

Tillmann, Peter

**Working Paper**

## Financial Markets and Dissent in the ECB's Governing Council

MAGKS Joint Discussion Paper Series in Economics, No. 48-2020

**Provided in Cooperation with:**

Faculty of Business Administration and Economics, University of Marburg

*Suggested Citation:* Tillmann, Peter (2020) : Financial Markets and Dissent in the ECB's Governing Council, MAGKS Joint Discussion Paper Series in Economics, No. 48-2020, Philipps-University Marburg, School of Business and Economics, Marburg

This Version is available at:

<https://hdl.handle.net/10419/234853>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**MAGKS**



**Joint Discussion Paper  
Series in Economics**

by the Universities of  
**Aachen · Gießen · Göttingen  
Kassel · Marburg · Siegen**

ISSN 1867-3678

**No. 48-2020**

**Peter Tillmann**

**Financial Markets and Dissent in the ECB's Governing  
Council**

This paper can be downloaded from  
<http://www.uni-marburg.de/fb02/makro/forschung/magkspapers>

Coordination: Bernd Hayo • Philipps-University Marburg  
School of Business and Economics • Universitätsstraße 24, D-35032 Marburg  
Tel: +49-6421-2823091, Fax: +49-6421-2823088, e-mail: [hayo@wiwi.uni-marburg.de](mailto:hayo@wiwi.uni-marburg.de)

# Financial Markets and Dissent in the ECB's Governing Council<sup>\*</sup>

Peter Tillmann<sup>†</sup>

April 14, 2021

## Abstract

The decision-making process in the ECB's Governing Council remains opaque as the ECB, in contrast to many other central banks, does not publish the votes for or against a policy proposal. In this paper, we construct an index of dissent based on the ECB presidents' answers to journalists' questions during the press conference following each meeting. This narrative account of dissent suggests that dissenting votes are cast frequently. We show that the non-forecastable component of dissent weakens the response of long-term interest rates to policy surprises and thus affects the monetary transmission mechanism. The yield response is significantly stronger under unanimity compared to dissent. This finding is robust to several alternative specifications.

**Keywords:** event studies, monetary policy transmission, monetary policy committee, disagreement, term structure

**JEL classification:** E42, E43, E58

---

<sup>\*</sup>I am grateful to the editor of this journal, Florin Bilbiie, an Associate Editor and two anonymous reviewers for very helpful feedback on the original draft of the paper. I thank Hamza Bennani, David Finck, Paul Hubert, Klodiana Istrefi, David-Jan Jansen, Peter Winker and seminar participants in Giessen for comments. Niklas Benner, Justin Berndt and Anisa Tiza Mimun helped preparing the data set. Wirginia Doryń and Moritz Grebe kindly shared their data. Funding from *Deutsche Forschungsgemeinschaft* is gratefully acknowledged.

<sup>†</sup>Justus-Liebig-University Giessen, Department of Economics, 35394 Giessen, Germany, Email: peter.tillmann@wirtschaft.uni-giessen.de.

# 1 INTRODUCTION

The outcomes of central bank meetings drive financial markets. Market participants closely monitor decisions to change interest rates, the amount of asset purchases or the extent of forward guidance. In order to better understand current policy and anticipate future policy decisions, observers pay attention to every detail of the decision. They carefully parse the press release and hang on every word during post-meeting press conferences. Communicating with market participants became even more important when short-term interest rates hit the effective lower bound and central banks adopted unconventional policies.<sup>1</sup> This also implies that they pay attention to whether the policy decision was made unanimously or whether there was dissent in the committee.

Several central banks, most notably the U.S. Federal Reserve and the Bank of England, publish the voting results on the Federal Open Market Committee (FOMC) or the Monetary Policy Committee (MPC), respectively. The literature suggests that these voting outcomes, and dissent in particular, contain important information for future interest rate policy (Gerlach-Kristen, 2004; Gerlach-Kristen and Meade, 2010; Horvath et al., 2012; Riboni and Ruge-Murcia, 2014) or asset purchases (Neuenkirch, 2013). The European Central Bank (ECB), in contrast, remains opaque about the voting procedure in the Governing Council (GovC), i.e. the policy making body. Neither the post-meeting press release, nor the brief accounts of the meetings published since 2015 contain the number of votes for or against a policy proposal. Due to this lack of information, there is no evidence yet on the effects of dissent in the GovC.

The key research question of this paper is to analyze whether the vote in the GovC affects the strength of the transmission of monetary policy surprises to long-term interest rates. For that purpose, we introduce a new index of dissent for the ECB's GovC and show that dissent does indeed reduce the effectiveness of policy. As the ECB does not provide voting outcomes, we infer the extent of dissent from the ECB presidents' answers to questions from journalists during the regular press conferences. Ehrmann and Fratzscher (2009) show that these press conferences do indeed reveal information that is not contained in the press release on the monetary policy decision. We take a step beyond the work of

---

<sup>1</sup>See Coenen et al. (2017) for a survey paper on communicating unconventional policy.

Ehrmann and Fratzscher (2009) and specifically analyze the information that is given on the vote in the GovC. Typically, journalists ask the president whether a given decision was unanimous or not. The following example from July 06 2006 is a particularly clear case:

Question: "Was the decision unanimous today?"

Trichet: "Yes, very much."

However, often the answers of the president to the same question are less straightforward. We study each press conference between December 2004 and December 2018 and manually classify the presidents' answers. The key contribution of this paper is to build an index of dissent. The index has an entry of +1 if the ECB president hints at dissent in the meeting. A unanimous vote is associated with an entry of 0. By constructing this index of dissent, the paper is the first to be able to shed light on the role of dissent in the transmission of ECB policy.<sup>2</sup> The ECB is known for its strong emphasis on consensus, which is reflected in the fact that dissent is less frequent than in the FOMC or the MPC. Nevertheless, we find evidence of dissent in 28% of all meetings, for which we could collect information on the vote.

Market participants can forecast dissent based on information that is publicly available before the start of Q&A session after the press conference. Based on an estimated probit model, we show that dissent is more likely in meetings during which a new set of macroeconomic projections is released. Reporting in the *Financial Times* about tensions in the GovC also contains information about dissent in the upcoming meeting. For the remainder of the paper, we use the non-forecastable component of dissent, i.e. the part of the dissent index that is unexplained by the probit model.

