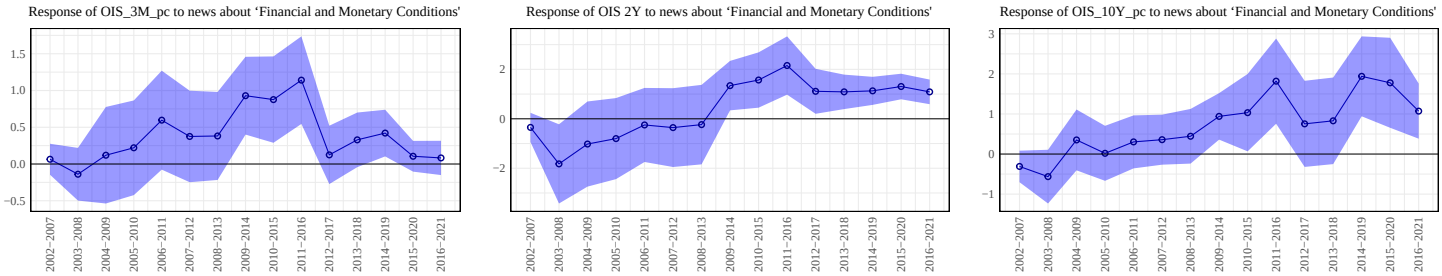


Figure 4: Exchange rate responses to news about 'financial and monetary conditions'

This figure illustrates the time-variation in the response of the exchange rates to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021 and present results for six-year rolling window subsamples. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in exchange rates, we use data on the Euro vs the US dollar, the British pound, and the Japanese yen available in the Euro Area Monetary Policy event-study Database (EA-MPD). We regress currency returns on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. We report coefficient estimates for the topic 'financial and monetary conditions' along with 90% confidence intervals based on standard errors corrected for heteroscedasticity following White (1980).

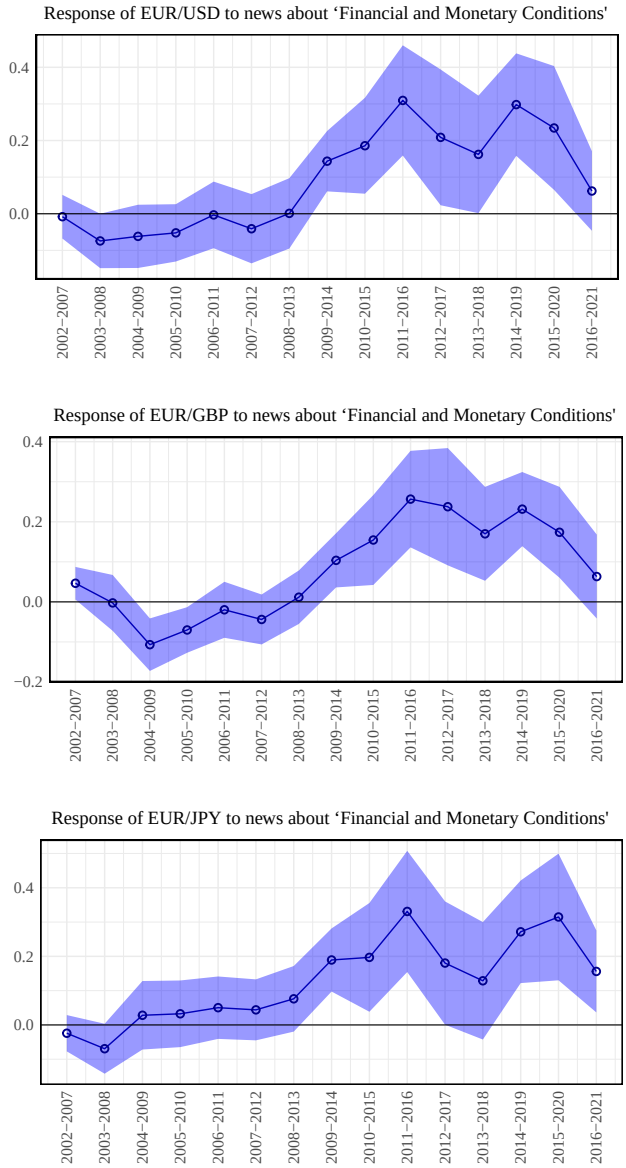


Figure 5: Time-variation in the response of sovereign yield spreads to news about 'fiscal policy'

This figure illustrates the time-variation in the response of sovereign yield spreads to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021 and present results for six-year rolling window subsamples. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in asset prices, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). We measure changes in sovereign spreads from the difference in the ten-year yields of Spanish and Italian versus German government bonds. We regress spread changes on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. We report coefficient estimates for the topic 'fiscal policy' along with 90% confidence intervals based on standard errors corrected for heteroscedasticity following White (1980).

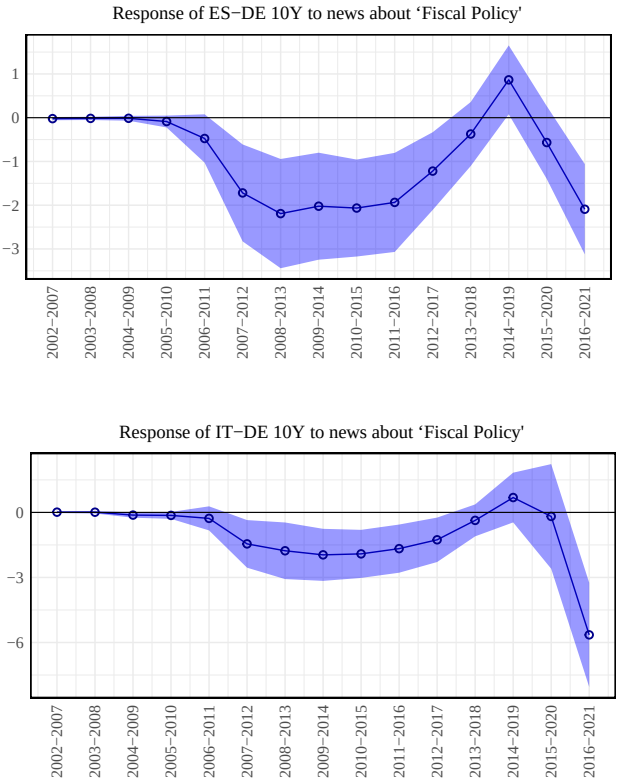
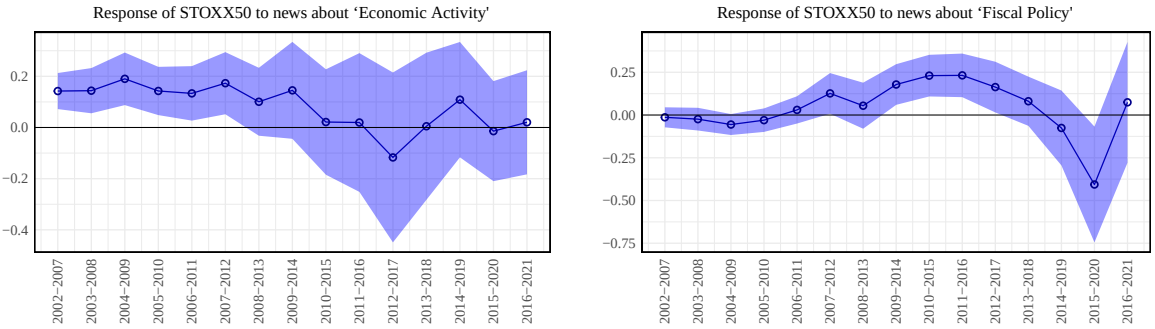


Figure 6: Equity markets to news about 'economic activity' and 'fiscal policy'

This figure illustrates the time-variation in the response of equity prices to topic-specific news communicated by the ECB during its press conferences. We measure topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021 and present results for six-year rolling window subsamples. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. We measure high-frequency returns in the Eurostoxx 50 index (Panel A) and in the Eurostoxx bank index (Panel B) from data available in the Euro Area Monetary Policy event-study Database (EA-MPD). We regress equity returns on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. We report coefficient estimates for the topics 'economic activity' and 'fiscal policy' along with 90% confidence intervals based on standard errors corrected for heteroscedasticity following White (1980).

Panel A: Eurostoxx 50 index



Panel B: Eurostoxx bank index (SX7E)

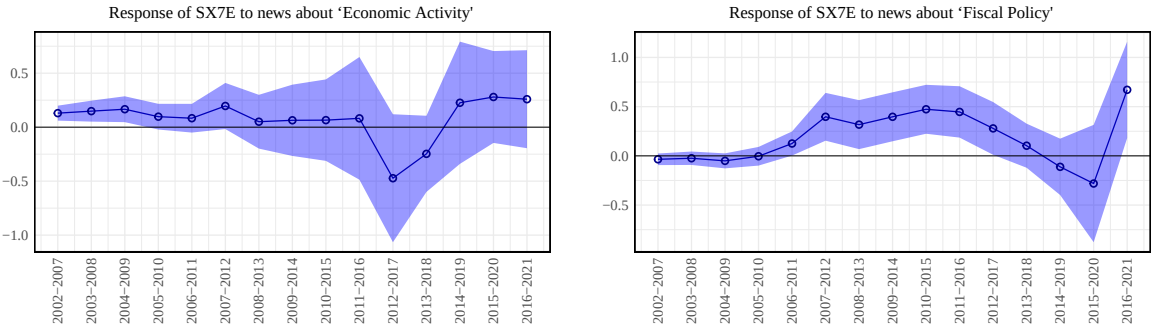


Figure 7: Sovereign yield spreads and ECB communication about 'fiscal policy'

This figure plots the time-series of levels and changes in the spread of yields of Spanish and German ten-year sovereign bonds (Panel A, left) and measures of the ECB's communication about the topic 'fiscal policy' (Panel B, right). For the sovereign spread, we report the level on ECB meeting days, the change in the press release window (PR, measured from 13:35 to 14.00 CET) as well as the change during the press conference window (PC, measured from 14:25 to 15:40 CET). For the 'fiscal policy' communication we measure the number of words that the ECB dedicates to the topic (in total and as a share of the press conference), the tone-based stance measure, and changes in stance compared to the previous press conference. The sample period is from January 2002 to June 2021.

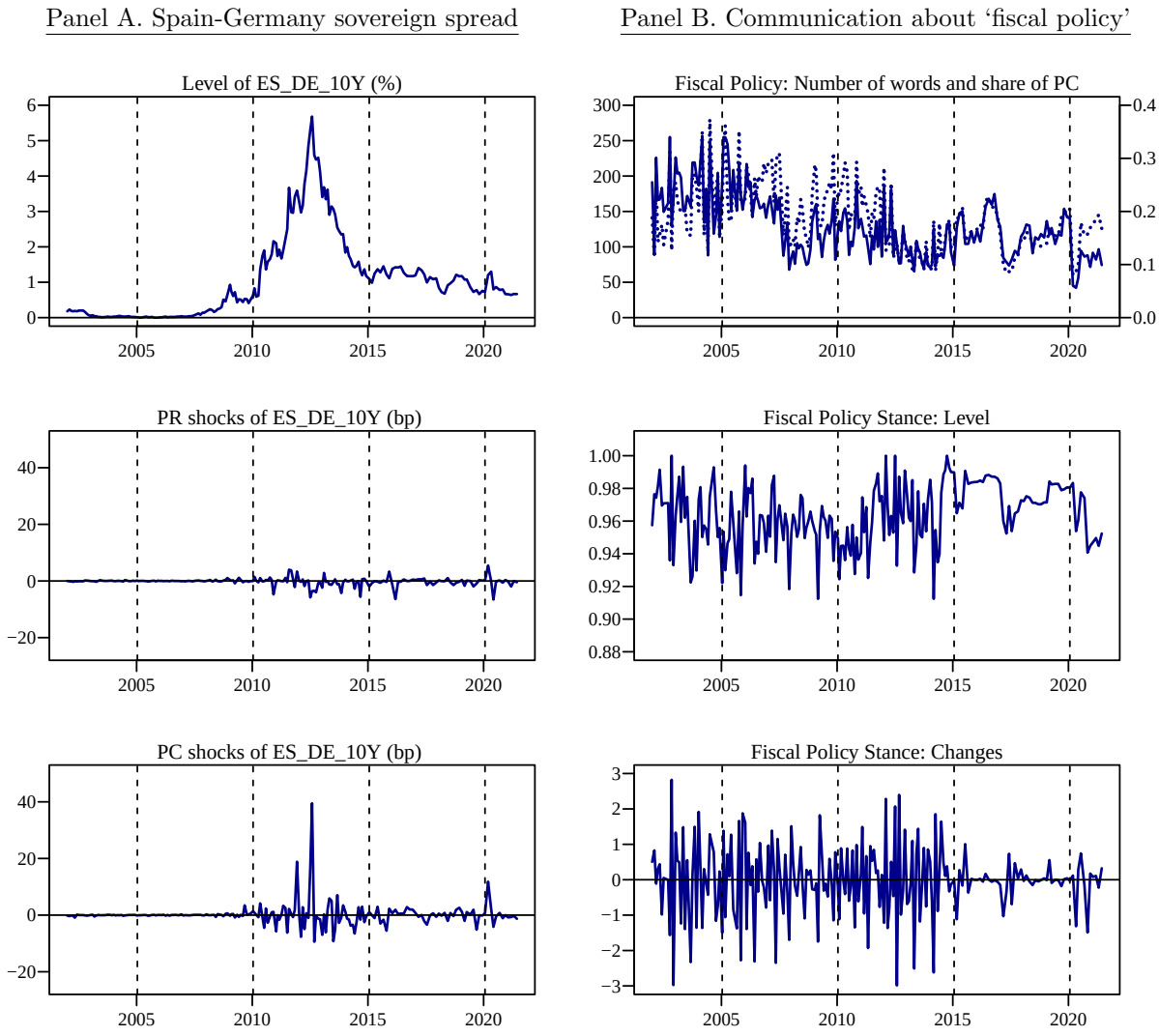
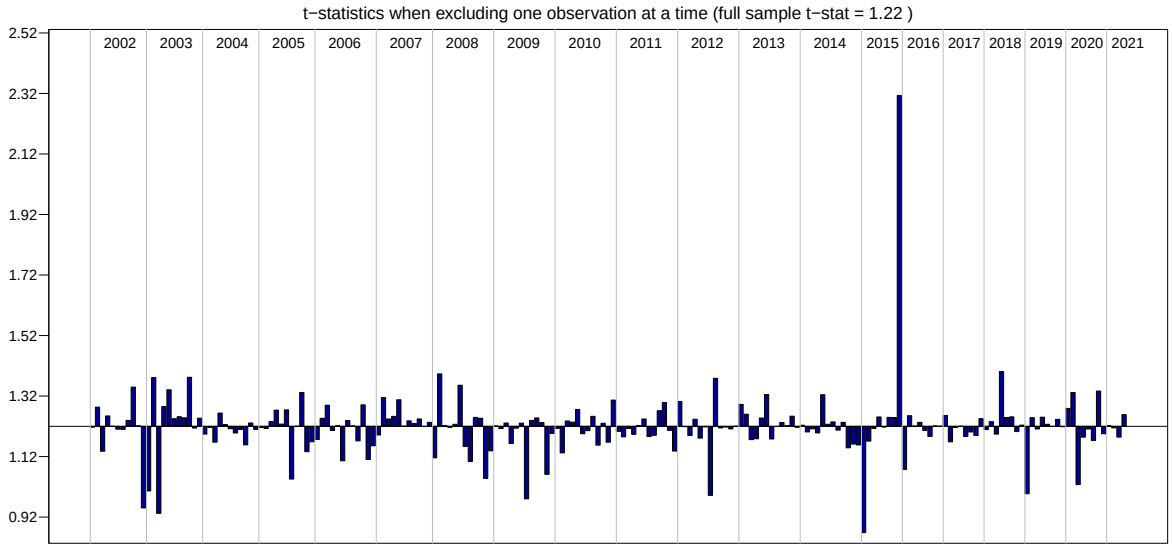


Figure 8: Significance of 'economic activity' news for stock markets

This figure illustrates how each individual ECB meeting affects the statistical significance of 'economic activity' news for stock markets. We measure the ECB's topic-specific stances from the introductory statements of the ECB's press conferences from January 2002 to June 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1). For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t. To measure high-frequency changes in asset prices, we use data available in the Euro Area Monetary Policy event-study Database (EA-MPD). To assess equity market responses, we regress Eurostoxx 50 returns on changes in the ECB's topic-specific stances and on a large set of control variables, which capture information associated with the ECB press release prior to the press conference, announcements of unconventional policies (UMP), current price levels, changes in topic-specific stances revealed during the previous press conference, news communicated by ECB officials between press conferences, changes in financial market conditions as proxied by stock market returns and volatility and changes in the German two-year yield, and changes in the ECB's economic projections. In the full sample, the t-statistic (based on White, 1980, standard errors) for the change on the 'economic activity' stance is 1.22. We repeat the regression leaving out one press conference at a time and report the t-statistics of the coefficient on 'economic activity' stance changes. That is, e.g., the t-statistics is 2.31 when leaving out the last press conference in 2015.



Internet Appendix for

Deciphering Monetary Policy Shocks

(not for publication)

IA.A. Details on the measurement of monetary policy shocks

This appendix presents technical details related to the identification of monetary policy shocks from the term structure of interest rates as well as from the co-movement of interest rates and stocks, as discussed in Section 4 of the main paper.

IA.A.1. Shocks based on the term structure of interest rates

In order to construct the 'interest rate' shock of Leombroni et al. (2021) we perform principal component analysis (PCA) on a matrix that contains the high frequency reactions of our interest rate universe during the press conference. More formally, let X be a 207×7 matrix, where each row corresponds to a press conference and each column to an OIS maturity. First, we demean each row and then we apply PCA to X

$$P = XW \tag{IA.A.1}$$

where P is a 207×7 matrix containing the principal components in each column and W is a 7×7 matrix where the i-th column contains the loadings of the yields on the i-th principal component. We then extract the first principal component, i.e. the first column of P, and scale it to load with a factor of one on the two-year OIS movement. We repeat this exercise for the high frequency rate changes during the press release in order to construct the press release control variable.

For replicating the 'timing', 'forward guidance' and 'quantitative easing' factors of Altavilla et al. (2019) we again gather all press conference reactions of OIS rates in a matrix X. We then perform PCA as in equation (IA.A.1) and extract the first, second and third columns of P, i.e. the first three principal components. Afterwards, we rotate them such that the second and third factors are orthogonal to the OIS 1M and the third factor has a minimal variance prior to August 2008.

More formally, let F be a 207×3 matrix that contains the first three columns of P, i.e. the first three principal components. Let Λ consist of the first three rows of W^T, recall that $W^T = W^{-1}$, thus Λ is a 3×7 matrix and each row i now contains the loadings of the yields on the i-th principal component. That means we rewrite IA.A.1 as

$$X = F\Lambda \tag{IA.A.2}$$

We need to find an orthonormal rotation matrix U with $UU' = I$

$$X = \underbrace{FU}_{F^R}\underbrace{U'\Lambda}_{\Lambda^R} \tag{IA.A.3}$$

and then the rotated factors F^R are given by $F^R = FU$. U has to be orthonormal, thus, its columns

have unit length

$$u_{1j}^2 + u_{2j}^2 + u_{3j}^2 = 1 \; for \; j = 1, 2, 3 \tag{IA.A.4}$$

and columns are orthogonal to each other

$$\begin{aligned} u_{11} * u_{12} + u_{21} * u_{22} + u_{31} * u_{32} &= 0 \\ u_{11} * u_{13} + u_{21} * u_{23} + u_{31} * u_{33} &= 0 \\ u_{12} * u_{13} + u_{22} * u_{23} + u_{32} * u_{33} &= 0 \end{aligned} \tag{IA.A.5}$$

Additionally, we want the second and third rotated factor to be orthogonal to the OIS 1M

$$\begin{aligned} u_{12} * \lambda_{11} + u_{22} * \lambda_{21} + u_{32} * \lambda_{31} &= 0 \\ u_{13} * \lambda_{11} + u_{23} * \lambda_{21} + u_{33} * \lambda_{31} &= 0 \end{aligned} \tag{IA.A.6}$$

Given constraints in equations (IA.A.3), (IA.A.5) and (IA.A.6) we then solve the following optimization problem, which ensures that the third factor has minimum variance in the pre-crisis period

$$\arg\min_{u_{ij}} \frac{1}{T} \sum_{t=1}^{T} \sum_{j=1}^{3} f_{tj} u_{j3} \tag{IA.A.7}$$

where $t = 1, \ldots, T$ are the time points between January 2002 and August 2008. We then scale the rotated factors such that the 'timing' factors loads with one on the six-month OIS, the 'forward guidance' factor loads with one on the two-year OIS and the 'quantitative easing' factor loads with one on the ten-year OIS.

We repeat this analysis with the yield curve movements during press conferences to obtain a corresponding press release window control variable, but only consider the rotated first principal component, thereby following Altavilla et al. (2019).

IA.A.2. Shocks identified from the co-movement of interest rates and stocks

The main framework of monetary policy shocks based on co-movement of assets is as following: it is assumed that the observed high frequency shocks Δy_t are driven by a structural shock u_t

$$\Delta y_t = A^{-1} u_t \tag{IA.A.8}$$

where $y_t \sim WN(0, \Sigma)$ and $u_t \sim WN(0, I)$.

Δy_t are the observed high frequency market reactions, i.e. the changes of yields and stock returns. u_t are orthogonal structural shocks that the researcher would like to back out, i.e., the 'policy' and 'information'

respectively 'monetary', 'growth' and 'risk premium' shocks. The matrix A^{-1} is not unique, rather there exists a whole set of possible candidates. However, for a set of specific shocks the researcher knows the sign restrictions of A's entries.

'Policy' and 'information' shocks The y_t vector contains changes in the 2-year interest rate (Δi_t) and stock market returns (r_t). As Jarociński and Karadi (2020) we assume that (i) a 'policy' shock (u_t^{Policy}) impacts interest rates and stock valuations with opposite signs and (ii) an 'information' shock ($u_t^{Information}$) moves interest rates and stock valuations in the same direction. Under these assumptions, the we can write equation (IA.A.8) as

$$\underbrace{\begin{pmatrix} \Delta i_t \\ r_t \end{pmatrix}}_{\Delta y_t} = \underbrace{\begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}}_{A^{-1}} \underbrace{\begin{pmatrix} u_t^{Policy} \\ u_t^{Information} \end{pmatrix}}_{u_t}, \; u_t \sim N(0, I) \tag{IA.A.9}$$

with the sign restrictions $a_{11} > 0$, $a_{12} > 0$, $a_{21} < 0$ and $a_{22} > 0$ on the entries of A^{-1}.

'Monetary', 'growth' and 'risk premium' shocks The y_t vector contains changes in the 2-year interest rate (Δi_t^{2Y}), changes in the 10-year interest rate (Δi_t^{10Y}) and stock market returns (r_t). As Cieslak and Schrimpf (2019) we assume that

- a 'monetary' shock ($u_t^{Monetary}$) impacts interest rates and stock valuations with opposite signs and impacts the two-year rate more than the 10Y rate
- a 'growth' shock (u_t^{Growth}) moves interest rates and stock valuations in the same direction and impacts the two-year rate more than the 10Y rate
- a 'risk premium' (u_t^{RP}) shock moves interest rates and stock valuations in the same direction and impacts the ten-year rate more than the two-year rate

Thus, we can write equation (IA.A.8) as

$$\underbrace{\begin{pmatrix} \Delta i_t^{2Y} \\ \Delta i_t^{10Y} \\ r_t \end{pmatrix}}_{\Delta y_t} = \underbrace{\begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}}_{A^{-1}} \underbrace{\begin{pmatrix} u_t^{Growth} \\ u_t^{Monetary} \\ u_t^{RP} \end{pmatrix}}_{u_t}, \; u_t \sim N(0, I) \tag{IA.A.10}$$

with the sign restrictions $a_{i1} > 0$ for $i = 1, 2, 3$, $a_{i2} > 0$ for $i = 1, 2$ and $a_{32} < 0$, $a_{i3} < 0$ for $i = 1, 2, 3$, $|a_{13}| < |a_{23}|$, $|a_{11}| > |a_{21}|$, $|a_{12}| > |a_{13}|$ and $|a_{22}| < |a_{23}|$.

Generating A Hence, the task boils down to generating a set of suitable matrices which entries have the sign derived by theory. In order to back out A^{-1} we first decompose the covariance matrix Σ with a Cholesky Decomposition s.t. $\Sigma = CC'$ where C is a lower triangular matrix. Furthermore, let Q be an orthogonal matrix $QQ' = Q'Q = I$. Then

$$\Delta y_t = \underbrace{CQ}_{A^{-1}} u_t \tag{IA.A.11}$$

ensures that Δy_t retains its covariance structure, while u_t has unit variance. Q is the so called rotation matrix.

In order to find a suitable set of rotation matrices we follow the procedure outlined by Rubio-Ramirez et al. (2010):

- First, we randomly generate a matrix X with independent standard normally distributed entries and apply a QR decomposition $X = QR$ (the entries in the diagonal of R have to be positive).
- Second, we generate a candidate matrix for A^{-1} by $A^{-1} = CQ$ and check whether the sign restrictions are met. If so we keep the matrix as an candidate for A^{-1}. We repeat the procedure until we have obtained 2000 candidate for A^{-1}.
- Finally, we apply the median target of Fry and Pagan (2011): we choose the matrix A^{-1}, which entries minimize the distance to the median of the set of candidate matrices. Hence, we ensure that the chosen matrix lies within the set of generated candidates.

Table IA.1: Summary statistics for control variables

The table presents summary statistics for all control variables used in the paper. OIS 3M, OIS 2Y and OIS 10Y denote the rate changes of the overnight index swap with maturities of 3 months, 2 years and 10 years. The 'interest rate' factor is based on Leombroni et al. (2021). The 'timing', 'forward guidance' and 'quantitative easing' factors were introduced by Altavilla et al. (2019). The 'policy' and 'information' shocks are based on Jarociński and Karadi (2020). The 'monetary', 'growth' and 'risk premium' shocks were introduced by Cieslak and Schrimpf (2019). The letters in the parentheses correspond to the initials of the shocks' original authors. PR indicates that shocks are measured during the press release. UMP is a hand-coded variable that can takes values in $\{-1, 0, 1\}$, where 1 means (an indication of) an unexpected unconventional monetary tightening, -1 an easing and 0 no change. 'Inter-PC' denotes that the change in stance is measured based on ECB board members' speeches between introductory statements. Inflation below 2% is based on the most recent flash estimate of HICP inflation in the euro area and takes the value 1 if inflation is below 2%. $R_{EuroStoxx\ 50}$ is the return of the Eurostoxx 50, Δ Vstoxx is the change of the Vstoxx and Δ German 2Y yield is the change of the 2 year yield between two press conferences. Δ real GDP projection and Δ inflation projection are the changes in one-year-ahead GDP and inflation forecasts from macroeconomic projections announced during press conferences.

	Mean	Median	SD	Min	Max
OIS 3M PR	0.25	0.00	2.06	-9.40	13.85
OIS 2Y PR	0.12	0.02	1.58	-8.25	8.40
OIS 10Y PR	-0.07	-0.05	1.27	-5.90	5.40
EUR/USD PR	-2.73	-0.78	23.55	-107.63	138.41
EUR/GBP PR	-1.22	0.00	19.55	-98.59	108.47
EUR/JPY PR	-1.28	0.76	23.99	-152.91	117.20
ES-DE 10Y PR	-0.20	-0.00	1.38	-6.55	5.45
IT-DE 10Y PR	-0.36	-0.05	2.32	-18.95	12.00
STOXX50 PR	-0.10	-0.09	0.61	-3.00	2.04
SX7E PR	-0.21	-0.13	1.08	-7.08	2.77
IR (LVVW) PR	0.01	-0.14	1.38	-7.50	9.03
Timing (ABGMR) PR	0.00	-0.19	1.77	-9.24	11.05
POLICY (JK) PR	0.00	-0.04	1.00	-4.32	6.40
INFO (JK) PR	-0.00	0.03	1.00	-3.39	7.57
Monetary (CS) PR	-0.00	-0.03	1.00	-4.51	6.02
Growth (CS) PR	-0.00	-0.06	1.00	-4.25	7.93
Risk Premium (CS) PR	0.00	-0.05	1.00	-4.35	3.80
UMP	-0.11	0.00	0.33	-1.00	1.00
Δ UMP (inter-PC)	-0.00	0.00	0.01	-0.06	0.06
Δ Bank Funding (inter-PC)	-0.00	0.00	0.01	-0.03	0.03
Δ Economic Activity (inter-PC)	-0.00	0.00	0.02	-0.12	0.13
Δ Inflation (inter-PC)	0.00	0.00	0.01	-0.05	0.05
Δ Monetary Developments (inter-PC)	0.00	0.00	0.01	-0.07	0.07
Δ Bank Lending (inter-PC)	-0.00	0.00	0.01	-0.04	0.05
Δ Structural Reforms (inter-PC)	-0.00	0.00	0.02	-0.12	0.11
Δ Fiscal Discipline (inter-PC)	0.00	0.00	0.01	-0.03	0.03
Inflation below 2%	0.54	1.00	0.50	0.00	1.00
$R_{EuroStoxx\ 50}$	0.21	0.96	4.91	-19.65	18.58
Δ Vstoxx	0.01	-0.49	6.23	-40.80	40.60
Δ German 2Y yield	-0.02	-0.00	0.19	-0.79	0.63
Δ Real GDP Projection	-0.02	0.00	0.36	-1.70	3.90
Δ Inflation Projection	-0.00	0.00	0.16	-1.20	0.50

Table IA.2: Top LDA keywords for the ECBs' speeches corpus

The table presents top keywords for relevant topics obtained by applying Latent Dirichlet Allocation (LDA) to the corpus of speeches by ECB executive board members from 1997–2020. Each column corresponds to a topic, where the column header contains the topic name. Topic names are chosen by researchers. The words below the column header are the top 30 keywords allocated to each topic by the LDA. Underscores indicate multi-word expressions.

Unconventional Monetary Policy	Bank Funding	Inflation	Structural Reforms	Fiscal Discipline	Economic Activity	Monetary Developments	Bank Lending
asset_purchase_programme	money_market	inflation_rate	structural_reform	fiscal_policy	recovery	monetary_analysis	loan
asset_purchase	long_term_refinancing_operation	hicp	labour_market	growth_pact	domestic_demand	reference_value	non_financial_corporation
net_asset	main_refinancing_operation	oil	unemployment_rate	public_finance	favourable_financing_condition	mthree	sme
monetary_accommodation	operational_framework	consumer_price	labour_market_reform	deficit	disposable_income	monetary_development	bank_loan
term_premia	inter_bank_market	energy_price	product_market	public_debt	macroeconomic_projection	monetary_growth	credit_condition
net_purchase	maintenance_period	second_round_effect	employment_rate	debt_ratio	gdp_growth	first_pillar	bank_lending
inflation_path	reserve_requirement	energy	market_flexibility	automatic_stabiliser	economic_activity	money_growth	bank_lending_survey
duration	tender	commodity_price	lisbon_agenda	fiscal_position	private_consumption	inflation_target	medium_sized_enterprise
pandemic_emergenc_ypurchase_programme	liquidity_provision	oil_price	reform_process	fiscal_rule	growth_outlook	broad_money	bank_lending_rate
inflation_convergence	allotment	food_price	participation_rate	fiscal_consolidation	economic_outlook	monetary_expansion	loan_sale
unconventional_measure	eonia	flash_estimate	labour_mobility	excessive_deficit_procedure	foreign_demand	mone	house_purchase
side_effect	money_market_rate	indirect_tax	labour_market_policy	fiscal_deficit	corporate_profitability	monetary_pillar	credit_supply
term_premium	central_bank_liquidity	food	employment_protection_legislation	debt_level	consumer_confidence	mthree_growth	nfc
principal_payment	tender_procedure	price_index	wage_flexibility	debt_to_gdp_ratio	industrial_production	monetary_phenomenon	credit_flow
public_sectorpurchase_programme	overnight_rate	measurement_bias	mobility	government_deficit	external_demand	money_demand	non_financial_sector_balance_sheet
duration_risk	inter_bank_money_market	producer_price	labour_force_participation	sgp	export_growth	portfolio_shift	loan_dynamic
negative_interest_rate	refinancing_operation	price_pressure	unemployment	budget	growt_hmomentum	inflation_forecast	lending_condition
security_purchase	marginal_lending_facility	price_setting	labour_demand	fiscal_imbalance	business_efficiency	second_pillar	funding_condition
term_structure	euribor	core_inflation	wage_policy	fiscal_framework	economic_sentiment	monetary_target	enterprise
reinvestment	main_refinancing_rate	unprocessed_food	good_market	fiscal_adjustment	upturn	credit_growth	borrowing_condition
pandemic	open_market_operation	headline_inflation	part_time	budget_deficit	geopolitical_factor	overnight_deposit	credit_demand
negative_territory	corridor	positive_inflation	job	fiscal_sustainability	containment	inflation_targeting	lending_rate
qe	deposit_facility	negative_inflation	labour_market_rigidity	expenditure	geopolitical_tension	money_supply	loan_demand
dfr	non_standard_measure	consumer_price_inflation	bottleneck	stability_programme	industrial_confidence	monetary_data	bank_lending_channel
inflation_outlook	excess_reserve	price_change	lisbon_strategy	balanced_budget	business_investment	inflationary_risk	bank_financing
unconventional_monetary_policy	separation_principle	service_price	youth_unemployment	public_expenditure	business_confidence	two_pillar_approach	corporate_sector_purchase_programme
ratee_xpectation	liquidity_operation	cpi	market_regulation	fiscal_development	upswing	financial_indicator	non_financial_private_sector
rate_path	minimum_bidrate	oil_priceshock	economic_reform	fiscal_stimulus	sentiment	money	bank_funding
policy_rate	mro_rate	service_price_inflation	wage_settlement	fiscal_space	survey_indicator	monetary_dynamic	loan_growth
easing_package	fix_rate_full_allotment	consumer_price_index	bargaining	fiscal_discipline	economic_recovery	monetary_liquidity	external_financing

Table IA.3: Topic mapping between PC topics and inter-press conference topics

This table presents the mapping between press conference and inter-press conference topics. The first column contains the name of the press conference topic, while the second column contains the names of the corresponding inter-press conference topics. For example, as a counterpart to the change in stance on 'financial & monetary conditions' we use the inter-press conference changes in stance on the two topics 'bank lending' and 'monetary developments' as control variables.