As a second key contribution, we use an event study regression to estimate the response of Overnight Index Swap (OIS) rates to monetary policy surprises. The surprise is the change in German two-year rates in a narrow window that covers the duration of the press conference. We allow policy surprises to interact with dissent. Our key finding suggests that a monetary policy shock has a smaller effect on long-term interest rates if it emerges from a meeting with dissent. Hence,

---

<sup>2</sup>Since we cannot uncover individual dissenting votes, we cannot estimate structural models of committee voting as in Hansen et al. (2014) and Hansen and McMahon (2016).

dissent weakens the transmission of monetary policy impulses. Consider five-year OIS rates as an example: under unanimity, the estimated marginal effect of a policy surprise is 0.91. With dissent, in contrast, the effect is 0.69. This difference is significantly different from zero with a  $p$ -value of 0.01. In our baseline model, dissent weakens the transmission of policy for all maturities considered, i.e. for OIS rates from three-year to ten-year maturities.

The results are consistent with the view that dissent affects the way market participants anticipate future monetary policy. The smaller response of interest rate under dissent suggests that markets believe the policy tightening to be less persistent than under unanimity. Alternatively, internal opposition could delay the implementation of a policy program. As a result, the market response today should be smaller.<sup>3</sup> Madeira and Madeira (2019), the paper closest to this one, shows that equity prices increase if a policy decision of the FOMC is unanimous and decrease if dissenting votes are cast. They do not, however, study the effect of monetary policy conditional on dissent.

The importance of vote remains unaffected if dissent occurs in subsequent meetings. Hence, serial dissent reduces the effectiveness of policy transmission in the same way as the first occurrence of dissent after a unanimous meeting. Furthermore, the results are robust with respect to the size of the policy surprise and the hawkish or uncertain tone of the Introductory Statement.

Estimating the model over a rolling-window reveals that the significance of dissent disappears since mid-2014. At this time, the ECB was preparing markets for the adoption of a large asset purchase program, which the GovC finally adopted in January 2015. We interpret the non-significant role of the vote since then as a sign of the credibility of policy: dissent in the GovC became less important for the assessment of the future policy path.

The remainder of the paper is structured as follows: section two introduces the new dissent index for the GovC. Section three estimates a probit model to show that dissent is partly forecastable. The main empirical analysis on the transmission of policy surprises is reported in section four, while section five discusses the re-

---

<sup>3</sup>The results are consistent with Tillmann and Walter (2020). In this paper, we show that disagreement between the ECB and the Bundesbank president, which we derive from a textual analysis of speeches, weakens the transmission of policy. Our findings are also in line with Detmers (2016). She studies the dispersion of forecasts of FOMC members and finds that dispersion reduces the information content of forward guidance.

sults from alternative specifications. Section six concludes. The online appendix contains a full documentation of the index construction as well as additional results.

## 2 An index of dissent in the Governing Council

The communication of the ECB on meeting days of the GovC consists of two main elements. The first element is the press release published at 13:45 CET, in which the ECB outlines the latest policy decision. Even though this release contains a few sentences about changes in interest rate or asset purchases, it does not offer information about the background of the decision or the future policy steps.

This is followed by the second element, the press conference, which begins at 14:30 CET. At the beginning of the press conference, the ECB president reads out the Introductory Statement, which summarizes the Council's assessment of the economic situation and the policy change. Thenceforth, the ECB president as well as the vice president answer questions from journalists.

Importantly, neither the press release nor the Introductory Statement contains information about the voting outcome in the council. In contrast to the Fed, the Bank of England, the Swedish Riksbank and other central banks, the ECB does not publish the votes for or against the policy proposal, nor does it publish detailed transcripts of the meeting at a later stage.<sup>4</sup>

The only hint to the degree of unanimity in the GovC is typically given during the press conference of the ECB president. Typically, journalists ask whether or not the decision was unanimous, which the president takes as an opportunity to briefly comment on the degree of consensus in the council. We use the answers to these questions to construct a narrative indicator of dissent in the Governing Council.<sup>5</sup> As it will become clear below, the information given during the press conference allows us to infer whether there was dissent or not. It does not allow

---

<sup>4</sup>Since 2015, the ECB does provide the Monetary Policy Accounts, a brief summary of the discussion in the council. However, these accounts also do not contain numerical information about the voting outcome, but only carefully chosen words summarizing the debate, e.g. "members widely shared the assessment provided by Mr Praet in his introduction ..." or "There was broad agreement among members that the incoming information indicated ongoing progress ...".

<sup>5</sup>Apel et al. (2019) use a deep learning model to quantify the degree of agreement in the FOMC based on the transcripts. Since the transcripts are released with a lag of five years, the authors cannot look at the interaction between policy surprises and agreement, though.

us to quantify the number of dissenting votes, nor is it informative about the direction of the dissent, i.e. whether the dissenting vote was on the hawkish or dovish side, nor do we know the intensity of the dissent. Since the ECB remains opaque about its meetings, we do not know who the dissenter is or who the dissenters are.

The indicator is constructed as follows. The ECB provides the full transcripts of the press conferences, including all questions and answers, on its website. We download the transcripts of all Q&A sessions after the press conference between December 2004 and December 2018. We do not consider the meetings on August 4 2005 and August 2 2007, which were not followed by a press conference. We also do not consider the teleconference on October 8 2008, which was not followed by a press conference either. We manually identify the text passages that contain information about the unanimity of the council's decision.

The aim is to associate all meetings with evidence of dissent with a +1. Meetings for which we do not find evidence on the vote are dropped from the analysis. All other meetings are classified with a 0. This gives us an index of dissent with entries for each meeting day  $m$ ,  $Dis_m$ , which we will use in our empirical analysis below:

$$Dis_m = \begin{cases} 1 & \text{if president hints at dissent in meeting } m \\ 0 & \text{otherwise.} \end{cases}$$

Some help with interpreting the coded language of the president is offered by president Trichet on April 07, 2011:

"We can decide by majority decision, we can decide by consensus and we can decide unanimously. These are the three categories."