PC Topic	**Inter-PC Topic**
Monetary Policy Tools	Unconventional Monetary Policy, Bank Funding
Economic Activity	Economic Activity
Inflation	Inflation
Financial & Monetary Conditions	Bank Lending, Monetary Developments
Fiscal Policy	Structural Reforms, Fiscal Discipline

Table IA.4: Detailed regression results OIS 3M

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the change in the 3M overnight index swap rate. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	OIS 3M											
Rate Guidance	1.147***					1.087***	1.067***	1.116***	1.137***	1.103***	0.996***	0.996***
	(0.369)					(0.351)	(0.355)	(0.345)	(0.369)	(0.374)	(0.313)	(0.305)
Economic Activity		0.252**				0.213*	0.193	0.196	0.174	0.168	0.198	0.206
		(0.109)				(0.120)	(0.125)	(0.127)	(0.137)	(0.137)	(0.137)	(0.136)
Inflation			0.099			0.035	0.033	0.144	0.005	−0.031	−0.040	−0.034
			(0.092)			(0.100)	(0.101)	(0.124)	(0.193)	(0.200)	(0.200)	(0.204)
Financial & Monetary Cond.				0.253*		0.205	0.198	0.203	0.217	0.226	0.188	0.185
				(0.153)		(0.145)	(0.143)	(0.144)	(0.142)	(0.146)	(0.148)	(0.149)
Fiscal Policy					−0.012	0.023	0.036	0.050	0.077	0.086	0.086	0.090
					(0.134)	(0.141)	(0.138)	(0.137)	(0.164)	(0.165)	(0.167)	(0.166)
UMP							0.354	0.405	0.454	0.511	0.449	0.461
							(0.487)	(0.496)	(0.497)	(0.505)	(0.462)	(0.464)
Press Release Shock							0.034	0.030	0.037	0.026	0.056	0.055
							(0.065)	(0.068)	(0.055)	(0.067)	(0.080)	(0.081)
Inflation below 2%								0.229	0.436	0.356	0.470	0.459
								(0.267)	(0.384)	(0.418)	(0.429)	(0.434)
Inflation × below 2%								−0.225	−0.093	−0.072	−0.056	−0.052
								(0.181)	(0.218)	(0.227)	(0.225)	(0.238)
Economic Activity (lag)									−10.811	−12.568	−13.933	−13.959
									(8.162)	(8.059)	(8.571)	(8.570)
Inflation below 2% (lag)									−0.223	−0.167	−0.277	−0.253
									(0.379)	(0.420)	(0.412)	(0.412)
Inflation (lag)									−22.698	−23.781	−27.841	−28.120
									(17.667)	(17.900)	(19.317)	(19.223)
Inflation (lag) × below 2% (lag)									24.463	22.853	31.938	31.600
									(19.552)	(20.217)	(23.094)	(22.763)
Fiscal Policy (lag)									0.132	−0.313	0.189	0.202
									(6.730)	(6.452)	(6.161)	(6.222)
Financial & Monetary Cond. (lag)									2.665	2.381	1.203	0.788
									(10.492)	(11.092)	(11.099)	(10.973)
UMP (inter-PC)										5.760	4.452	4.793
										(10.127)	(9.669)	(9.404)
Bank Funding (inter-PC)										6.841	6.505	7.552
										(13.297)	(13.282)	(13.542)
Economic Activity (inter-PC)										3.401	2.579	2.306
										(5.522)	(5.767)	(5.678)
Inflation (inter-PC)										3.178	4.499	5.552
										(20.477)	(20.758)	(20.691)
Inflation (inter-PC) × below 2%										−8.948	−7.079	−7.781
										(22.241)	(22.501)	(22.723)
Monetary Developments (inter-PC)										1.627	2.254	2.463
										(9.591)	(10.216)	(10.284)
Bank Lending (inter-PC)										17.988	14.436	14.234
										(16.902)	(17.246)	(17.912)
Structural Reforms (inter-PC)										−2.847	−0.395	−0.908
										(7.044)	(7.175)	(7.229)
Fiscal Discipline (inter-PC)										1.192	2.963	2.242
										(15.351)	(15.626)	(15.424)
$R_{Eurostoxx\ 50}$											−0.031	−0.025
											(0.051)	(0.056)
Δ VSTOXX											−0.031	−0.026
											(0.035)	(0.036)
Δ GER 2Y Yield											1.470	1.487
											(1.655)	(1.662)
Δ Real GDP Projection												−0.211
												(0.271)
Δ Inflation Projection												0.005
												(0.927)
Constant	−0.147	−0.096	−0.096	−0.096	−0.096	−0.144	−0.112	−0.225	−0.223	−0.195	−0.177	−0.187
	(0.131)	(0.138)	(0.139)	(0.138)	(0.140)	(0.129)	(0.131)	(0.211)	(0.220)	(0.217)	(0.221)	(0.217)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.062	0.011	-0.002	0.011	-0.005	0.067	0.062	0.059	0.054	0.024	0.029	0.019
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.5: Detailed regression results OIS 2Y

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the change in the two-year overnight index swap rate. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	OIS 2Y											
Rate Guidance	1.745**					1.591**	1.558**	1.704**	1.687**	1.751**	1.489**	1.598**
	(0.714)					(0.705)	(0.720)	(0.713)	(0.731)	(0.739)	(0.658)	(0.646)
Economic Activity		0.735***				0.709**	0.673**	0.671**	0.655**	0.672**	0.757**	0.838***
		(0.251)				(0.277)	(0.282)	(0.288)	(0.324)	(0.302)	(0.312)	(0.313)
Inflation			0.201			−0.007	−0.004	0.221	−0.133	−0.125	−0.124	−0.058
			(0.199)			(0.230)	(0.234)	(0.323)	(0.469)	(0.481)	(0.510)	(0.511)
Financial & Monetary Cond.				0.362		0.289	0.286	0.290	0.197	0.179	0.120	0.101
				(0.323)		(0.322)	(0.325)	(0.326)	(0.337)	(0.350)	(0.354)	(0.355)
Fiscal Policy					−0.040	−0.054	−0.045	−0.010	0.069	0.095	0.087	0.113
					(0.264)	(0.265)	(0.260)	(0.257)	(0.311)	(0.324)	(0.340)	(0.344)
UMP							0.342	0.457	0.742	0.759	0.691	0.718
							(0.854)	(0.861)	(0.849)	(0.886)	(0.814)	(0.816)
Press Release Shock							0.138	0.130	0.132	0.073	0.126	0.083
							(0.197)	(0.199)	(0.192)	(0.205)	(0.220)	(0.218)
Inflation below 2%								0.612	−0.352	−0.290	−0.168	−0.361
								(0.577)	(0.833)	(0.833)	(0.774)	(0.787)
Inflation × below 2%								−0.456	−0.189	−0.232	−0.230	−0.285
								(0.385)	(0.463)	(0.495)	(0.506)	(0.510)
Economic Activity (lag)									−21.733	−21.966	−23.757	−23.631
									(15.650)	(15.924)	(17.101)	(16.412)
Inflation below 2% (lag)									1.316	1.246	1.031	1.162
									(0.838)	(0.830)	(0.778)	(0.790)
Inflation (lag)									−48.982	−49.621	−57.850	−60.294
									(34.748)	(34.964)	(38.122)	(38.703)
Inflation (lag) × below 2% (lag)									34.097	41.521	55.357	55.890
									(36.726)	(38.671)	(43.530)	(43.720)
Fiscal Policy (lag)									−2.089	−3.721	−2.540	−3.011
									(13.912)	(13.569)	(13.350)	(13.548)
Financial & Monetary Cond. (lag)									−37.923	−36.787	−39.385	−44.571*
									(25.724)	(26.606)	(26.722)	(26.853)
UMP (inter-PC)										−5.951	−8.485	−4.215
										(17.647)	(17.081)	(16.254)
Bank Funding (inter-PC)										14.183	12.264	17.574
										(24.825)	(24.296)	(24.392)
Economic Activity (inter-PC)										8.574	7.406	7.179
										(11.293)	(11.529)	(11.340)
Inflation (inter-PC)										11.349	12.035	18.789
										(41.544)	(43.119)	(42.651)
Inflation (inter-PC) × below 2%										2.915	6.141	−3.338
										(46.812)	(47.182)	(46.721)
Monetary Developments (inter-PC)										−8.360	−6.582	−4.731
										(18.801)	(19.835)	(20.084)
Bank Lending (inter-PC)										6.725	0.127	3.788
										(31.471)	(32.393)	(33.462)
Structural Reforms (inter-PC)										8.677	13.336	9.541
										(13.762)	(14.636)	(14.206)
Fiscal Discipline (inter-PC)										11.811	12.348	13.449
										(31.734)	(31.476)	(31.086)
$R_{Eurostoxx\ 50}$											0.012	0.061
											(0.121)	(0.128)
Δ VSTOXX											−0.015	0.022
											(0.064)	(0.064)
Δ GER 2Y Yield											2.771	2.835
											(2.909)	(2.918)
Δ Real GDP Projection												−0.925
												(0.613)
Δ Inflation Projection												−1.884
												(2.026)
Constant	−0.325	−0.247	−0.247	−0.247	−0.247	−0.318	−0.294	−0.604	−0.771	−0.765	−0.674	−0.665
	(0.279)	(0.286)	(0.290)	(0.289)	(0.290)	(0.274)	(0.285)	(0.508)	(0.508)	(0.513)	(0.500)	(0.495)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.031	0.027	-0.003	0.003	-0.005	0.045	0.039	0.037	0.051	0.014	0.016	0.015
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.6: Detailed regression results OIS 10Y

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the change in the 10Y overnight index swap rate. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	OIS 10Y											
Rate Guidance	0.420					0.307	0.312	0.428	0.433	0.456	0.377	0.358
	(0.354)					(0.358)	(0.363)	(0.373)	(0.389)	(0.414)	(0.398)	(0.407)
Economic Activity		0.553***				0.484**	0.472**	0.463**	0.359	0.341	0.370	0.365
		(0.199)				(0.218)	(0.229)	(0.231)	(0.261)	(0.246)	(0.250)	(0.258)
Inflation			0.315*			0.137	0.133	0.233	0.231	0.207	0.210	0.206
			(0.178)			(0.194)	(0.192)	(0.266)	(0.296)	(0.294)	(0.302)	(0.303)
Financial & Monetary Cond.				0.492**		0.474**	0.470**	0.468**	0.432*	0.428*	0.408*	0.408*
				(0.200)		(0.206)	(0.206)	(0.207)	(0.221)	(0.230)	(0.233)	(0.235)
Fiscal Policy					0.154	0.142	0.152	0.174	0.254	0.191	0.188	0.189
					(0.186)	(0.188)	(0.193)	(0.191)	(0.203)	(0.204)	(0.211)	(0.211)
UMP							0.220	0.292	0.440	0.417	0.385	0.394
							(0.675)	(0.651)	(0.643)	(0.612)	(0.590)	(0.594)
Press Release Shock							−0.136	−0.127	−0.132	−0.149	−0.152	−0.147
							(0.185)	(0.184)	(0.179)	(0.173)	(0.173)	(0.181)
Inflation below 2%								0.471	−0.218	−0.188	−0.136	−0.113
								(0.363)	(0.590)	(0.599)	(0.593)	(0.603)
Inflation × below 2%								−0.204	−0.138	−0.115	−0.116	−0.104
								(0.364)	(0.376)	(0.379)	(0.378)	(0.383)
Economic Activity (lag)									−20.314*	−18.894	−19.498	−19.565
									(12.267)	(12.464)	(13.178)	(13.203)
Inflation below 2% (lag)									0.962	0.950	0.876	0.881
									(0.620)	(0.623)	(0.626)	(0.631)
Inflation (lag)									4.272	6.070	4.002	4.135
									(19.406)	(18.838)	(19.655)	(19.558)
Inflation (lag) × below 2% (lag)									9.805	7.633	12.470	12.007
									(23.480)	(24.443)	(27.641)	(27.132)
Fiscal Policy (lag)									5.587	2.692	3.041	3.153
									(8.425)	(8.387)	(8.380)	(8.355)
Financial & Monetary Cond. (lag)									−20.308	−20.440	−21.333	−20.904
									(17.750)	(18.106)	(18.248)	(18.116)
UMP (inter-PC)										−15.955	−17.074	−17.497
										(11.454)	(11.068)	(11.191)
Bank Funding (inter-PC)										−0.383	−1.111	−0.897
										(20.688)	(20.813)	(20.930)
Economic Activity (inter-PC)										−9.287	−9.324	−9.515
										(11.265)	(11.362)	(11.306)
Inflation (inter-PC)										13.981	14.129	13.952
										(24.622)	(24.961)	(25.137)
Inflation (inter-PC) × below 2%										−5.151	−3.818	−2.763
										(32.791)	(32.637)	(32.800)
Monetary Developments (inter-PC)										7.821	8.482	8.360
										(11.213)	(11.415)	(11.520)
Bank Lending (inter-PC)										5.449	3.263	2.491
										(16.994)	(17.266)	(17.853)
Structural Reforms (inter-PC)										1.269	3.411	3.562
										(12.000)	(11.565)	(11.757)
Fiscal Discipline (inter-PC)										17.752	18.349	17.398
										(20.793)	(20.882)	(21.325)
$R_{Eurostoxx\,50}$											−0.002	−0.004
											(0.073)	(0.084)
Δ VSTOXX											−0.012	−0.014
											(0.049)	(0.057)
Δ GER 2Y Yield											0.809	0.814
											(1.356)	(1.353)
Δ Real GDP Projection												−0.078
												(0.364)
Δ Inflation Projection												0.325
												(1.265)
Constant	−0.077	−0.058	−0.058	−0.058	−0.058	−0.072	−0.057	−0.302	−0.436	−0.452	−0.427	−0.440
	(0.188)	(0.186)	(0.188)	(0.187)	(0.189)	(0.181)	(0.179)	(0.280)	(0.280)	(0.277)	(0.278)	(0.276)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.0001	0.037	0.009	0.028	-0.002	0.057	0.053	0.052	0.054	0.025	0.012	0.001
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.7: Detailed regression results EUR/USD

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the return of the Euro against the USD. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	EUR/USD											
Rate Guidance	7.067					5.916	3.010	4.001	4.857	6.137	6.001	7.041
	(7.015)					(7.032)	(6.619)	(6.612)	(6.875)	(6.667)	(6.364)	(6.095)
Economic Activity		3.618				3.356	2.752	2.184	1.421	0.342	0.759	1.310
		(2.688)				(2.898)	(2.991)	(3.047)	(3.830)	(3.969)	(3.896)	(3.943)
Inflation			1.088			−0.239	−0.824	−5.762**	−6.129*	−6.063*	−4.831	−4.348
			(2.792)			(2.911)	(2.977)	(2.721)	(3.589)	(3.567)	(3.685)	(3.744)
Financial & Monetary Cond.				4.869*		4.743*	4.742*	4.309	5.594**	5.498**	5.505*	5.409*
				(2.794)		(2.831)	(2.737)	(2.698)	(2.713)	(2.762)	(2.839)	(2.840)
Fiscal Policy					1.006	1.165	2.254	1.969	1.458	0.313	−0.336	−0.189
					(3.256)	(3.480)	(3.417)	(3.406)	(3.929)	(3.692)	(3.649)	(3.693)
UMP							26.497**	25.043**	24.939**	24.879**	23.692**	23.741**
							(12.407)	(12.313)	(12.007)	(11.966)	(11.328)	(11.122)
Press Release Shock							−0.020	−0.042	−0.023	0.001	0.011	0.005
							(0.260)	(0.263)	(0.261)	(0.257)	(0.245)	(0.241)
Inflation below 2%								1.422	0.109	2.076	3.780	2.106
								(5.499)	(9.330)	(8.275)	(7.847)	(7.817)
Inflation × below 2%								9.957**	11.563**	11.711**	10.920**	10.362**
								(4.833)	(4.868)	(5.309)	(4.935)	(4.960)
Economic Activity (lag)									−114.715	−92.929	−74.091	−70.394
									(218.221)	(215.480)	(205.607)	(202.294)
Inflation below 2% (lag)									1.455	−0.286	−3.305	−2.553
									(9.375)	(8.269)	(7.859)	(7.844)
Inflation (lag)									−55.770	−6.376	69.922	47.939
									(256.829)	(247.754)	(263.788)	(265.599)
Inflation (lag) × below 2% (lag)									486.402	531.450	634.564	646.568
									(322.266)	(373.370)	(412.341)	(413.432)
Fiscal Policy (lag)									−14.105	−61.344	−36.318	−39.955
									(143.957)	(134.861)	(127.930)	(128.787)
Financial & Monetary Cond. (lag)									300.589	355.258	359.871	322.421
									(236.832)	(233.898)	(227.027)	(232.705)
UMP (inter-PC)										−377.504*	−388.180**	−348.359*
										(198.226)	(190.503)	(196.975)
Bank Funding (inter-PC)										47.388	29.978	60.568
										(404.625)	(397.810)	(399.944)
Economic Activity (inter-PC)										−209.785	−221.945	−225.024
										(220.622)	(229.343)	(233.205)
Inflation (inter-PC)										462.816	507.788	560.929
										(357.751)	(351.974)	(352.656)
Inflation (inter-PC) × below 2%										47.566	−1.484	−88.963
										(440.602)	(434.981)	(448.612)
Monetary Developments (inter-PC)										−69.850	−20.158	−6.203
										(226.591)	(217.870)	(218.841)
Bank Lending (inter-PC)										148.344	45.217	79.872
										(236.778)	(235.893)	(247.632)
Structural Reforms (inter-PC)										223.102	352.097**	321.559**
										(189.281)	(162.050)	(160.156)
Fiscal Discipline (inter-PC)										−4.061	22.212	43.788
										(339.820)	(332.763)	(342.418)
$R_{Eurostoxx\,50}$											0.568	0.917
											(1.074)	(1.205)
Δ VSTOXX											−1.221*	−0.978
											(0.739)	(0.795)
Δ GER 2Y Yield											−16.220	−15.799
											(21.846)	(22.028)
Δ Real GDP Projection												−4.403
												(5.441)
Δ Inflation Projection												−17.725
												(21.775)
Constant	−1.060	−0.747	−0.747	−0.747	−0.747	−1.009	2.066	0.801	0.448	0.269	0.397	0.674
	(3.060)	(2.989)	(2.998)	(2.980)	(2.998)	(3.043)	(2.892)	(4.160)	(4.285)	(4.232)	(4.199)	(4.201)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.001	0.002	-0.004	0.008	-0.004	-0.0005	0.031	0.035	0.023	0.020	0.051	0.045
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.8: Detailed regression results EUR/GBP

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the return of the Euro against the British Pound. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	EUR/GBP											
Rate Guidance	5.891					4.290	1.884	3.466	3.936	4.284	4.603	4.994
	(5.232)					(5.139)	(4.820)	(4.916)	(5.154)	(5.097)	(4.961)	(4.840)
Economic Activity		3.167*				3.182	2.696	2.244	1.587	1.062	1.243	1.452
		(1.882)				(2.107)	(2.074)	(2.107)	(2.697)	(2.690)	(2.625)	(2.648)
Inflation			0.904			−0.579	−1.087	−3.536*	−4.363	−4.485	−3.386	−3.198
			(2.028)			(2.164)	(2.111)	(2.132)	(2.991)	(3.005)	(3.104)	(3.157)
Financial & Monetary Cond.				5.944***		5.841**	5.835***	5.529**	6.330***	6.347***	6.545***	6.513***
				(2.294)		(2.343)	(2.246)	(2.211)	(2.205)	(2.175)	(2.094)	(2.088)
Fiscal Policy					0.024	0.221	1.070	1.054	1.127	0.178	−0.447	−0.393
					(2.278)	(2.396)	(2.340)	(2.325)	(2.769)	(2.717)	(2.667)	(2.680)
UMP							20.950**	20.601**	20.728**	21.037**	20.444**	20.474***
							(9.203)	(9.099)	(8.938)	(8.756)	(7.991)	(7.948)
Press Release Shock							0.003	−0.004	0.020	0.049	0.072	0.075
							(0.208)	(0.206)	(0.201)	(0.200)	(0.187)	(0.187)
Inflation below 2%								4.804	7.461	8.527	9.332	8.656
								(4.140)	(6.775)	(6.322)	(5.723)	(5.856)
Inflation × below 2%								4.853	6.473*	6.807*	6.149*	5.911
								(3.477)	(3.719)	(3.896)	(3.735)	(3.779)
Economic Activity (lag)									−148.773	−122.973	−97.653	−96.877
									(175.753)	(174.353)	(168.276)	(166.963)
Inflation below 2% (lag)									−3.141	−4.021	−6.239	−5.945
									(6.581)	(6.126)	(5.465)	(5.553)
Inflation (lag)									−145.014	−115.027	−33.236	−41.820
									(204.357)	(197.928)	(207.843)	(208.540)
Inflation (lag) × below 2% (lag)									417.975*	432.472	475.303	481.450
									(244.463)	(279.527)	(296.191)	(295.129)
Fiscal Policy (lag)									15.106	−17.413	1.890	0.558
									(108.902)	(104.375)	(95.737)	(96.214)
Financial & Monetary Cond. (lag)									192.327	233.919	243.660	229.069
									(171.601)	(169.180)	(162.969)	(167.146)
UMP (inter-PC)										−331.835**	−333.628**	−318.251**
										(157.539)	(152.671)	(158.195)
Bank Funding (inter-PC)										52.804	41.070	53.731
										(291.009)	(283.200)	(285.732)
Economic Activity (inter-PC)										−173.791	−186.813	−188.588
										(140.106)	(140.136)	(141.451)
Inflation (inter-PC)										188.840	215.029	235.018
										(256.912)	(259.809)	(260.262)
Inflation (inter-PC) × below 2%										99.251	49.774	15.756
										(337.873)	(346.682)	(357.474)
Monetary Developments (inter-PC)										−16.347	25.219	30.248
										(175.639)	(165.098)	(165.618)
Bank Lending (inter-PC)										153.591	79.287	93.361
										(183.427)	(181.396)	(188.029)
Structural Reforms (inter-PC)										148.873	244.092**	232.440*
										(135.650)	(124.214)	(122.536)
Fiscal Discipline (inter-PC)										11.871	18.187	26.494
										(228.717)	(223.014)	(228.973)
$R_{Eurostoxx\,50}$											0.822	0.956
											(0.841)	(0.923)
Δ VSTOXX											−0.785	−0.692
											(0.562)	(0.605)
Δ GER 2Y Yield											−20.966	−20.833
											(15.355)	(15.499)
Δ Real GDP Projection												−1.595
												(4.190)
Δ Inflation Projection												−7.162
												(15.893)
Constant	0.584	0.845	0.845	0.845	0.845	0.655	3.138	0.327	0.395	0.298	0.410	0.543
	(2.306)	(2.239)	(2.249)	(2.211)	(2.250)	(2.271)	(2.114)	(3.045)	(3.164)	(3.138)	(3.025)	(3.010)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.002	0.005	-0.004	0.029	-0.005	0.024	0.060	0.061	0.050	0.047	0.090	0.081
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.9: Detailed regression results EUR/JPY

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the return of the Euro against the Japanese Yen. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	EUR/JPY											
Rate Guidance	−0.058					−2.447	−4.845	−4.170	−2.566	−2.196	−2.365	−2.492
	(6.394)					(6.122)	(5.829)	(5.715)	(6.028)	(6.018)	(5.921)	(5.858)
Economic Activity		5.914*				7.206**	6.513*	6.386*	7.026*	5.654	6.057	5.976
		(3.031)				(3.418)	(3.493)	(3.530)	(4.161)	(4.109)	(4.065)	(4.214)
Inflation			−2.698			−5.481**	−5.765**	−6.030*	−8.656**	−8.600**	−7.682**	−7.752**
			(2.544)			(2.668)	(2.589)	(3.116)	(3.563)	(3.693)	(3.892)	(3.847)
Financial & Monetary Cond.				6.182**		7.069**	7.260**	7.190**	7.771**	6.959**	7.017**	7.035**
				(3.142)		(3.148)	(2.995)	(3.016)	(3.078)	(3.034)	(3.089)	(3.097)
Fiscal Policy					2.649	1.773	2.865	2.912	3.360	1.930	1.408	1.383
					(3.438)	(3.663)	(3.420)	(3.431)	(3.971)	(3.785)	(3.768)	(3.767)
UMP							30.027**	30.099**	30.737***	32.608***	32.095***	32.065***
							(11.892)	(11.722)	(11.536)	(11.469)	(10.705)	(10.771)
Press Release Shock							−0.231	−0.236	−0.222	−0.231	−0.229	−0.229
							(0.211)	(0.212)	(0.211)	(0.209)	(0.205)	(0.204)
Inflation below 2%								2.279	−5.225	−2.819	−2.170	−1.945
								(5.246)	(7.639)	(7.244)	(7.246)	(7.486)
Inflation × below 2%								0.528	3.140	3.977	3.441	3.502
								(4.790)	(4.803)	(5.025)	(5.120)	(5.151)
Economic Activity (lag)									−23.364	1.238	21.943	21.580
									(194.285)	(193.145)	(196.131)	(196.656)
Inflation below 2% (lag)									8.982	6.961	4.751	4.612
									(7.855)	(7.486)	(7.458)	(7.587)
Inflation (lag)									−349.418	−282.230	−233.867	−230.099
									(252.155)	(247.485)	(268.133)	(267.569)
Inflation (lag) × below 2% (lag)									509.982*	563.665	602.974	602.009
									(304.334)	(359.572)	(425.046)	(420.760)
Fiscal Policy (lag)									32.046	−9.431	7.242	7.666
									(138.313)	(131.555)	(126.914)	(126.594)
Financial & Monetary Cond. (lag)									210.985	286.627	285.444	290.863
									(214.739)	(200.950)	(203.290)	(210.137)
UMP (inter-PC)										−464.707**	−469.702**	−473.227**
										(194.680)	(186.986)	(191.331)
Bank Funding (inter-PC)										−131.671	−152.623	−158.599
										(423.082)	(418.125)	(419.983)
Economic Activity (inter-PC)										−184.576	−191.796	−190.783
										(192.393)	(200.234)	(200.113)
Inflation (inter-PC)										297.902	309.834	301.200
										(350.556)	(345.041)	(344.532)
Inflation (inter-PC) × below 2%										340.548	308.778	320.902
										(427.384)	(413.999)	(424.728)
Monetary Developments (inter-PC)										105.378	143.781	141.701
										(202.315)	(196.161)	(198.684)
Bank Lending (inter-PC)										266.965	199.671	195.919
										(254.186)	(253.932)	(255.291)
Structural Reforms (inter-PC)										438.228***	516.222***	520.988***
										(149.457)	(163.000)	(164.230)
Fiscal Discipline (inter-PC)										−90.871	−85.085	−86.277
										(354.908)	(348.017)	(359.577)
$R_{Eurostoxx\,50}$											0.933	0.880
											(1.183)	(1.234)
Δ VSTOXX											−0.430	−0.467
											(0.788)	(0.819)
Δ GER 2Y Yield											−11.381	−11.472
											(22.073)	(22.064)
Δ Real GDP Projection												0.955
												(5.635)
Δ Inflation Projection												2.166
												(22.816)
Constant	−0.147	−0.150	−0.150	−0.150	−0.150	−0.041	3.172	1.907	0.857	0.681	1.036	1.021
	(3.064)	(2.988)	(3.011)	(2.985)	(3.011)	(2.988)	(2.739)	(3.807)	(3.881)	(3.714)	(3.778)	(3.784)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.005	0.014	-0.001	0.016	-0.001	0.033	0.099	0.090	0.075	0.107	0.114	0.104
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.10: Detailed regression results ES-DE 10Y

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the change in the yield spread of Spanish and German 10 year government bonds. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	ES-DE 10Y											
Rate Guidance	0.073					−0.129	−0.045	−0.183	−0.195	−0.015	0.160	0.145
	(0.356)					(0.382)	(0.430)	(0.367)	(0.381)	(0.449)	(0.482)	(0.514)
Economic Activity		−0.165				0.078	0.097	0.116	0.107	−0.007	−0.050	−0.029
		(0.192)				(0.183)	(0.191)	(0.196)	(0.238)	(0.234)	(0.236)	(0.236)
Inflation			−0.376			−0.435*	−0.414*	−0.452	−0.583*	−0.592	−0.586	−0.566
			(0.246)			(0.245)	(0.248)	(0.287)	(0.343)	(0.386)	(0.380)	(0.372)
Financial & Monetary Cond.				−0.033		−0.047	−0.048	−0.038	−0.071	−0.301	−0.245	−0.269
				(0.129)		(0.154)	(0.157)	(0.159)	(0.186)	(0.307)	(0.306)	(0.299)
Fiscal Policy					−0.713	−0.758	−0.791	−0.810	−0.745	−0.586*	−0.598**	−0.575*
					(0.610)	(0.628)	(0.681)	(0.690)	(0.622)	(0.304)	(0.302)	(0.300)
UMP							−0.804	−0.860	−0.804	−0.450	−0.296	−0.207
							(2.023)	(2.066)	(2.038)	(1.437)	(1.392)	(1.357)
Press Release Shock							0.022	0.014	0.014	−0.098	−0.154	−0.250
							(0.504)	(0.506)	(0.485)	(0.504)	(0.497)	(0.515)
Inflation below 2%								−0.530	−0.071	0.019	−0.230	−0.224
								(0.730)	(0.719)	(0.660)	(0.726)	(0.741)
Inflation × below 2%								0.080	0.208	0.335	0.332	0.379
								(0.519)	(0.571)	(0.569)	(0.534)	(0.553)
Economic Activity (lag)									−13.402	−19.232	−15.902	−15.515
									(12.517)	(15.575)	(14.857)	(14.654)
Inflation below 2% (lag)									−0.504	−0.553	−0.409	−0.282
									(0.736)	(0.642)	(0.691)	(0.665)
Inflation (lag)									−23.545	−24.504	−20.466	−21.070
									(25.997)	(26.971)	(27.138)	(27.667)
Inflation (lag) × below 2% (lag)									24.849	31.855	12.236	7.618
									(33.132)	(37.918)	(36.419)	(37.280)
Fiscal Policy (lag)									3.063	2.849	1.742	1.851
									(13.915)	(14.585)	(14.455)	(14.483)
Financial & Monetary Cond. (lag)									−10.866	−14.049	−13.646	−15.625
									(24.984)	(23.739)	(24.016)	(22.835)
UMP (inter-PC)										7.025	9.504	9.310
										(20.691)	(21.116)	(21.890)
Bank Funding (inter-PC)										−23.584	−25.611	−23.010
										(19.011)	(18.863)	(18.744)
Economic Activity (inter-PC)										43.672	44.200	42.725
										(74.507)	(73.081)	(72.456)
Inflation (inter-PC)										46.607	40.745	44.497
										(32.965)	(31.471)	(32.563)
Inflation (inter-PC) × below 2%										−72.198*	−74.055*	−74.140
										(43.494)	(44.118)	(45.502)
Monetary Developments (inter-PC)										24.581	23.993	25.108
										(15.846)	(15.726)	(15.784)
Bank Lending (inter-PC)										−2.706	3.805	1.400
										(27.071)	(26.007)	(23.751)
Structural Reforms (inter-PC)										17.760	10.453	8.840
										(19.984)	(15.250)	(15.368)
Fiscal Discipline (inter-PC)										4.088	0.484	−4.037
										(32.798)	(32.150)	(31.496)
$R_{Eurostoxx\ 50}$											0.130	0.148
											(0.080)	(0.092)
Δ VSTOXX											0.130*	0.149*
											(0.069)	(0.078)
Δ GER 2Y Yield											−1.900*	−1.845
											(1.155)	(1.134)
Δ Real GDP Projection												−1.305
												(0.887)
Δ Inflation Projection												0.898
												(1.695)
Constant	0.176	0.180	0.180	0.180	0.180	0.185	0.095	0.376	0.398	0.396	0.396	0.290
	(0.287)	(0.283)	(0.282)	(0.284)	(0.279)	(0.284)	(0.215)	(0.361)	(0.376)	(0.376)	(0.395)	(0.355)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.005	-0.003	0.004	-0.005	0.026	0.018	0.012	0.006	-0.016	0.011	0.018	0.019
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.11: Detailed regression results IT-DE 10Y