In order to construct our index based on this classification, we search the transcripts for the words "majority", "unanimity" and "consensus" as well as related forms such as "unanimous", "consensual" or others. We cross-check the context in order to avoid that the ECB president refers to other committees and fora such as the European Council or the G20. We also check that the terms are related to the monetary policy decision, not the commitment to the mandate or other aspects of central banking. Following the remark from April 07, 2011, we interpret a decision made by consensus or majority rather than unanimity as a case of dissent in the council.



Often, the classification of the ECB president's answers is straightforward. Take again the example from July 06, 2006 mentioned in the introduction:

Question: "Was the decision unanimous today?"

Trichet: "Yes, very much."

We associate this and all other meetings with straight answers to the same question with a 0 entry in the dissent index.

In the following, we give three examples of Governing Council meetings which we associate with a +1 entry in the  $Dis_m$  index. The first example is from August 03, 2006, when president Trichet answered:

"First of all, the decision in favor of a 25 basis point increase today was overwhelmingly supported by the Governing Council."

We interpret the adverb "overwhelmingly" as evidence of dissent, hence allocate a +1 to this meeting. In the Q&A session following the meeting on June 05, 2008, the ECB president uses the word "consensus", hence we also associate a +1 to this meeting:

"We had no unanimous views on the analysis and on what would be the best decision to take. As always, we exchanged all views, we compared our positions and finally we decided, by consensus ..."

The third example is the answer of president Draghi on September 06, 2012, where he is explicit about the number of dissenting views and arguably suggests that the dissenter is Jens Weidmann, president of the Bundesbank.

Question: "My question regards the vote today. Was it unanimous and, if not, what does it mean?"

Draghi: "Well, it was not unanimous. There was one dissenting view. We do not disclose the details of our work. It is up to you to guess."

According to the scheme used before, this meeting is also classified as a +1 in the  $Dis_m$  index.

Sometimes, the president not just points to a unanimous vote, but explicitly stresses the importance of unanimity. Consider the answer given by president Draghi on July 04, 2013:

"What the Governing Council did today was to inject a downward bias in interest rates for the foreseeable future linked to its assessment of these three sets of variables. The decision was unanimous, which is also quite important."

Draghi underlines the importance of the GovC being unanimous on the policy decision. This statement is particularly important as the ECB in the July 2013 meeting adopted forward guidance when the Governing Council said it "expected interest rates to remain low for an extended period of time". The GovC clearly understood the importance of showing a united front in order to provide effective guidance.<sup>6</sup>

The full set of meetings and the classification into unanimity and dissent, whenever information on the vote is available, is provided in the online appendix. Since 2015, the ECB publishes the Monetary Policy Accounts four weeks after each meeting, which give a detailed summary of the discussion in the GovC. These accounts do not, however, contain information on the formal voting process. Nevertheless, the "Monetary policy decisions and communication" section of the accounts characterizes the opinions of members using a set of keywords. We use this section to cross-check the dissent index constructed from the press conferences. Due to the publication lag, the accounts are no alternative to the information from the press conference. We manually classify the meeting into unanimity when a description such as "unanimous", "all members", "broad agreement" and "wide agreement" is used. A meeting is classified as dissent when the accounts refer to a "large majority" or a "general agreement". If a meeting is classified as dissent or unanimity based on our reading of the accounts, while the press conference does not contain information in this regard, we do not include the meeting in the dissent index. The online appendix offers the full documentation of this classification.

The resulting series of the  $Dis_m$  index is presented as shaded areas in Figure (1). We find dissent in 35 of our 123 meetings, which gives a share of dissent of 0.28. It does not matter for the empirical analysis conducted in the next section whether

---

<sup>6</sup>Market participants noticed the emphasis on unanimity and understood that even President Weidmann agreed: "The ECB chief also said there had been an "extensive discussion" about a possible interest rate cut and that the decision to offer its "unprecedented" forward guidance had been unanimous – a statement that means Jens Weidmann, president of the hawkish Bundesbank, did not dissent from the view." (*Financial Times*, July 04, 2013).

there was indeed a formal vote in the GovC or not. Without a formal vote, the index summarizes the perceived extent of opposition in the committee.

It is interesting to compare the dissent share with the case of the FOMC, which is very transparent on its voting outcome. In particular, starting in early 2002 the press release issued immediately after the meeting contains the names of the dissenting members. Using the updated data set from Thornton and Wheelock (2014), we find formal dissent in 81 FOMC meetings out of 202 meetings between February 1994 and September 2018. This gives a share of dissent of 0.40, which is markedly higher than for the ECB's GovC.<sup>7</sup> Madeira and Madeira (2019) find dissent in 59 meetings out of 131 meeting in total between 2002 and 2018. As Meade (2005) shows, the extent of dissent voiced in the meetings and reported in the transcripts is even larger than the number of formal dissenting votes.<sup>8</sup> Riboni and Ruge-Murcia (2014) calculate frequencies of dissent (at least one dissenter) of 0.63 for the Monetary Policy Committee at the Bank of England and of 0.38 for the policy committee of the Swedish Riksbank. Ruge-Murcia and Riboni (2017) show that between 2011 and 2015, the probability of at least one dissenting vote at the Bank of Israel is 0.31.

The relatively low number of ECB meetings with dissent reflects the strong willingness of the president to achieve consensus in the ECB's GovC. In 2012, President Draghi told journalists:

"Given the peculiar nature of the ECB, one of my objectives is that we have as much consensus as possible. We have to do the right things, and we have to do them together."<sup>9</sup>

It is this notion of consensus that makes formal dissent even more outstanding and informative for market participants.

### 3 Explaining dissent

Dissent in monetary policy committees potentially reflects a number of determinants. In this section, we estimate the driving forces of dissent in the GovC. We

---

<sup>7</sup>We can only compare the frequency of meetings with dissent. We cannot, however, look at the number of dissenting votes relative to the total number of votes cast.

<sup>8</sup>The relatively small number of meetings with dissent is in line with Blinder's (2007) characterization of the GovC as a "genuinely collegial" committee.