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the change in the yield spread of Italian and German 10 year government bonds. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	IT-DE 10Y											
Rate Guidance	0.065					−0.189	−0.296	−0.371	−0.418	−0.192	0.037	0.071
	(0.397)					(0.453)	(0.510)	(0.443)	(0.452)	(0.522)	(0.535)	(0.570)
Economic Activity		−0.477*				−0.093	−0.094	−0.056	−0.103	−0.216	−0.261	−0.200
		(0.275)				(0.227)	(0.235)	(0.241)	(0.301)	(0.290)	(0.300)	(0.299)
Inflation			−0.852			−0.875	−0.747*	−0.494	−0.658*	−0.618	−0.630	−0.597
			(0.564)			(0.577)	(0.447)	(0.316)	(0.391)	(0.448)	(0.434)	(0.423)
Financial & Monetary Cond.				−0.029		0.001	0.023	0.048	0.026	−0.369	−0.298	−0.329
				(0.174)		(0.222)	(0.238)	(0.243)	(0.254)	(0.398)	(0.397)	(0.390)
Fiscal Policy					−0.824	−0.864	−0.890	−0.879	−0.799	−0.628*	−0.631*	−0.604*
					(0.709)	(0.729)	(0.817)	(0.834)	(0.745)	(0.368)	(0.364)	(0.360)
UMP							−0.460	−0.401	−0.298	0.265	0.512	0.592
							(2.367)	(2.447)	(2.434)	(1.716)	(1.662)	(1.624)
Press Release Shock							0.312	0.290	0.275	0.173	0.121	0.052
							(0.345)	(0.328)	(0.317)	(0.255)	(0.209)	(0.269)
Inflation below 2%								−0.226	0.260	0.589	0.214	0.156
								(0.924)	(0.825)	(0.855)	(0.929)	(0.955)
Inflation × below 2%								−0.519	−0.499	−0.376	−0.399	−0.434
								(0.843)	(0.911)	(0.815)	(0.743)	(0.745)
Economic Activity (lag)									−15.377	−19.403	−14.737	−13.736
									(17.201)	(20.849)	(20.037)	(19.634)
Inflation below 2% (lag)									−0.536	−0.798	−0.577	−0.483
									(0.948)	(0.818)	(0.918)	(0.896)
Inflation (lag)									−26.636	−26.575	−23.333	−25.657
									(32.460)	(34.422)	(34.777)	(35.541)
Inflation (lag) × below 2% (lag)									−9.230	7.676	−21.075	−23.687
									(45.641)	(49.937)	(51.308)	(52.144)
Fiscal Policy (lag)									0.348	0.270	−1.494	−1.379
									(15.642)	(16.504)	(16.337)	(16.137)
Financial & Monetary Cond. (lag)									−6.251	−7.685	−7.525	−11.101
									(31.203)	(28.067)	(28.263)	(27.433)
UMP (inter-PC)										−7.979	−3.308	−0.563
										(23.770)	(23.748)	(24.400)
Bank Funding (inter-PC)										−45.808**	−47.829**	−44.767**
										(23.160)	(21.678)	(22.364)
Economic Activity (inter-PC)										53.532	54.467	53.387
										(89.829)	(88.427)	(87.988)
Inflation (inter-PC)										51.737	42.155	46.496
										(43.315)	(41.844)	(43.204)
Inflation (inter-PC) × below 2%										−76.400	−78.914	−83.767
										(57.886)	(59.153)	(61.381)
Monetary Developments (inter-PC)										38.339*	36.420*	37.437**
										(20.136)	(18.939)	(18.840)
Bank Lending (inter-PC)										−16.444	−5.832	−5.955
										(33.092)	(31.609)	(28.762)
Structural Reforms (inter-PC)										50.896	38.295	35.834
										(41.400)	(30.151)	(31.066)
Fiscal Discipline (inter-PC)										8.938	4.356	3.988
										(37.121)	(35.990)	(35.984)
$R_{Eurostoxx\ 50}$											0.183	0.211
											(0.123)	(0.137)
Δ VSTOXX											0.210*	0.236*
											(0.127)	(0.134)
Δ GER 2Y Yield											−2.276*	−2.203
											(1.379)	(1.358)
Δ Real GDP Projection												−1.153
												(1.184)
Δ Inflation Projection												−0.119
												(2.102)
Constant	0.420	0.423	0.423	0.423	0.423	0.431	0.496	0.631	0.681	0.666	0.681	0.619
	(0.366)	(0.360)	(0.356)	(0.361)	(0.356)	(0.359)	(0.362)	(0.453)	(0.468)	(0.476)	(0.510)	(0.497)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.005	0.004	0.022	-0.005	0.021	0.032	0.043	0.036	0.020	0.079	0.098	0.093
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.12: Detailed regression results STOXX50

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the return in the Eurostoxx 50 index. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	STOXX50											
Rate Guidance	−0.056					−0.053	−0.057	−0.069	−0.065	−0.070	−0.095	−0.103
	(0.077)					(0.077)	(0.078)	(0.083)	(0.085)	(0.087)	(0.087)	(0.089)
Economic Activity		0.069				0.057	0.055	0.058	0.054	0.064	0.063	0.061
		(0.043)				(0.043)	(0.044)	(0.044)	(0.048)	(0.048)	(0.048)	(0.050)
Inflation			0.039			0.023	0.023	0.031	0.046	0.041	0.021	0.018
			(0.045)			(0.048)	(0.046)	(0.046)	(0.057)	(0.058)	(0.055)	(0.055)
Financial & Monetary Cond.				0.010		0.014	0.013	0.015	0.021	0.038	0.025	0.025
				(0.041)		(0.043)	(0.042)	(0.043)	(0.044)	(0.049)	(0.048)	(0.047)
Fiscal Policy					0.053	0.044	0.045	0.044	0.029	0.032	0.045	0.045
					(0.055)	(0.054)	(0.059)	(0.061)	(0.058)	(0.044)	(0.043)	(0.043)
UMP							0.032	0.032	0.024	0.001	−0.020	−0.017
							(0.243)	(0.246)	(0.246)	(0.227)	(0.212)	(0.212)
Press Release Shock							−0.024	−0.015	−0.056	−0.119	−0.107	−0.103
							(0.204)	(0.206)	(0.197)	(0.171)	(0.178)	(0.179)
Inflation below 2%								−0.041	−0.099	−0.134	−0.093	−0.082
								(0.094)	(0.121)	(0.125)	(0.133)	(0.136)
Inflation × below 2%								−0.016	−0.010	−0.001	0.008	0.015
								(0.092)	(0.098)	(0.096)	(0.091)	(0.090)
Economic Activity (lag)									0.549	0.619	−0.403	−0.422
									(3.176)	(3.157)	(3.131)	(3.148)
Inflation below 2% (lag)									0.071	0.108	0.124	0.124
									(0.123)	(0.120)	(0.130)	(0.128)
Inflation (lag)									2.302	1.830	0.158	0.237
									(3.155)	(3.409)	(3.602)	(3.628)
Inflation (lag) × below 2% (lag)									2.823	2.513	5.656	5.428
									(5.490)	(6.476)	(6.231)	(6.214)
Fiscal Policy (lag)									−0.658	−0.175	−0.294	−0.260
									(1.900)	(1.949)	(1.889)	(1.883)
Financial & Monetary Cond. (lag)									0.708	0.271	0.174	0.360
									(3.484)	(3.475)	(3.449)	(3.538)
UMP (inter-PC)										3.548	3.038	2.810
										(2.550)	(2.537)	(2.606)
Bank Funding (inter-PC)										5.913	6.333	6.369
										(5.135)	(4.752)	(4.811)
Economic Activity (inter-PC)										−1.662	−1.574	−1.634
										(6.113)	(5.533)	(5.524)
Inflation (inter-PC)										−4.398	−3.426	−3.538
										(5.005)	(4.788)	(4.721)
Inflation (inter-PC) × below 2%										−2.815	−1.793	−1.282
										(8.503)	(8.807)	(9.023)
Monetary Developments (inter-PC)										−1.633	−2.284	−2.328
										(3.589)	(3.352)	(3.398)
Bank Lending (inter-PC)										0.491	0.638	0.279
										(3.396)	(3.280)	(3.367)
Structural Reforms (inter-PC)										−3.186	−3.066	−2.972
										(3.274)	(2.903)	(2.949)
Fiscal Discipline (inter-PC)										−4.914	−3.925	−4.310
										(4.900)	(4.398)	(4.529)
$R_{Eurostoxx\ 50}$											−0.051***	−0.052***
											(0.018)	(0.020)
Δ VSTOXX											−0.022	−0.022
											(0.014)	(0.015)
Δ GER 2Y Yield											0.571**	0.572**
											(0.271)	(0.274)
Δ Real GDP Projection												−0.030
												(0.096)
Δ Inflation Projection												0.153
												(0.369)
Constant	−0.098**	−0.100**	−0.100**	−0.100**	−0.100**	−0.098**	−0.095**	−0.071	−0.083	−0.087	−0.098*	−0.104*
	(0.044)	(0.043)	(0.043)	(0.043)	(0.043)	(0.044)	(0.041)	(0.061)	(0.061)	(0.059)	(0.056)	(0.057)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.003	0.008	-0.001	-0.005	0.002	-0.004	-0.014	-0.023	-0.043	-0.053	0.006	-0.004
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.13: Detailed regression results SX7E

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the return in the Eurostoxx bank index (SX7E). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	SX7E											
Rate Guidance	−0.104					−0.079	−0.104	−0.114	−0.110	−0.137	−0.172	−0.194
	(0.116)					(0.115)	(0.118)	(0.121)	(0.125)	(0.131)	(0.134)	(0.142)
Economic Activity		0.084				0.032	0.029	0.025	0.023	0.040	0.041	0.030
		(0.067)				(0.059)	(0.060)	(0.060)	(0.068)	(0.072)	(0.074)	(0.076)
Inflation			0.129			0.120	0.122	0.059	0.127	0.106	0.085	0.076
			(0.104)			(0.106)	(0.105)	(0.068)	(0.084)	(0.088)	(0.084)	(0.085)
Financial & Monetary Cond.				0.049		0.050	0.053	0.050	0.065	0.097	0.078	0.080
				(0.064)		(0.070)	(0.069)	(0.073)	(0.074)	(0.087)	(0.084)	(0.083)
Fiscal Policy					0.130	0.132	0.135	0.129	0.085	0.074	0.089	0.086
					(0.117)	(0.119)	(0.128)	(0.132)	(0.122)	(0.075)	(0.076)	(0.075)
UMP							0.137	0.114	0.067	0.024	−0.012	−0.014
							(0.398)	(0.411)	(0.414)	(0.353)	(0.341)	(0.340)
Press Release Shock							−0.109	−0.107	−0.166	−0.209*	−0.193	−0.200
							(0.153)	(0.147)	(0.139)	(0.124)	(0.117)	(0.127)
Inflation below 2%								−0.059	−0.098	−0.167	−0.099	−0.064
								(0.169)	(0.179)	(0.194)	(0.208)	(0.218)
Inflation × below 2%								0.127	0.132	0.151	0.159	0.173
								(0.204)	(0.208)	(0.192)	(0.179)	(0.177)
Economic Activity (lag)									2.611	2.752	1.477	1.397
									(4.827)	(5.275)	(5.121)	(5.147)
Inflation below 2% (lag)									0.041	0.109	0.111	0.097
									(0.182)	(0.178)	(0.201)	(0.203)
Inflation (lag)									9.431	8.768	6.908	7.389
									(5.937)	(6.528)	(7.081)	(7.198)
Inflation (lag) × below 2% (lag)									8.848	6.584	11.572	11.301
									(9.829)	(11.087)	(11.337)	(11.552)
Fiscal Policy (lag)									−1.246	−0.954	−0.954	−0.885
									(3.595)	(3.710)	(3.698)	(3.642)
Financial & Monetary Cond. (lag)									1.392	0.008	−0.014	0.719
									(6.574)	(6.135)	(6.000)	(6.015)
UMP (inter-PC)										5.148	4.354	3.558
										(4.457)	(4.476)	(4.610)
Bank Funding (inter-PC)										7.433	7.824	7.313
										(6.365)	(5.905)	(5.947)
Economic Activity (inter-PC)										−5.183	−5.121	−5.070
										(13.966)	(13.267)	(13.250)
Inflation (inter-PC)										−5.680	−4.043	−5.065
										(8.454)	(8.267)	(8.440)
Inflation (inter-PC) × below 2%										−5.723	−4.635	−2.815
										(13.488)	(13.898)	(14.006)
Monetary Developments (inter-PC)										0.907	0.307	0.051
										(5.477)	(5.145)	(5.134)
Bank Lending (inter-PC)										3.649	3.220	2.423
										(6.395)	(6.227)	(6.178)
Structural Reforms (inter-PC)										−6.726	−5.708	−5.126
										(8.312)	(6.761)	(6.813)
Fiscal Discipline (inter-PC)										−3.734	−2.164	−2.735
										(7.839)	(7.331)	(7.473)
$R_{Eurostoxx\,50}$											−0.067**	−0.073**
											(0.029)	(0.032)
Δ VSTOXX											−0.038	−0.043
											(0.028)	(0.030)
Δ GER 2Y Yield											0.696**	0.692*
											(0.353)	(0.358)
Δ Real GDP Projection												0.074
												(0.192)
Δ Inflation Projection												0.383
												(0.542)
Constant	−0.206***	−0.211***	−0.211***	−0.211***	−0.211***	−0.207***	−0.192***	−0.165*	−0.181*	−0.181*	−0.196**	−0.204**
	(0.077)	(0.075)	(0.075)	(0.075)	(0.075)	(0.076)	(0.073)	(0.094)	(0.096)	(0.095)	(0.096)	(0.099)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.003	0.001	0.009	-0.003	0.010	0.009	0.006	-0.0005	0.013	0.002	0.026	0.018
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.14: Overview of structural measures of monetary policy shocks

This table provides an overview of the structural monetary policy shock measures we use in our empirical analysis. We consider shocks to the term structure of interest rates as well as shocks estimated from the joint dynamics of interest rates and stock prices. The first column contains the source and the label of the monetary policy shocks. The second column lists the assets and identification assumptions on which the shocks are based. The last column summarizes how a positive shock is interpreted.

Market-based shock measure	Identification	Shock ↑
Term structure shocks		
Leombroni et al. (2021)	PCA of yield changes: 1M to 10Y	
Interest rate factor (IR)	1^{st} PC	yield level ↑
Altavilla et al. (2019)	PCA of yield changes: 1M to 10Y	
Timing factor (TIM)	1^{st} PC, rotated	short-term rates ↑
Forward guidance factor (FG)	2^{nd} PC, rotated, ⊥1M	medium-term rates ↑
Quantitative easing factor (QE)	3^{rd} PC, rotated, ⊥1M	long-term rates ↑
Joint interest rate and equity shocks		
Jarociński and Karadi (2020)	structural shocks: 2Y, ESX50	
Policy shock (POL)	2Y ↑, ESX50 ↓	hawkish news
Information shock (INF)	2Y ↑, ESX50 ↑	good economic news
Cieslak and Schrimpf (2019)	structural shocks: 2Y, 10Y, ESX50	
Monetary shock (MON)	2Y ↑↑, 10Y ↑ , ESX50 ↓	hawkish news
Growth shock (GRO)	2Y ↑↑, 10Y ↑ , ESX50 ↑	good economic news
Risk Premium shock (RP)	2Y ↓ , 10Y ↓↓, ESX50 ↓	risk premium ↑

Table IA.15: Summary statistics for structural ECB shocks

This table presents descriptive statistics and pairwise correlations for structural monetary policy shocks during the ECB press conference window. All shocks are based on high-frequency market data available from the Euro Area Monetary Policy event-study Database (EA-MPD), see Altavilla et al. (2019). To assess shocks to the term structure of interest rates, we construct the 'interest rate' (IR) factor of Leombroni et al. (2021) and the three term structure factors 'timing', 'forward guidance' (FG), and 'quantitative easing' (QE) proposed by Altavilla et al. (2019). To gauge the joint responses of interest rates and stock markets (i.e., the Eurostoxx 50), we construct 'policy' and 'information' shocks as suggested by Jarociński and Karadi (2020) as well as the 'monetary', 'growth', and 'risk premium' shocks proposed by Cieslak and Schrimpf (2019). Panel A reports the pairwise shock correlations. Panel B reports descriptive statistics and the unit in which shocks are measured, i.e., we indicate whether shocks are measured in basis points (bps) or standardized (std). Our sample covers 203 ECB press conferences from January 2002 to June 2021.