<sup>9</sup>See <https://www.ecb.europa.eu/press/key/date/2012/html/sp120224.en.html>.

use the results of this estimate to decompose the dissent index into a component that is explained by variables available before the meeting and a non-forecastable component. This enables us to run the main regressions of the paper based on the surprise component of dissent.<sup>10</sup>

### A. A probit model

Due to the binary nature of the dissent index, we estimate a probit model. Let  $Dis_m^*$  be a latent continuous variable reflecting the true extent of dissent at meeting  $m$ . This variable is linearly related to a vector  $X_m$ , which contains explanatory variables available to the public before the ECB's press conference

$$Dis_m^* = \beta X_m + \varepsilon_m, \quad (1)$$

where  $\beta$  is a vector of coefficients and  $\varepsilon_m$  is an error term. The binary dissent index introduced in the previous chapter is determined by

$$Dis_m = \begin{cases} 1 & \text{if } Dis_m^* > 0 \\ 0 & \text{if } Dis_m^* \leq 0. \end{cases} \quad (2)$$

Then,

$$\Pr [Dis_m = 1 | \beta X_m] = \Phi (\beta X_m), \quad (3)$$

where  $\Phi$  is the cumulative distribution function of  $\varepsilon_m$  based on the standard normal distribution. Hence,  $\Pr [Dis_m = 1 | \beta X_m]$  are the fitted values, the part of the observable dissent that can be explained by the variables in  $X_m$ . Therefore, the unexplained part of the dissent index is

$$\widehat{Dis}_m \equiv Dis_m - \Pr [Dis_m = 1 | \beta X_m]. \quad (4)$$

In the main part of the paper, we use  $\widehat{Dis}_m$  to study the impact of dissent on the market response to policy shocks.<sup>11</sup>

---

<sup>10</sup>Horvath et al. (2014) study the determinants of dissenting votes for the Fed, the Bank of England, the Riksbank, the Czech National Bank and the National Bank of Hungary. All of these central bank publish attributable voting results. There is no evidence yet on the driving forces of dissent in the ECB's GovC. Firrell and Reinold (2020) estimate a probit model on individual votes of members of the Bank of England's MPC.

<sup>11</sup>See Brandao-Marques et al. (2020) and Nier (2020) for other studies using the unexplained

The vector  $X_m$  contains variables available to the public before the post-meeting press conference. We include a dummy variable that is one if the quarterly Macroeconomic Projections (*staff projections*) are released on the meeting day and zero otherwise. If important decisions are timed in order to coincide with a new set of projections, we expect dissent to be higher on these days.

Following many other central banks, the ECB formally adopted forward guidance, i.e. the provision of information about the future policy path, in July 2013. The purpose of forward guidance at the zero lower bound of nominal interest rates is to implement additional monetary stimulus through a decline in the public's expectations of future interest rates. We include a dummy variable (*forward guidance*) which is one from July 2013 onwards and zero before.<sup>12</sup> Another dummy variable (*rotation*) is included which captures the introduction of the rotation scheme of votes in the GovC in January 2015.<sup>13</sup> A rotation scheme of votes should also have an effect on the frequency and the nature of dissent. We include a third step-dummy (*Draghi*) which distinguishes the presidency of Jean-Claude Trichet from the presidency of Mario Draghi.

It could be argued that dissent in the upcoming meeting is subject to press reporting. In fact, the media often reports about dissenting views among GovC members in the inter-meeting period, such that market participants can forecast the occurrence of dissent based on news reports. We count the number of newspaper articles in the *The Financial Times*, which contain the words "ECB", "Governing Council" and one of the following words: "dissent", "conflict", "resistance", "division" and "split". We read each article and include only those which explicitly refer to dissent in the upcoming meeting, not the past meeting. From this set of articles we construct an index (*FT reporting*) that simply counts the number of articles that appeared in the inter-meeting period.<sup>14</sup>

The Introductory Statement read by the ECB president at the beginning of the press conference also contains information about the likelihood of dissent in the meeting. Hence, ECB watchers could obtain information from the tone of the Introductory Statement before the president explicitly hints towards unanimity

---

part of a binary policy indicator.

<sup>12</sup>See Hubert and Labondance (2018) and Ehrmann et al. (2019) for an analysis of ECB forward guidance and its effects on the term structure and the uncertainty of the public, respectively.

<sup>13</sup>Ehrmann et al. (2020) study the nexus between the rotation of voting rights and the behavior of FOCM members.

<sup>14</sup>The online appendix provides a figure with the number of *Financial Times* articles.

or dissent in response to journalists' questions. We construct three indicators of the semantic tone. This first, *IS dovishness*, expresses the number of dovish words relative to the sum of neutral and hawkish words. The textual data is provided by Picault and Renault (2017).<sup>15</sup> A second index, *IS economic tone*, is calculated as the ratio of words with a negative semantic tone to the sum of the words with a neutral or a positive tone. This data is also taken from Picault and Renault (2017). The third index, *IS uncertainty*, is the ratio of words expressing uncertainty to the total number of words. This data is taken from Baranowskia et al. (2021).<sup>16</sup> As a third group of variables, we include the inter-quartile ranges of the next-year forecasts of inflation, GDP growth and the unemployment rate from the last available Survey of Professional Forecasters. A wider dispersion of forecasts could be a possible determinant of dissent among policymakers. In addition, we include the mean forecast of inflation, growth and unemployment for the coming year.

## B. Results

The resulting parameter estimates are shown in Table (1). We find that some explanatory variables do indeed forecast dissent. Meetings in which a new set of staff projections is released, exhibit a significantly higher probability of dissent. It appears plausible that important decisions are made based on new projections. These important decisions are more likely to provoke dissent. After the adoption of forward guidance, the probability of dissent falls. The estimated coefficient, however, is significant only for the first specification. Likewise, dissent appears to be more frequent under President Draghi than under President Trichet. Again, this effect is significant only in the first column. It should be stressed that the Draghi dummy (equal to one since 2011) and the forward guidance dummy (equal to one since 2013) overlap. If we drop the dummy for the president, the forward guidance effect becomes significantly negative even in the full model.