	Term structure shocks				Joint interest rate and equity shocks				
	IR	TM	FG	QE	POL	INF	MOM	GRO	RP
Panel A. Pairwise shock correlations									
IR (LVVW)	1.00								
Timing (ABGMR)	0.62	1.00							
FG (ABGMR)	0.76	0.00	1.00						
QE (ABGMR)	0.21	0.00	0.00	1.00					
POLICY (JK)	0.76	0.39	0.67	0.05	1.00				
INFO (JK)	0.70	0.43	0.55	0.09	0.10	1.00			
Monetary (CS)	0.65	0.3	0.57	0.13	0.98	-0.07	1.00		
Growth (CS)	0.72	0.49	0.63	-0.27	0.25	0.91	0.07	1.00	
Risk Premium (CS)	-0.39	-0.09	-0.2	-0.91	-0.03	-0.45	-0.04	-0.07	1.00
Panel B. Summary statistics									
Mean	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Median	-0.01	0.13	0.09	0.00	-0.04	0.03	-0.06	0.07	0.04
SD	4.08	2.21	3.43	1.98	1.00	1.00	1.00	1.00	1.00
Min	-18.04	-12.1	-25.38	-7.64	-5.39	-3.93	-4.77	-4.83	-2.81
Max	20.53	10.69	10.42	6.2	3.83	3.16	4.1	3.87	4.44
Meanabschange	2.55	1.27	2.11	1.4	0.68	0.7	0.7	0.67	0.73
Unit	bps	bps	bps	bps	std	std	std	std	std

Table IA.16: Detailed regression results 'interest rate' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'interest rate' shock of Leombroni et al. (2021). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	IR (LVVW)											
Rate Guidance	1.920***					1.773**	1.813**	1.982***	1.987***	2.024***	1.766***	1.816***
	(0.736)					(0.727)	(0.743)	(0.738)	(0.761)	(0.770)	(0.679)	(0.663)
Economic Activity		0.720***				0.664**	0.588**	0.579**	0.531*	0.525*	0.613**	0.666**
		(0.244)				(0.271)	(0.276)	(0.284)	(0.311)	(0.295)	(0.299)	(0.302)
Inflation			0.240			0.042	0.058	0.270	−0.034	−0.056	−0.052	−0.010
			(0.194)			(0.218)	(0.226)	(0.292)	(0.429)	(0.440)	(0.461)	(0.469)
Financial & Monetary Cond.				0.457		0.378	0.348	0.349	0.286	0.295	0.220	0.209
				(0.313)		(0.310)	(0.313)	(0.314)	(0.327)	(0.337)	(0.345)	(0.346)
Fiscal Policy					0.012	0.023	0.032	0.068	0.181	0.162	0.147	0.168
					(0.266)	(0.268)	(0.263)	(0.259)	(0.314)	(0.326)	(0.339)	(0.340)
UMP							0.522	0.643	0.902	0.884	0.783	0.817
							(0.859)	(0.858)	(0.860)	(0.890)	(0.805)	(0.807)
Press Release Shock							0.277	0.279	0.262	0.244	0.342	0.315
							(0.197)	(0.211)	(0.203)	(0.223)	(0.240)	(0.241)
Inflation below 2%								0.690	−0.132	−0.135	0.054	−0.075
								(0.563)	(0.788)	(0.799)	(0.770)	(0.786)
Inflation × below 2%								−0.428	−0.178	−0.202	−0.191	−0.219
								(0.386)	(0.460)	(0.480)	(0.482)	(0.497)
Economic Activity (lag)									−26.343*	−26.624*	−28.492*	−28.497*
									(14.779)	(15.107)	(16.342)	(16.072)
Inflation below 2% (lag)									1.151	1.130	0.855	0.962
									(0.799)	(0.807)	(0.768)	(0.779)
Inflation (lag)									−41.253	−41.654	−50.694	−52.373
									(34.059)	(34.102)	(37.054)	(37.275)
Inflation (lag) × below 2% (lag)									33.978	36.978	54.188	53.903
									(35.930)	(37.683)	(43.168)	(42.861)
Fiscal Policy (lag)									2.261	−0.399	1.015	0.797
									(13.634)	(13.216)	(12.936)	(13.086)
Financial & Monetary Cond. (lag)									−28.767	−28.407	−31.450	−34.610
									(24.557)	(25.543)	(25.741)	(25.637)
UMP (inter-PC)										−2.536	−5.205	−2.447
										(18.654)	(17.900)	(17.424)
Bank Funding (inter-PC)										13.347	11.471	15.588
										(25.555)	(25.088)	(25.300)
Economic Activity (inter-PC)										−0.709	−2.705	−3.124
										(10.979)	(11.118)	(10.948)
Inflation (inter-PC)										19.297	20.459	25.572
										(40.384)	(42.006)	(41.995)
Inflation (inter-PC) × below 2%										−5.889	−2.070	−8.337
										(45.901)	(46.508)	(46.696)
Monetary Developments (inter-PC)										−2.785	−0.376	0.779
										(17.751)	(18.854)	(19.000)
Bank Lending (inter-PC)										12.550	4.180	5.986
										(31.893)	(32.872)	(34.182)
Structural Reforms (inter-PC)										2.220	7.621	4.986
										(14.951)	(14.774)	(14.664)
Fiscal Discipline (inter-PC)										17.719	19.675	19.098
										(30.892)	(30.939)	(30.566)
$R_{Eurostoxx\ 50}$											0.005	0.037
											(0.112)	(0.123)
Δ VSTOXX											−0.029	−0.005
											(0.064)	(0.068)
Δ GER 2Y Yield											3.078	3.127
											(2.910)	(2.922)
Δ Real GDP Projection												−0.746
												(0.550)
Δ Inflation Projection												−1.006
												(1.870)
Constant	−0.092	−0.007	−0.007	−0.007	−0.007	−0.085	−0.030	−0.384	−0.542	−0.533	−0.439	−0.446
	(0.272)	(0.281)	(0.285)	(0.284)	(0.286)	(0.266)	(0.270)	(0.476)	(0.480)	(0.481)	(0.475)	(0.469)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.040	0.026	-0.001	0.008	-0.005	0.057	0.058	0.058	0.064	0.026	0.035	0.029
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.17: Detailed regression results 'timing' factor

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'timing' factor of Altavilla et al. (2019). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Timing (ABGMR)											
Rate Guidance	1.200***					1.145***	1.097***	1.107***	1.132***	1.079***	0.976***	0.980***
	(0.397)					(0.374)	(0.385)	(0.383)	(0.409)	(0.407)	(0.348)	(0.345)
Economic Activity		0.138				0.083	0.073	0.079	0.062	0.054	0.082	0.093
		(0.126)				(0.136)	(0.144)	(0.146)	(0.157)	(0.159)	(0.160)	(0.159)
Inflation			0.114			0.078	0.068	0.154	0.016	−0.053	−0.068	−0.058
			(0.108)			(0.115)	(0.117)	(0.134)	(0.201)	(0.206)	(0.203)	(0.206)
Financial & Monetary Cond.				0.346*		0.292*	0.292*	0.297*	0.324*	0.341*	0.300*	0.297*
				(0.177)		(0.173)	(0.170)	(0.172)	(0.169)	(0.174)	(0.172)	(0.172)
Fiscal Policy					−0.024	0.044	0.061	0.070	0.093	0.081	0.088	0.094
					(0.147)	(0.151)	(0.146)	(0.145)	(0.176)	(0.180)	(0.182)	(0.182)
UMP							0.416	0.447	0.468	0.533	0.461	0.477
							(0.578)	(0.588)	(0.595)	(0.601)	(0.561)	(0.565)
Press Release Shock							−0.0002	−0.002	0.009	0.014	0.038	0.035
							(0.089)	(0.090)	(0.074)	(0.086)	(0.100)	(0.100)
Inflation below 2%								0.071	0.522	0.386	0.513	0.489
								(0.305)	(0.433)	(0.463)	(0.484)	(0.495)
Inflation × below 2%								−0.172	−0.046	0.033	0.044	0.045
								(0.208)	(0.239)	(0.249)	(0.246)	(0.259)
Economic Activity (lag)									−9.996	−11.218	−12.924	−12.952
									(9.661)	(9.441)	(9.926)	(9.900)
Inflation below 2% (lag)									−0.534	−0.414	−0.500	−0.466
									(0.434)	(0.469)	(0.459)	(0.465)
Inflation (lag)									−24.013	−25.579	−29.685	−30.122
									(19.653)	(19.593)	(20.531)	(20.488)
Inflation (lag) × below 2% (lag)									24.677	20.458	30.456	30.108
									(22.184)	(22.796)	(25.605)	(25.335)
Fiscal Policy (lag)									0.131	0.012	0.433	0.428
									(7.640)	(7.285)	(6.888)	(6.930)
Financial & Monetary Cond. (lag)									7.874	6.453	5.360	4.674
									(12.246)	(12.888)	(12.895)	(12.727)
UMP (inter-PC)										6.361	4.865	5.467
										(11.962)	(11.597)	(11.388)
Bank Funding (inter-PC)										10.275	10.237	11.648
										(13.693)	(13.746)	(13.954)
Economic Activity (inter-PC)										−3.372	−3.933	−4.255
										(5.713)	(5.970)	(5.877)
Inflation (inter-PC)										−1.874	−0.103	1.432
										(21.379)	(21.280)	(21.220)
Inflation (inter-PC) × below 2%										−16.121	−13.825	−15.132
										(24.958)	(24.991)	(25.134)
Monetary Developments (inter-PC)										8.568	8.881	9.188
										(10.081)	(10.744)	(10.801)
Bank Lending (inter-PC)										22.605	19.517	19.476
										(17.930)	(18.233)	(18.872)
Structural Reforms (inter-PC)										−5.734	−3.013	−3.774
										(8.098)	(8.494)	(8.614)
Fiscal Discipline (inter-PC)										−5.432	−3.253	−4.014
										(16.676)	(16.802)	(16.807)
$R_{Eurostoxx\,50}$											−0.059	−0.051
											(0.054)	(0.058)
Δ VSTOXX											−0.046	−0.039
											(0.038)	(0.040)
Δ GER 2Y Yield											1.520	1.541
											(1.716)	(1.720)
Δ Real GDP Projection												−0.275
												(0.315)
Δ Inflation Projection												−0.090
												(0.985)
Constant	−0.056	−0.003	−0.003	−0.003	−0.003	−0.053	−0.004	−0.035	0.001	0.027	0.037	0.027
	(0.147)	(0.154)	(0.154)	(0.153)	(0.155)	(0.145)	(0.143)	(0.224)	(0.237)	(0.231)	(0.230)	(0.226)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.055	-0.001	-0.002	0.020	-0.005	0.058	0.052	0.044	0.042	0.021	0.025	0.016
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.18: Detailed Regression Results 'forward guidance' factor

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'forward guidance' factor of Altavilla et al. (2019). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	FG (ABGMR)											
Rate Guidance	0.770					0.698	0.910	1.057*	1.008*	1.101*	0.940*	1.032*
	(0.518)					(0.542)	(0.576)	(0.613)	(0.597)	(0.582)	(0.559)	(0.560)
Economic Activity		0.498**				0.538**	0.453*	0.436*	0.463	0.489*	0.561**	0.630**
		(0.211)				(0.232)	(0.250)	(0.252)	(0.307)	(0.268)	(0.272)	(0.269)
Inflation			−0.008			−0.138	−0.093	−0.004	−0.234	−0.162	−0.142	−0.085
			(0.174)			(0.202)	(0.204)	(0.286)	(0.386)	(0.391)	(0.430)	(0.428)
Financial & Monetary Cond.				−0.090		−0.115	−0.167	−0.173	−0.289	−0.302	−0.347	−0.357
				(0.283)		(0.293)	(0.299)	(0.301)	(0.301)	(0.313)	(0.311)	(0.310)
Fiscal Policy					−0.037	−0.108	−0.137	−0.115	−0.050	−0.019	−0.048	−0.024
					(0.198)	(0.193)	(0.192)	(0.194)	(0.241)	(0.255)	(0.279)	(0.282)
UMP							−0.119	−0.044	0.202	0.123	0.084	0.111
							(0.519)	(0.507)	(0.507)	(0.521)	(0.498)	(0.499)
Press Release Shock							0.291*	0.298*	0.266*	0.238	0.300*	0.279
							(0.151)	(0.159)	(0.157)	(0.172)	(0.176)	(0.174)
Inflation below 2%								0.555	−0.790	−0.642	−0.563	−0.761
								(0.521)	(0.862)	(0.818)	(0.744)	(0.746)
Inflation × below 2%								−0.181	−0.048	−0.193	−0.187	−0.247
								(0.307)	(0.356)	(0.399)	(0.420)	(0.415)
Economic Activity (lag)									−9.664	−8.966	−8.983	−8.885
									(14.350)	(14.086)	(14.434)	(13.672)
Inflation below 2% (lag)									1.748**	1.580**	1.354*	1.473**
									(0.822)	(0.758)	(0.700)	(0.706)
Inflation (lag)									−27.182	−27.076	−32.840	−35.253
									(25.305)	(24.425)	(26.166)	(26.261)
Inflation (lag) × below 2% (lag)									7.980	19.535	27.601	28.221
									(26.515)	(26.721)	(28.875)	(29.332)
Fiscal Policy (lag)									−1.589	−3.263	−2.271	−2.636
									(11.437)	(11.203)	(11.112)	(11.232)
Financial & Monetary Cond. (lag)									−43.483*	−41.186*	−44.011*	−48.317**
									(22.398)	(22.673)	(22.584)	(22.916)
UMP (inter-PC)										−3.614	−5.004	−0.792
										(15.335)	(15.470)	(15.131)
Bank Funding (inter-PC)										6.512	4.350	8.793
										(20.220)	(19.422)	(19.355)
Economic Activity (inter-PC)										9.777	8.200	7.895
										(9.503)	(9.453)	(9.250)
Inflation (inter-PC)										15.817	14.009	20.554
										(29.324)	(30.836)	(30.128)
Inflation (inter-PC) × below 2%										17.971	20.826	11.114
										(37.321)	(36.985)	(36.545)
Monetary Developments (inter-PC)										−17.972	−15.386	−13.912
										(13.556)	(13.731)	(13.922)
Bank Lending (inter-PC)										−16.225	−22.072	−18.432
										(23.056)	(24.323)	(24.920)
Structural Reforms (inter-PC)										11.192	14.030	10.529
										(11.919)	(12.763)	(12.741)
Fiscal Discipline (inter-PC)										22.051	22.356	23.350
										(24.581)	(23.853)	(23.541)
$R_{Eurostoxx\ 50}$											0.080	0.122
											(0.102)	(0.107)
Δ VSTOXX											0.028	0.058
											(0.049)	(0.047)
Δ GER 2Y Yield											1.842	1.890
											(1.855)	(1.858)
Δ Real GDP Projection												−0.714
												(0.463)
Δ Inflation Projection												−1.831
												(1.573)
Constant	−0.040	−0.006	−0.006	−0.006	−0.006	−0.036	−0.060	−0.351	−0.538	−0.550	−0.456	−0.436
	(0.236)	(0.237)	(0.240)	(0.240)	(0.240)	(0.234)	(0.252)	(0.458)	(0.451)	(0.455)	(0.430)	(0.428)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.005	0.016	-0.005	-0.004	-0.005	0.009	0.021	0.018	0.043	0.024	0.030	0.030
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.19: Detailed Regression Results 'quantitative easing' factor