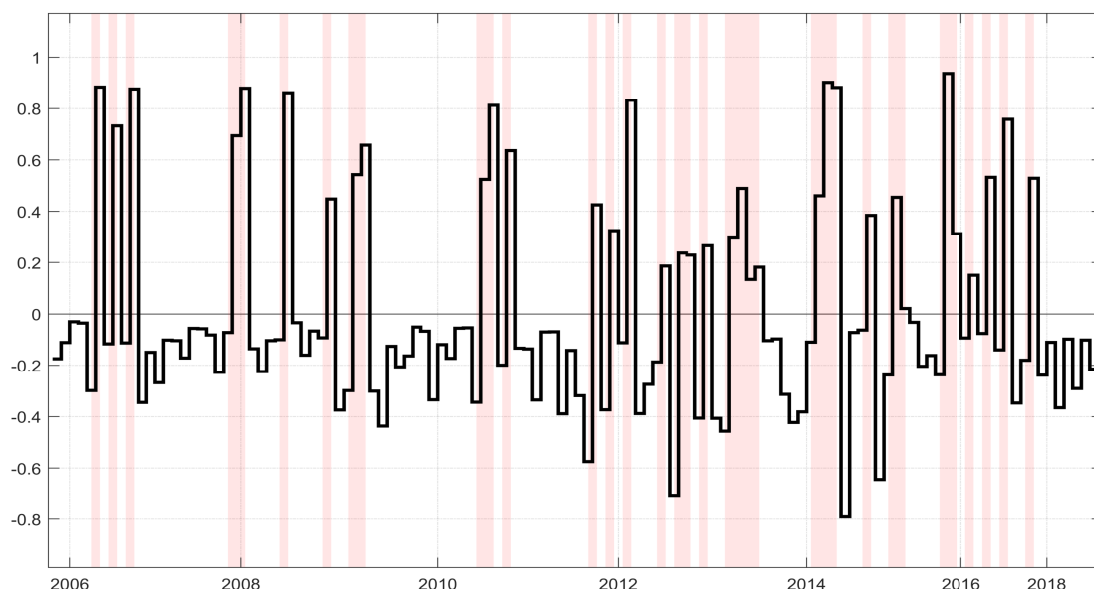
Across all three estimated model specifications, the extent of reporting in the *Financial Times* about a division in the GovC enters with a significantly positive coefficient. Hence, market participants could forecast dissent based on newspaper

---

<sup>15</sup>The data is available at <http://www.cbcomindex.com/>.

<sup>16</sup>Specifications with alternative measures of uncertainty derived from newspaper reporting yield very similar results.

Figure 1: Narrative index of dissent in the ECB's Governing Council



*Notes:* The graph shows the narrative index of dissent in the ECB's Governing Council,  $Dis_m$ , as a shaded area in red for each meeting day that includes a press conference. The non-forecastable component of dissent,  $\widehat{Dis}_m$ , which we obtain from the estimated probit model, is shown as a black line. In 2015, the frequency of meetings changed from monthly to a six-week cycle.

reporting. The variables stemming from the SPF, both the level and the dispersion of the forecasts, as well as the tone of the Introductory Statement do not have forecasting power for dissent. The pseudo- $R^2$  indicates that the full model, which we use throughout the remainder of the paper, explains about one quarter of the variation in the dissent index.

Figure (1) shows the non-forecastable component of dissent,  $\widehat{Dis}_m$ , as a black line. A positive (negative)  $\widehat{Dis}_m$  indicates that the probit model underestimates (overestimates) the probability of dissent. We clearly see that for some meetings dissent was more predictable than for other meetings, i.e. the unexpected component is smaller. In the following, we use the unexpected component of the likelihood of dissent to show that dissent weakens the market responses to monetary policy surprises. We will show the responses for two realizations of  $\widehat{Dis}_m$ . A value of  $\widehat{Dis}_m = -0.25$  corresponds to unexpected unanimity and  $\widehat{Dis}_m = 0.50$  corresponds to unexpected dissent.

Table 1: The determinants of dissent

|                                  | (I)                  | (II)                | (III)               |
|----------------------------------|----------------------|---------------------|---------------------|
| staff projections                | 0.653<br>[0.229***]  | 0.636<br>[0.232***] | 0.641<br>[0.245***] |
| forward guidance                 | -0.697<br>[0.468***] | -1.188<br>[0.823]   | -1.393<br>[1.023]   |
| rotation                         | -0.211<br>[0.456]    | 0.533<br>[0.787]    | 0.968<br>[0.936]    |
| Draghi                           | 0.816<br>[0.314***]  | 0.505<br>[0.406]    | -0.266<br>[0.482]   |
| FT reporting                     | 0.489<br>[0.133***]  | 0.300<br>[0.160*]   | 0.324<br>[0.171*]   |
| IS dovishness                    |                      | 0.391<br>[0.323]    | 0.449<br>[0.365]    |
| IS economic tone                 |                      | 0.419<br>[0.343]    | 0.368<br>[0.513]    |
| IS uncertainty                   |                      | 1.113<br>[30.47]    | 5.007<br>[37.35]    |
| SPF inflation IQR                |                      |                     | -3.560<br>[2.155*]  |
| SPF unemp IQR                    |                      |                     | 0.483<br>1.909      |
| SPF GDP IQR                      |                      |                     | -1.594<br>[1.995]   |
| SPF inflation mean               |                      |                     | 0.310<br>[0.656]    |
| SPF GDP mean                     |                      |                     | -1.119<br>[0.882]   |
| SPF unemp mean                   |                      |                     | 0.130<br>[0.159]    |
| # obs.                           | 123                  | 123                 | 123                 |
| pseudo- $R^2$                    | 0.171                | 0.206               | 0.248               |
| LR test: $p$ -value ( $\chi^2$ ) | <0.001               | 0.001               | 0.005               |

*Notes:* The table reports the estimated coefficients from alternative probit models. Newey-West standard errors are shown in parenthesis. A significance level of 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*.



## 4 Dissent and the effectiveness of policy

In this section, we use an event study to shed light on the consequences of dissent for the market response to monetary policy surprises.

### A. Model

We estimate a model which relates the change in Overnight Index Swap (OIS) rates of maturity  $n$  on meeting day  $m$ ,  $\Delta y_m^n$ , to a monetary policy surprise,  $e_m^{MP}$ . The change is expressed as the difference between the meeting day and the day before. The linear model is

$$\Delta y_m^n = \alpha + \beta e_m^{MP} + u_m. \quad (5)$$

We expect the slope coefficient to be positive, i.e.  $\beta > 0$ . Hence, a policy tightening raises OIS rates of longer maturities. A residual  $u_m$  captures the unexplained part of the dependent variable. Using OIS rates is particularly attractive for our purpose since these rates most closely reflect the monetary conditions in the euro area, but are not affected by flight-to-safety premia or risk premia since there is no underlying bond that could be used as a store of wealth. An increase in OIS rates is consistent with the notion of an expected tightening of the policy path. We use OIS rates for maturities of  $n = 3, 4, 5, \dots, 10$  years.

Using the non-forecastable component of the dissent index introduced in the previous section,  $\widehat{Dis}_m$ , we generalize the model to allow for non-linear effects of policy surprises

$$\Delta y_m^{(n)} = \alpha + \beta_0 e_m^{MP} + \beta_1 \left( \widehat{Dis}_m \times e_m^{MP} \right) + \beta_2 \widehat{Dis}_m + u_m, \quad (6)$$

such that

$$\frac{\partial \Delta y_m^{(n)}}{\partial e_m^{MP}} = \beta_0 + \beta_1 \widehat{Dis}_m. \quad (7)$$

The key parameter of interest is  $\beta_1$ . If dissent weakens the effectiveness of policy, we expect  $\beta_1 < 0$ .

To measure the monetary policy surprise,  $e_m^{MP}$ , we draw the data from the EA-MPD database of Altavilla et al. (2019). The authors provide intraday data for three time windows on ECB meeting days: the first window is the release win-

dow (13:25 - 14:15 CET), the second is the press conference window (14:15 - 15:50 CET) and the third, referred to as monetary policy window, encompasses both the release and the conference window (13:25 - 15:50 CET). Our preferred surprise series is the change in German two-year rates during the conference window on meeting day  $m$ .<sup>17</sup> At least since the financial crisis, most of the unconventional policy measures have been announced during the conference window, not the release window. As a result, the surprise is much more volatile during the conference window. In addition, the ECB president uses the press conference to hint at the future course of policy. We use the conference window since the interpretation of the information revealed during the press conference should be most sensitive to the vote in the GovC. Nevertheless, the online appendix also shows results for the surprise during the release window. The series of policy surprises are shown in Figure (8).

Recent studies such as Altavilla et al. (2019) or Leombroni et al. (2020) obtain series of policy surprises from a factor model applied to a set of short- and long-term interest rates. We do not use their series here. This is because these surprises are, by construction, based on information from longer maturities and are obtained from linear models. The point of this paper is to show that the response of long-term rates is non-linear and depends on the non-forecastable part of the vote in the council.<sup>18</sup>

## B. Results

Table (2) reports the estimated coefficient from our baseline model. For each maturity, the key coefficient  $\beta_1$  is estimated to be significantly negative. To compare the results with the extended specifications to be introduced below, we believe a graphical illustration of the effect is superior to a tabular reporting of the estimated coefficients. Therefore, Figure (2) shows the marginal effect of a monetary policy surprise on the OIS rates of different maturities under both unanimity and dissent.

---

<sup>17</sup>The choice of two-year rate changes as a policy surprise is in line with Hanson and Stein (2015).

<sup>18</sup>The online appendix offers an analysis of dissent in the FOMC based on the same model we use to investigate dissent in the GovC.

Table 2: Response of OIS rates to policy surprises

|          | $e_m^{MP}$          | $\widehat{Dis}_m \times e_m^{MP}$ | $\widehat{Dis}_m$  | # obs. | $R^2$ |
|----------|---------------------|-----------------------------------|--------------------|--------|-------|
| $n = 3$  | 1.004<br>[0.103***] | -0.777<br>[0.143***]              | 0.005<br>[0.008]   | 122    | 0.55  |
| $n = 4$  | 0.910<br>[0.078***] | -0.279<br>[0.111**]               | 0.022<br>[0.009**] | 121    | 0.51  |
| $n = 5$  | 0.834<br>[0.075***] | -0.288<br>[0.113**]               | 0.017<br>[0.009*]  | 121    | 0.44  |
| $n = 6$  | 0.745<br>[0.070***] | -0.291<br>[0.117**]               | 0.015<br>[0.009*]  | 121    | 0.35  |
| $n = 7$  | 0.690<br>[0.080***] | -0.336<br>[0.122***]              | 0.012<br>[0.010]   | 121    | 0.27  |
| $n = 8$  | 0.611<br>[0.073***] | -0.294<br>[0.129**]               | 0.015<br>[0.009]   | 121    | 0.26  |
| $n = 9$  | 0.525<br>[0.072***] | -0.249<br>[0.138*]                | 0.015<br>[0.010]   | 121    | 0.18  |
| $n = 10$ | 0.510<br>[0.072***] | -0.306<br>[0.141**]               | 0.012<br>[0.010]   | 121    | 0.16  |

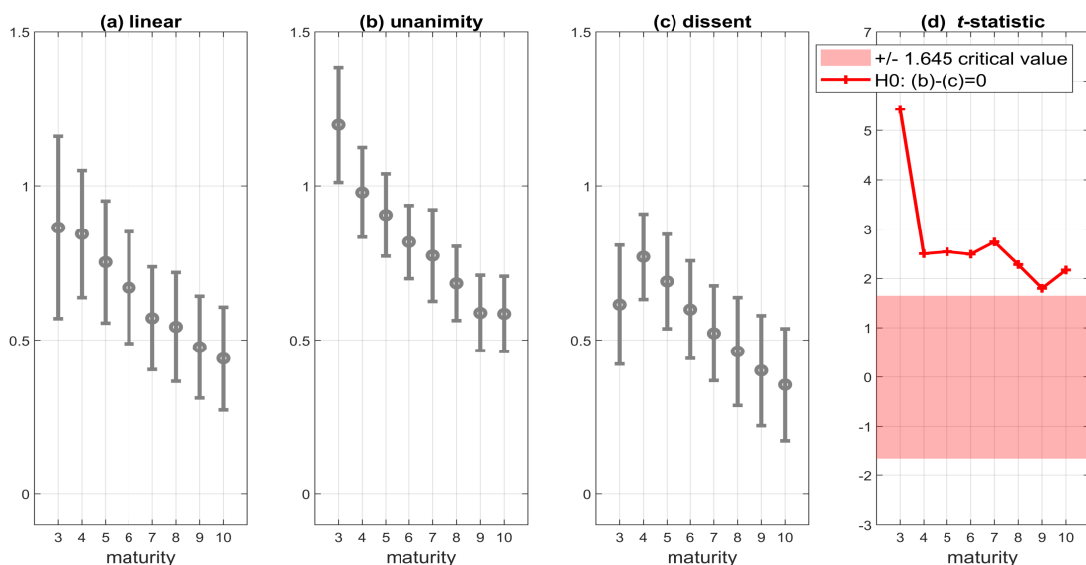
*Notes:* The dependent variable is the change of OIS rates of maturity  $n$  between the meeting day of the Governing Council and the day before. Our series of policy surprises captures the response of German two-year rates in the press conference window on meeting days. The model also includes a constant. The non-forecastable component of the index of dissent is explained in the text. Newey-West standard errors in parenthesis. A significance level of 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*.