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'quantitative easing' factor of Altavilla et al. (2019). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	QE (ABGMR)											
Rate Guidance	−0.324*					−0.367*	−0.426*	−0.341	−0.316	−0.293	−0.251	−0.338
	(0.187)					(0.220)	(0.230)	(0.249)	(0.265)	(0.256)	(0.259)	(0.271)
Economic Activity		0.260*				0.192	0.195	0.185	0.076	0.036	0.025	−0.031
		(0.155)				(0.159)	(0.163)	(0.166)	(0.186)	(0.172)	(0.176)	(0.181)
Inflation			0.272*			0.181	0.168	0.215	0.366	0.342	0.353	0.307
			(0.154)			(0.160)	(0.153)	(0.230)	(0.238)	(0.229)	(0.232)	(0.194)
Financial & Monetary Cond.				0.336**		0.345**	0.351**	0.347**	0.368**	0.376**	0.388**	0.394***
				(0.145)		(0.147)	(0.145)	(0.146)	(0.150)	(0.152)	(0.152)	(0.152)
Fiscal Policy					0.168	0.163	0.178	0.191	0.250	0.163	0.158	0.141
					(0.137)	(0.144)	(0.149)	(0.150)	(0.156)	(0.139)	(0.144)	(0.145)
UMP							0.306	0.347	0.368	0.307	0.317	0.308
							(0.597)	(0.586)	(0.571)	(0.507)	(0.484)	(0.494)
Press Release Shock							−0.035	−0.031	−0.036	−0.003	−0.006	0.012
							(0.100)	(0.100)	(0.094)	(0.095)	(0.095)	(0.094)
Inflation below 2%								0.319	0.117	0.152	0.132	0.303
								(0.277)	(0.391)	(0.398)	(0.399)	(0.422)
Inflation × below 2%								−0.096	−0.132	−0.097	−0.104	−0.042
								(0.320)	(0.311)	(0.307)	(0.308)	(0.284)
Economic Activity (lag)									−13.590	−12.092	−11.473	−11.605
									(10.289)	(10.707)	(11.008)	(10.311)
Inflation below 2% (lag)									0.310	0.303	0.315	0.236
									(0.380)	(0.381)	(0.388)	(0.393)
Inflation (lag)									25.073**	27.666**	29.626***	31.536***
									(11.207)	(10.816)	(11.241)	(11.178)
Inflation (lag) × below 2% (lag)									−0.483	−6.264	−8.458	−9.491
									(15.452)	(15.910)	(17.760)	(17.568)
Fiscal Policy (lag)									7.940	5.452	5.465	5.825
									(5.933)	(5.973)	(5.928)	(5.895)
Financial & Monetary Cond. (lag)									1.258	0.770	1.272	4.792
									(11.380)	(11.840)	(11.877)	(12.230)
UMP (inter-PC)										−13.911	−13.389	−16.912*
										(9.022)	(9.023)	(8.655)
Bank Funding (inter-PC)										−8.623	−8.510	−11.314
										(13.873)	(13.846)	(14.206)
Economic Activity (inter-PC)										−14.910	−14.907	−14.979
										(10.662)	(10.761)	(10.437)
Inflation (inter-PC)										13.719	13.862	9.092
										(16.399)	(15.926)	(14.053)
Inflation (inter-PC) × below 2%										−4.947	−6.177	2.042
										(23.342)	(23.152)	(21.542)
Monetary Developments (inter-PC)										10.245	10.396	9.276
										(8.189)	(8.286)	(8.563)
Bank Lending (inter-PC)										2.255	2.586	−1.119
										(10.295)	(10.351)	(10.976)
Structural Reforms (inter-PC)										−3.856	−3.905	−1.283
										(9.384)	(9.403)	(9.395)
Fiscal Discipline (inter-PC)										14.361	14.129	12.236
										(15.341)	(15.065)	(15.119)
$R_{Eurostoxx\,50}$											0.012	−0.020
											(0.058)	(0.058)
Δ VSTOXX											−0.0005	−0.024
											(0.043)	(0.041)
Δ GER 2Y Yield											−0.634	−0.657
											(0.792)	(0.774)
Δ Real GDP Projection												0.393
												(0.310)
Δ Inflation Projection												1.734
												(1.255)
Constant	0.017	0.003	0.003	0.003	0.003	0.019	0.057	−0.112	−0.170	−0.192	−0.202	−0.234
	(0.139)	(0.137)	(0.137)	(0.136)	(0.138)	(0.134)	(0.129)	(0.184)	(0.183)	(0.177)	(0.171)	(0.171)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.0004	0.012	0.014	0.024	0.002	0.045	0.038	0.035	0.046	0.037	0.023	0.033
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.20: Detailed regression results 'policy' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'policy' shock of Jarociński and Karadi (2020). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Policy (JK)											
Rate Guidance	0.357**					0.328**	0.326**	0.366**	0.359**	0.374**	0.352**	0.381**
	(0.157)					(0.159)	(0.165)	(0.168)	(0.171)	(0.170)	(0.158)	(0.155)
Economic Activity		0.053				0.061	0.056	0.051	0.050	0.044	0.057	0.074
		(0.067)				(0.070)	(0.070)	(0.070)	(0.083)	(0.076)	(0.078)	(0.079)
Inflation			−0.007			−0.025	−0.021	0.006	−0.065	−0.059	−0.034	−0.021
			(0.058)			(0.065)	(0.063)	(0.063)	(0.092)	(0.096)	(0.107)	(0.112)
Financial & Monetary Cond.				0.051		0.035	0.034	0.033	0.012	−0.009	−0.005	−0.008
				(0.074)		(0.076)	(0.076)	(0.076)	(0.079)	(0.084)	(0.083)	(0.082)
Fiscal Policy					−0.062	−0.055	−0.057	−0.051	−0.023	−0.020	−0.037	−0.033
					(0.075)	(0.077)	(0.083)	(0.084)	(0.087)	(0.077)	(0.083)	(0.083)
UMP							0.014	0.035	0.089	0.118	0.125	0.127
							(0.304)	(0.310)	(0.311)	(0.304)	(0.283)	(0.282)
Press Release Shock							0.040	0.044	0.025	−0.017	0.020	0.011
							(0.106)	(0.104)	(0.099)	(0.096)	(0.098)	(0.097)
Inflation below 2%								0.159	0.053	0.099	0.078	0.031
								(0.146)	(0.155)	(0.155)	(0.156)	(0.159)
Inflation × below 2%								−0.055	−0.018	−0.036	−0.043	−0.060
								(0.106)	(0.114)	(0.118)	(0.122)	(0.127)
Economic Activity (lag)									−4.588	−4.677	−4.067	−3.961
									(4.611)	(4.459)	(4.732)	(4.672)
Inflation below 2% (lag)									0.154	0.105	0.052	0.072
									(0.144)	(0.141)	(0.147)	(0.149)
Inflation (lag)									−9.929	−9.675	−9.186	−9.836
									(7.566)	(7.607)	(9.043)	(9.109)
Inflation (lag) × below 2% (lag)									2.863	4.628	4.012	4.312
									(8.668)	(9.848)	(10.987)	(10.955)
Fiscal Policy (lag)									0.209	−0.536	−0.204	−0.304
									(3.264)	(3.223)	(3.200)	(3.229)
Financial & Monetary Cond. (lag)									−7.165	−6.566	−6.885	−7.960
									(5.840)	(5.975)	(6.009)	(6.099)
UMP (inter-PC)										−4.874	−4.699	−3.667
										(4.330)	(4.222)	(4.244)
Bank Funding (inter-PC)										−3.271	−3.662	−2.917
										(7.886)	(7.518)	(7.593)
Economic Activity (inter-PC)										3.522	3.172	3.123
										(6.856)	(6.210)	(6.119)
Inflation (inter-PC)										6.221	5.380	6.749
										(9.196)	(9.625)	(9.662)
Inflation (inter-PC) × below 2%										4.032	3.561	1.206
										(11.774)	(12.256)	(12.629)
Monetary Developments (inter-PC)										0.232	1.225	1.596
										(5.310)	(5.181)	(5.216)
Bank Lending (inter-PC)										0.664	−0.817	0.218
										(6.341)	(6.432)	(6.692)
Structural Reforms (inter-PC)										4.942	5.564	4.776
										(3.947)	(4.043)	(3.994)
Fiscal Discipline (inter-PC)										6.863	5.595	6.302
										(8.260)	(7.872)	(7.947)
$R_{Eurostoxx\ 50}$											0.057*	0.066*
											(0.031)	(0.035)
Δ VSTOXX											0.021	0.027
											(0.017)	(0.020)
Δ GER 2Y Yield											−0.072	−0.070
											(0.643)	(0.653)
Δ Real GDP Projection												−0.120
												(0.146)
Δ Inflation Projection												−0.497
												(0.469)
Constant	−0.016	−0.000	−0.000	−0.000	−0.000	−0.015	−0.013	−0.096	−0.115	−0.113	−0.085	−0.076
	(0.069)	(0.070)	(0.070)	(0.070)	(0.070)	(0.069)	(0.069)	(0.117)	(0.118)	(0.117)	(0.114)	(0.112)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.021	-0.002	-0.005	-0.002	-0.001	0.008	-0.001	-0.004	-0.003	-0.019	0.002	-0.003
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.21: Detailed regression results 'information' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'information shock' of Jarociński and Karadi (2020). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Information (JK)											
Rate Guidance	0.263*					0.236*	0.225	0.242*	0.241	0.245	0.168	0.182
	(0.148)					(0.143)	(0.145)	(0.145)	(0.151)	(0.156)	(0.148)	(0.149)
Economic Activity		0.217***				0.198***	0.197***	0.198***	0.189**	0.207***	0.220***	0.233***
		(0.064)				(0.067)	(0.067)	(0.069)	(0.075)	(0.074)	(0.073)	(0.075)
Inflation			0.083			0.025	0.026	0.076	0.032	0.026	0.007	0.018
			(0.065)			(0.069)	(0.069)	(0.092)	(0.123)	(0.123)	(0.116)	(0.109)
Financial & Monetary Cond.				0.080		0.070	0.069	0.072	0.061	0.075	0.049	0.045
				(0.073)		(0.072)	(0.071)	(0.072)	(0.074)	(0.081)	(0.080)	(0.080)
Fiscal Policy					0.053	0.040	0.042	0.048	0.043	0.055	0.068	0.073
					(0.078)	(0.075)	(0.077)	(0.076)	(0.081)	(0.073)	(0.070)	(0.070)
UMP							0.080	0.100	0.144	0.134	0.088	0.098
							(0.304)	(0.303)	(0.300)	(0.285)	(0.258)	(0.262)
Press Release Shock							−0.029	−0.031	−0.037	−0.053	−0.075	−0.076
							(0.061)	(0.062)	(0.065)	(0.064)	(0.065)	(0.067)
Inflation below 2%								0.079	−0.170	−0.197	−0.122	−0.153
								(0.145)	(0.245)	(0.250)	(0.247)	(0.251)
Inflation × below 2%								−0.100	−0.047	−0.046	−0.033	−0.037
								(0.139)	(0.155)	(0.157)	(0.148)	(0.143)
Economic Activity (lag)									−3.608	−3.497	−5.251	−5.253
									(4.639)	(4.753)	(4.772)	(4.636)
Inflation below 2% (lag)									0.327	0.352	0.337	0.366
									(0.252)	(0.250)	(0.247)	(0.246)
Inflation (lag)									−5.802	−6.708	−9.606	−10.086
									(7.300)	(7.424)	(6.847)	(6.908)
Inflation (lag) × below 2% (lag)									9.568	10.795	16.967*	16.910*
									(9.428)	(10.234)	(9.867)	(9.930)
Fiscal Policy (lag)									−1.310	−0.995	−1.023	−1.059
									(3.311)	(3.292)	(3.141)	(3.157)
Financial & Monetary Cond. (lag)									−6.683	−6.848	−7.498	−8.319
									(6.197)	(6.222)	(6.202)	(6.236)
UMP (inter-PC)										2.345	1.102	1.896
										(4.278)	(4.188)	(3.946)
Bank Funding (inter-PC)										9.151	9.656	10.944*
										(6.382)	(6.013)	(6.141)
Economic Activity (inter-PC)										0.404	0.660	0.386
										(7.247)	(6.749)	(6.821)
Inflation (inter-PC)										−3.900	−3.180	−1.659
										(9.407)	(8.975)	(8.608)
Inflation (inter-PC) × below 2%										−1.533	0.951	−0.734
										(13.657)	(13.705)	(13.431)
Monetary Developments (inter-PC)										−3.417	−3.928	−3.587
										(5.053)	(4.965)	(5.075)
Bank Lending (inter-PC)										2.056	1.185	1.461
										(7.198)	(7.218)	(7.392)
Structural Reforms (inter-PC)										−1.378	−0.355	−1.166
										(4.879)	(4.258)	(4.211)
Fiscal Discipline (inter-PC)										−3.119	−2.151	−2.448
										(7.302)	(6.792)	(6.800)
$R_{Eurostoxx\,50}$											−0.055**	−0.047*
											(0.026)	(0.026)
Δ VSTOXX											−0.025	−0.019
											(0.021)	(0.020)
Δ GER 2Y Yield											1.192**	1.214**
											(0.546)	(0.539)
Δ Real GDP Projection												−0.224
												(0.156)
Δ Inflation Projection												−0.230
												(0.623)
Constant	−0.012	0.000	0.000	0.000	0.000	−0.010	−0.001	−0.039	−0.081	−0.081	−0.083	−0.088
	(0.070)	(0.068)	(0.070)	(0.070)	(0.070)	(0.068)	(0.066)	(0.105)	(0.105)	(0.104)	(0.101)	(0.102)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.009	0.043	0.002	0.001	-0.002	0.042	0.034	0.028	0.020	-0.016	0.023	0.018
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.22: Detailed regression results 'monetary' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'monetary' shock of Cieslak and Schrimpf (2019). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Monetary (CS)											
Rate Guidance	0.292*					0.266*	0.265*	0.304*	0.298*	0.312*	0.306**	0.329**
	(0.149)					(0.150)	(0.154)	(0.159)	(0.162)	(0.162)	(0.154)	(0.152)
Economic Activity		0.027				0.035	0.033	0.028	0.024	0.014	0.025	0.037
		(0.071)				(0.074)	(0.074)	(0.074)	(0.085)	(0.079)	(0.081)	(0.084)
Inflation			−0.010			−0.023	−0.021	−0.0002	−0.056	−0.051	−0.023	−0.013
			(0.063)			(0.069)	(0.067)	(0.066)	(0.089)	(0.092)	(0.102)	(0.107)
Financial & Monetary Cond.				0.054		0.040	0.040	0.038	0.019	−0.005	0.004	0.002
				(0.072)		(0.075)	(0.075)	(0.075)	(0.078)	(0.083)	(0.083)	(0.082)
Fiscal Policy					−0.062	−0.054	−0.055	−0.049	−0.018	−0.020	−0.040	−0.036
					(0.077)	(0.078)	(0.085)	(0.087)	(0.088)	(0.076)	(0.081)	(0.081)
UMP							0.003	0.022	0.069	0.099	0.114	0.115
							(0.334)	(0.339)	(0.340)	(0.330)	(0.309)	(0.307)
Press Release Shock							0.016	0.022	0.004	−0.040	−0.012	−0.018
							(0.118)	(0.117)	(0.110)	(0.102)	(0.103)	(0.103)
Inflation below 2%								0.153	0.079	0.130	0.097	0.060
								(0.146)	(0.154)	(0.157)	(0.162)	(0.167)
Inflation × below 2%								−0.042	−0.015	−0.031	−0.041	−0.055
								(0.119)	(0.126)	(0.127)	(0.129)	(0.133)
Economic Activity (lag)									−4.446	−4.453	−3.548	−3.461
									(4.846)	(4.689)	(4.912)	(4.907)
Inflation below 2% (lag)									0.115	0.061	0.014	0.027
									(0.147)	(0.144)	(0.156)	(0.157)
Inflation (lag)									−7.720	−7.210	−6.061	−6.549
									(6.844)	(6.920)	(8.334)	(8.384)
Inflation (lag) × below 2% (lag)									0.937	2.194	0.333	0.622
									(8.629)	(10.004)	(10.919)	(10.852)
Fiscal Policy (lag)									0.802	−0.114	0.199	0.116
									(3.242)	(3.228)	(3.203)	(3.221)
Financial & Monetary Cond. (lag)									−6.204	−5.590	−5.774	−6.585
									(5.842)	(5.940)	(5.994)	(6.097)
UMP (inter-PC)										−6.042	−5.715	−4.913
										(4.336)	(4.200)	(4.267)
Bank Funding (inter-PC)										−5.419	−5.911	−5.421
										(8.418)	(7.966)	(8.058)
Economic Activity (inter-PC)										2.858	2.591	2.570
										(7.545)	(6.787)	(6.726)
Inflation (inter-PC)										7.121	5.976	6.978
										(9.007)	(9.294)	(9.336)
Inflation (inter-PC) × below 2%										4.127	3.407	1.569
										(12.399)	(12.909)	(13.353)
Monetary Developments (inter-PC)										1.389	2.409	2.686
										(5.526)	(5.305)	(5.355)
Bank Lending (inter-PC)										0.499	−0.654	0.188
										(5.874)	(5.926)	(6.174)
Structural Reforms (inter-PC)										5.183	5.647	5.062
										(4.227)	(4.192)	(4.198)
Fiscal Discipline (inter-PC)										8.148	6.750	7.390
										(8.382)	(7.876)	(8.034)
$R_{Eurostoxx\,50}$											0.065**	0.072**
											(0.031)	(0.035)
Δ VSTOXX											0.025	0.030
											(0.019)	(0.022)
Δ GER 2Y Yield											−0.314	−0.313
											(0.593)	(0.603)
Δ Real GDP Projection												−0.071
												(0.151)
Δ Inflation Projection												−0.400
												(0.515)
Constant	−0.013	−0.000	−0.000	−0.000	−0.000	−0.012	−0.011	−0.092	−0.107	−0.105	−0.079	−0.071
	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)	(0.069)	(0.111)	(0.113)	(0.111)	(0.107)	(0.106)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.012	-0.004	-0.005	-0.002	-0.001	-0.003	-0.013	-0.017	-0.023	-0.035	-0.006	-0.014
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.23: Detailed regression results 'growth' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'growth' shock of Cieslak and Schrimpf (2019). Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Growth (CS)											
Rate Guidance	0.380**					0.360**	0.350**	0.361**	0.354**	0.360**	0.280*	0.312**
	(0.154)					(0.150)	(0.154)	(0.152)	(0.156)	(0.158)	(0.145)	(0.144)
Economic Activity		0.165**				0.160**	0.162**	0.165**	0.176**	0.196***	0.215***	0.238***
		(0.067)				(0.069)	(0.069)	(0.070)	(0.079)	(0.075)	(0.077)	(0.079)
Inflation			0.030			−0.010	−0.010	0.041	−0.047	−0.042	−0.059	−0.038
			(0.061)			(0.066)	(0.065)	(0.100)	(0.131)	(0.128)	(0.126)	(0.114)
Financial & Monetary Cond.				0.016		0.001	0.001	0.004	−0.012	−0.006	−0.030	−0.036
				(0.077)		(0.075)	(0.074)	(0.075)	(0.076)	(0.079)	(0.079)	(0.079)
Fiscal Policy					0.003	−0.006	−0.005	−0.0002	−0.009	0.018	0.029	0.037
					(0.062)	(0.060)	(0.058)	(0.057)	(0.070)	(0.070)	(0.069)	(0.070)
UMP							0.051	0.069	0.122	0.127	0.092	0.103
							(0.295)	(0.295)	(0.290)	(0.285)	(0.253)	(0.260)
Press Release Shock							−0.025	−0.030	−0.012	−0.038	−0.051	−0.055
							(0.073)	(0.073)	(0.071)	(0.075)	(0.073)	(0.069)
Inflation below 2%								0.061	−0.136	−0.149	−0.086	−0.148
								(0.138)	(0.214)	(0.218)	(0.207)	(0.216)
Inflation × below 2%								−0.101	−0.035	−0.047	−0.038	−0.054
								(0.128)	(0.144)	(0.148)	(0.144)	(0.133)
Economic Activity (lag)									−1.773	−2.101	−3.541	−3.522
									(4.563)	(4.580)	(4.658)	(4.389)
Inflation below 2% (lag)									0.247	0.256	0.231	0.275
									(0.214)	(0.217)	(0.205)	(0.207)
Inflation (lag)									−12.693*	−13.742*	−16.785**	−17.648**
									(7.591)	(7.722)	(7.780)	(7.877)
Inflation (lag) × below 2% (lag)									10.343	12.962	18.435*	18.626*
									(9.068)	(9.717)	(10.032)	(10.127)
Fiscal Policy (lag)									−2.614	−1.998	−1.923	−2.011
									(3.417)	(3.366)	(3.226)	(3.265)
Financial & Monetary Cond. (lag)									−7.254	−6.989	−7.693	−9.205
									(5.800)	(5.983)	(5.991)	(6.087)
UMP (inter-PC)										3.663	2.444	3.957
										(4.552)	(4.403)	(3.728)
Bank Funding (inter-PC)										8.711	8.755	10.696*
										(6.222)	(5.844)	(6.067)
Economic Activity (inter-PC)										3.981	4.163	3.832
										(4.490)	(4.194)	(4.288)
Inflation (inter-PC)										−4.544	−4.259	−1.800
										(10.215)	(9.858)	(8.823)
Inflation (inter-PC) × below 2%										0.870	3.258	0.033
										(13.332)	(13.323)	(12.286)
Monetary Developments (inter-PC)										−5.314	−5.656	−5.085
										(4.932)	(5.046)	(5.213)
Bank Lending (inter-PC)										1.588	0.663	1.592
										(7.107)	(7.251)	(7.517)
Structural Reforms (inter-PC)										0.464	1.517	0.153
										(3.759)	(3.763)	(3.475)
Fiscal Discipline (inter-PC)										−3.672	−2.873	−2.838
										(7.891)	(7.502)	(7.285)
$R_{Eurostoxx\,50}$											−0.040	−0.025
											(0.030)	(0.029)
Δ VSTOXX											−0.017	−0.006
											(0.020)	(0.018)
Δ GER 2Y Yield											1.132*	1.162*
											(0.620)	(0.614)
Δ Real GDP Projection												−0.313*
												(0.175)
Δ Inflation Projection												−0.558
												(0.703)
Constant	−0.017	−0.000	−0.000	−0.000	−0.000	−0.016	−0.010	−0.038	−0.063	−0.061	−0.054	−0.054
	(0.069)	(0.069)	(0.070)	(0.070)	(0.070)	(0.068)	(0.065)	(0.108)	(0.108)	(0.108)	(0.101)	(0.102)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	0.024	0.022	-0.004	-0.005	-0.005	0.030	0.021	0.014	0.014	-0.015	0.011	0.018
Note:												*p<0.1; **p<0.05; ***p<0.01