In panel (a), we plot the slope coefficient from the linear model, i.e. the regression without an interaction term. Clearly, the response of OIS rates falls in the maturity  $n$ . Panels (b) and (c), in contrast, show the responses under unanimity ( $\widehat{Dis}_m = -0.25$ ) and dissent ( $\widehat{Dis}_m = 0.50$ ). Panel (d) reports the series of  $t$ -statistics for the null hypothesis of equal responses under unanimity and dissent. The Newey-West standard errors for this exercise are calculated using the delta method.<sup>19</sup>

The core result is that policy surprises have a significantly stronger impact on all

<sup>19</sup>The non-forecastable component of dissent is not observable but estimated. It is itself surrounded by uncertainty. As a result of this generated regressors problem, the standard errors of the coefficients of our regression model might be too small. The online appendix offers a bootstrap approach to sample alternative series for  $\widehat{Dis}_m$ . For each alternative series we estimate the impact of a policy surprise and its interaction with dissent. This gives us a distribution of coefficients that not only reflects estimation uncertainty stemming from the second stage, but also the sampling uncertainty from the probit-stage.

Figure 2: Responses implied by baseline model



*Notes:* The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the conference window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panel (a) depicts the effect obtained from the linear model. Panels (b) and (c) show the effect for  $\widehat{Dis}_m = -0.25$  (unanimity) and  $\widehat{Dis}_m = 0.50$  (dissent). In panel (d), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

maturities when the vote in the Governing Council was unanimous compared to a meeting with dissent. Consider five-year OIS rates as an example: under unanimity, the estimated marginal effect is 0.91. With dissent, in contrast, the effect is 0.69. This difference is significantly different from zero with a  $p$ -value of 0.01. Thus, dissent weakens the transmission of monetary policy to financial markets.<sup>20</sup>

These results are consistent with the view that dissent affects the perception of the duration of policy. Let us assume that the Expectations Hypothesis of the term structure of interest rates holds. Furthermore, it is not implausible to assume that dissent makes a reversal of the policy measure more likely. If a policy is unwound

<sup>20</sup>The appendix shows that the difference between unanimity and dissent is weaker, if we use the monetary policy surprise from the monetary policy window, which also includes the immediate market response to the release of the policy decision. This does not come as a surprise since (i) most of the unconventional measures over the past decade are announced during the conference window, not the release window, and (ii) the conference window is where information about the future path of policy is given.

earlier, longer-term interest rates should respond less to a policy surprise. This is exactly what we see in our findings.

The publication of weekly initial jobless claims by the U.S. Department of Labor at 8:30 ET coincides with the start of the ECB press conference. Unexpected changes in the U.S. labor market could thus affect financial markets in Europe. We follow Brand et al. (2010) and also run all regressions with the surprise number of initial jobless claims as a control variable. The surprise is the difference between actual and expected numbers, where the expected number is the one week-ahead forecast from an AR(4) fitted to the jobless claims series. All results (which are not shown here) remain unchanged.

The impact of policy surprises depends on the maturity  $n$ . To round off the presentation of our main results, we use the slope of the OIS term structure as the dependent variable, that is, the difference between the changes of ten and three year OIS rates. Under unanimity, the yield curve flattens by 0.61 percentage points, while under dissent the change in the slope of the term structure is -0.26 percentage points. This difference is highly statistically significant.

## 5 Alternative specifications

In this section, we modify the specification and take account of several aspects that could affect the impact of the votes in the GovC on financial markets.

### A. *Serial dissent*

Figure (1) suggests that there are meetings with serial dissent. Hence, a meeting with dissenting votes follows another meeting with dissent. Since we are unable to identify the dissenting member of the GovC, we cannot attribute serial dissent to specific members of the GovC. One case of serial dissent is the January 2015 meeting, where the Asset Purchase Programme was adopted with dissent, while the previous meeting was also marked by a dissenting vote.<sup>21</sup>

---

<sup>21</sup>Markets took notice of the importance of disagreement after the December 2014 meeting: "The ECB strengthened its forward guidance by saying the central bank "intends" to expand its balance sheet to around €3tn to boost inflation, rather than simply 'expecting' to meet this objective. But the semantic change was not unanimous, with dissent coming from members of the executive board of ECB officials, as well as some national central bank governors. The disagreement happened despite staff economists slashing their forecasts for growth and inflation in the currency area" (*Financial Times*, December 4, 2014).

In this section, we ask whether the occurrence of dissent in the previous meeting weakens or strengthens the impact of dissent in the current meeting. When markets already noticed dissent in the previous meeting, dissent in the current meeting might become less important for the assessment of the future path of monetary policy. The opposite effect might occur if dissent leads the committee to postpone important policy decisions. Hence, dissent could be a signal for a larger future policy step, which should result in a stronger change in interest rates today.

In order to understand the impact of serial dissent, we generalize the model and include information on the previous meeting,  $m - 1$

$$\Delta y_m^{(n)} = \alpha + \beta_0 e_m^{MP} + \beta_1 \left( \widehat{Dis}_m \times e_m^{MP} \right) + \beta_2 \left( \widehat{Dis}_{m-1} \times e_m^{MP} \right) + \gamma X_m + u_m, \quad (8)$$

where  $X_m$  contains  $\widehat{Dis}_m$  and  $\widehat{Dis}_{m-1}$ . As a consequence, the market response on meeting days is now given by

$$\frac{\partial \Delta y_m^{(n)}}{\partial e_m^{MP}} = \beta_0 + \beta_1 \widehat{Dis}_m + \beta_2 \widehat{Dis}_{m-1}. \quad (9)$$

As mentioned before, we do not have information on the vote for all GovC meetings, such that we have to skip a few events. For the purpose of estimating the effect of serial dissent, it is imperative that we include consecutive meetings only. Hence, we drop meetings  $m$  for which we do not have information on the vote in meeting  $m - 1$ .