Table IA.24: Detailed regression results 'risk premium' shock

This table presents detailed regression results, where in each column control variables are progressively added. The dependent variable is the 'risk premium' shock of Cieslak and Schrimpf (2019).. Coefficient estimates for the topic-specific measures of stance correspond to the regression model in equation (4). 'Economic activity', 'inflation', 'financial & monetary conditions' and 'fiscal policy' are scaled to unit variance. For 'rate guidance', 1 (-1) indicates a tighter (looser) policy stance. Reported standard errors are corrected for heteroscedasticity based on White (1980).

Δ Stance	Risk Premium (CS)											
Rate Guidance	0.091					0.121	0.121	0.091	0.079	0.079	0.093	0.128
	(0.091)					(0.102)	(0.105)	(0.114)	(0.123)	(0.130)	(0.132)	(0.137)
Economic Activity		−0.190***				−0.155**	−0.145*	−0.142*	−0.090	−0.086	−0.087	−0.072
		(0.069)				(0.074)	(0.076)	(0.077)	(0.090)	(0.087)	(0.087)	(0.089)
Inflation			−0.142*			−0.079	−0.081	−0.099	−0.157	−0.139	−0.132	−0.117
			(0.077)			(0.082)	(0.083)	(0.105)	(0.110)	(0.106)	(0.106)	(0.099)
Financial & Monetary Cond.				−0.189***		−0.194***	−0.191***	−0.190***	−0.191**	−0.203**	−0.196**	−0.199**
				(0.070)		(0.071)	(0.071)	(0.072)	(0.075)	(0.081)	(0.080)	(0.080)
Fiscal Policy					−0.107	−0.099	−0.101	−0.106	−0.127	−0.093	−0.099	−0.096
					(0.083)	(0.085)	(0.088)	(0.089)	(0.083)	(0.071)	(0.071)	(0.071)
UMP							−0.091	−0.106	−0.130	−0.096	−0.079	−0.081
							(0.310)	(0.307)	(0.299)	(0.256)	(0.251)	(0.252)
Press Release Shock							−0.057	−0.055	−0.071	−0.077	−0.075	−0.064
							(0.092)	(0.092)	(0.089)	(0.080)	(0.083)	(0.085)
Inflation below 2%								−0.115	0.107	0.123	0.094	0.041
								(0.143)	(0.227)	(0.228)	(0.234)	(0.239)
Inflation × below 2%								0.038	0.040	0.019	0.017	−0.0004
								(0.162)	(0.161)	(0.154)	(0.151)	(0.149)
Economic Activity (lag)									6.320	5.500	6.026	6.100
									(4.851)	(5.001)	(5.118)	(4.997)
Inflation below 2% (lag)									−0.307	−0.331	−0.332	−0.311
									(0.230)	(0.229)	(0.236)	(0.238)
Inflation (lag)									−10.531*	−11.158*	−10.491*	−11.053*
									(6.337)	(6.210)	(6.087)	(6.006)
Inflation (lag) × below 2% (lag)									−1.000	1.535	−0.544	−0.032
									(8.575)	(8.786)	(9.346)	(9.221)
Fiscal Policy (lag)									−2.838	−1.910	−1.930	−2.109
									(2.851)	(2.937)	(2.922)	(2.871)
Financial & Monetary Cond. (lag)									3.159	3.859	3.860	2.624
									(6.214)	(6.283)	(6.222)	(6.222)
UMP (inter-PC)										4.539	4.841	6.082
										(4.090)	(4.166)	(4.260)
Bank Funding (inter-PC)										−0.927	−1.146	−0.188
										(6.454)	(6.630)	(6.767)
Economic Activity (inter-PC)										7.328	7.317	7.250
										(7.109)	(6.851)	(6.778)
Inflation (inter-PC)										−3.778	−4.459	−2.785
										(7.684)	(7.660)	(7.363)
Inflation (inter-PC) × below 2%										5.334	4.899	2.067
										(11.861)	(11.892)	(11.648)
Monetary Developments (inter-PC)										−4.240	−4.004	−3.529
										(4.070)	(4.035)	(4.034)
Bank Lending (inter-PC)										−1.656	−1.443	−0.377
										(5.539)	(5.298)	(5.473)
Structural Reforms (inter-PC)										2.902	2.444	1.498
										(5.573)	(5.112)	(5.113)
Fiscal Discipline (inter-PC)										−4.023	−4.629	−3.820
										(7.088)	(7.097)	(7.168)
$R_{Eurostoxx\,50}$											0.027	0.038
											(0.026)	(0.029)
Δ VSTOXX											0.016	0.023
											(0.021)	(0.022)
Δ GER 2Y Yield											−0.264	−0.246
											(0.366)	(0.363)
Δ Real GDP Projection												−0.109
												(0.123)
Δ Inflation Projection												−0.577
												(0.461)
Constant	−0.004	0.000	−0.000	0.000	0.000	−0.005	−0.016	0.045	0.090	0.097	0.104	0.115
	(0.071)	(0.069)	(0.069)	(0.069)	(0.070)	(0.068)	(0.064)	(0.095)	(0.094)	(0.093)	(0.093)	(0.093)
Observations	203	203	203	203	203	203	203	203	203	203	203	203
Adjusted R^2	-0.003	0.031	0.015	0.031	0.006	0.067	0.061	0.055	0.065	0.045	0.037	0.034
Note:												*p<0.1; **p<0.05; ***p<0.01

Figure IA.1: Change in ECB's topic specific stance over the sample

This figure illustrates the time-variation of changes in the ECB's stance towards the topics 'rate guidance', 'inflation', 'economic activity', 'fiscal policy', and ' financial and monetary conditions'. We measure topic-specific stances from the introductory statements of the ECB's press conferences from 2002 to 2021. For 'rate guidance' we distinguish introductory statements with indications of tighter monetary policy (+1), no indications regarding future monetary policy (0), or monetary easing (−1), and plot the time-series of these indications. For the other topics, we measure the stance on topic i at time t as the ECB's topic-specific tone, defined as $\tau_{i,t} = 1 - N_{i,t}/T_{i,t}$, where $N_{i,t}$ denotes the number of negative words and $T_{i,t}$ is the total number of words associated with topic i at date t, and plot the stance changes compared to the previous press conference, i.e., $\Delta\tau_{i,t} = \tau_{i,t} - \tau_{i,t-1}$.

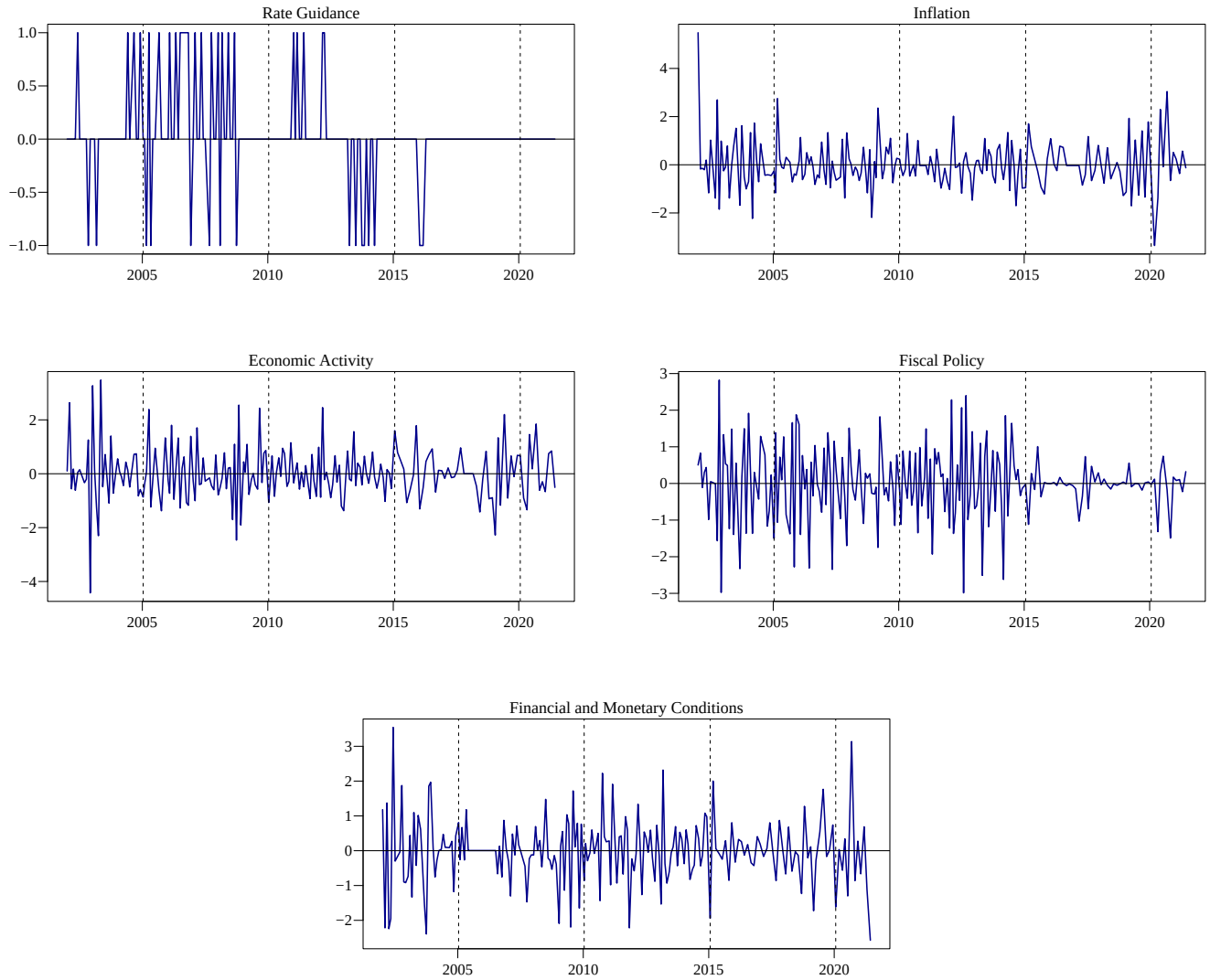


Figure IA.2: Daily time-series of the ES-DE-10Y spread

This figure plots the daily time-series of the 10-year yield spread between Spanish and German government bonds from January 1995 to June 2021. The vertical lines mark the beginning of our sample (January 2002) and the end (June 2021).

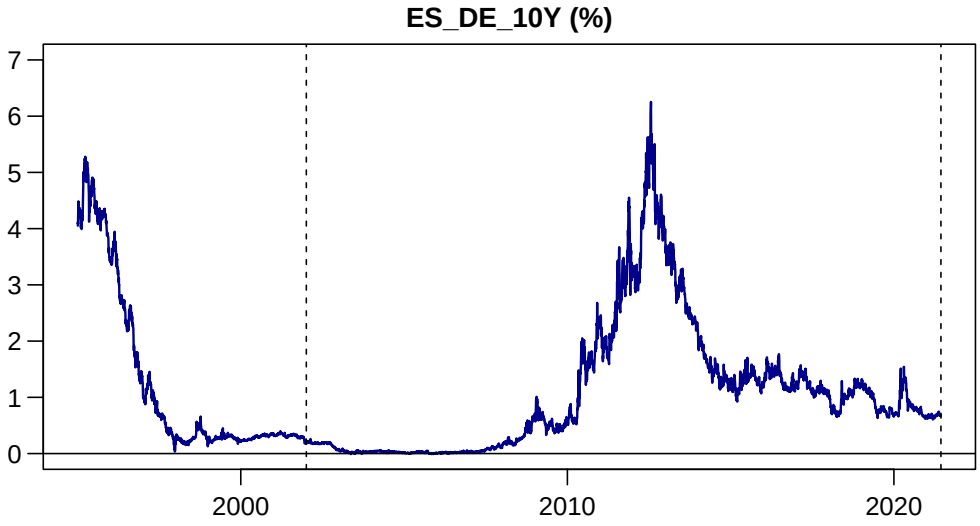


Figure IA.3: Rolling correlations of PR and PC responses

This figure summarizes how asset prices respond to ECB communication after meetings of the ECB Governing Council. First, the policy decisions are announced in a press release (PR) at 13:45 CET. Later, the post-announcement press conference (PC) starts at 14:30 CET. All market responses are based on high-frequency data available from the Euro Area Monetary Policy event-study Database (EA-MPD) established by Altavilla et al. (2019). We measure interest rate responses as changes in overnight index swap rates with maturities of three months (OIS 3M), two years (OIS 2Y), and ten years (OIS 10Y); the exchange rate response as the return of the Euro against the US Dollar (EURUSD); the equity market response as the return of the Eurostoxx 50 index (STOXX50); the response in sovereign spreads as the change in the spread between the Spanish and German ten-year government bond yields (ES-DE 10Y). The figure reports correlations estimated for six-year rolling window subsamples of the full sample period from January 2002 to June 2021