Figure (3) illustrates the implied response of OIS rates to a policy surprise and distinguishes between unanimity in meeting  $m$  that follows a unanimous decision in  $m - 1$ , a decision under dissent in  $m$  after a unanimous meeting in  $m - 1$  and two subsequent meetings with dissent. As in the baseline model, we use  $\widehat{Dis}_m = -0.25$  (unanimity) and  $\widehat{Dis}_m = -0.50$  (dissent) to calculate the responses.

If the meeting in  $m - 1$  is characterized by a unanimous decision, another unanimous decision in  $m$  is more powerful than a decision in  $m$  involving dissent. With the exception of the response of nine year OIS rates, the responses in panel (a) are significantly higher than in panel (b). For the market response to a decision in  $m$  than involves dissent it does not matter whether the previous meeting in  $m - 1$  was unanimous or not. The responses in panels (b) and (c) are statisti-

cally indistinguishable. Hence, serial dissent, i.e. dissent in subsequent meetings, reduces the effectiveness of policy transmission in the same way as the first occurrence of dissent after a unanimous meeting. If the previous policy decisions was accompanied by dissent, dissent in the present meeting does not becomes less relevant.

### B. *Tightening versus easing shocks*

If dissent is systematically more frequent when the GovC surprises markets with either a policy tightening or a policy easing and the strength of the transmission differs with respect of the sign of the surprise, the results could be wrongly attributed to the voting record rather than the sign of the surprise. To disentangle both factors, we generalize the regression model and differentiate between unanimity and dissent separately for tightening and easing shocks, respectively. Consider an indicator variable  $I_m^+$  that is one if the monetary policy surprise in meeting  $m$  is positive,  $e_m^{MP,+}$ , and zero otherwise and a corresponding indicator  $I_m^-$  that is one for a negative surprise,  $e_m^{MP,-}$ , and zero otherwise. We use the indicator to effectively split the regression into a model for tightening shocks, where the coefficients have a superscript  $+$  and a model for easing shocks indicated by a superscript  $-$

$$\begin{aligned} \Delta y_m^{(n)} = & I_m^+ \left[ \alpha^+ + \beta_0^+ e_m^{MP,+} + \beta_1^+ \left( \widehat{Dis}_m \times e_m^{MP,+} \right) + \beta_2^+ \widehat{Dis}_m \right] \\ & + I_m^- \left[ \alpha^- + \beta_0^- e_m^{MP,-} + \beta_1^- \left( \widehat{Dis}_m \times e_m^{MP,-} \right) + \beta_2^- \widehat{Dis}_m \right] + u_m. \end{aligned} \quad (10)$$

We illustrate the estimated coefficients in Figure (4), where we plot the yield curve responses for tightening and easing shocks. For tightening shocks, i.e. the upper half of the graph, the market response is significantly stronger under unanimity than under dissent. Our baseline results remains intact for the full range of maturities. A surprise easing of monetary conditions, in contrast, is not affected by the voting outcome in the GovC. While OIS rates fall after a surprise easing under unanimity, they remain mostly unaffected under dissent. As the  $t$ -statistics show, however, this difference is not statistically significant.

### C. Small versus large shocks

The previous robustness checks distinguished between tightening and easing shocks, but not between small and large shocks. We now want to shed light on whether the comparison between the transmission under unanimity and dissent is biased due to the fact that we do not control for the absolute size of the policy surprise. We augment the baseline regression model with the cubed policy surprise,

$$\Delta y_m^{(n)} = \alpha + \beta_0 e_m^{MP} + \beta_1 (\widehat{Dis}_m \times e_m^{MP}) + \beta_2 \widehat{Dis}_m + \beta_3 (e_m^{MP})^3 + u_m. \quad (11)$$

Figure (5) reports the response of OIS rates across the maturity spectrum under both unanimity and dissent for small surprises ( $e_m^{MP} = 0.05$ ) and large surprises ( $e_m^{MP} = 0.10$ ). For maturities of up to seven years, we find that the market response under unanimity is still significantly larger than under dissent<sup>22</sup>. Hence, the main result survives once we control for the different impact of small and large surprises, respectively.

### D. Controlling for the tone of the Introductory Statement

The ECB president starts the press conference with her presentation of the Introductory Statement, which explains the decisions made in the GovC meeting against the backdrop of the assessment of the economic outlook. In light of the efficient market hypothesis, our monetary policy surprise series should fully reflect the new information provided in the Introductory Statement. Previous research (e.g. Hubert and Labondance, 2021; Schmeling and Wagner, 2019), however, finds that the semantic tone of the Introductory Statement provides information beyond what is incorporated in price changes.

We draw on the (net) dovish tone and the uncertainty indicator used before in the estimated probit model and augment our baseline regression model with these two indicators. The original data stem from Picault and Renault (2017) and Baranowskia et al. (2021), respectively.

Figure (6) reports the results of this model. The results are slightly weaker than the baseline findings. Importantly, With the exception of the nine year matu-

---

<sup>22</sup>Note that in this model the  $t$ -statistic for the comparison between unanimity and dissent is identical for small and large surprises, respectively.



rity, the responsiveness of long-term rates remains significantly stronger under unanimity compared to dissent.

### *E. Stability over time*

In this subsection, we assess the stability of the main result of this paper over time. In particular, we shed light on whether the adoption of forward guidance, and unconventional monetary policies in general, change the importance of unanimity in the GovC for the strength of the policy transmission. If forward guidance is considered credible, dissent in the GovC should become less important in affecting the sensitivity of OIS rates with respect to monetary policy surprises. If, however, markets doubt the ECB's intention to keep interest rates at low levels, the occurrence of dissent could become more important in affecting markets than under normal circumstances.

We estimate the baseline model over a sample of 40 meetings of the GovC and then shift the fixed-size window over the sample period. For each estimation window, we calculate the  $t$ -statistic for the null hypothesis of equal responses under unanimity and dissent. This provides us with a series of 84  $t$ -statistics, which are shown in Figure (7) for maturities of OIS rates of three, five and seven years.

Before late 2014, the responses to policy surprises are significantly higher under unanimity. This is true for all three maturities. Since the end of 2014, however, all three  $t$ -statistics lie inside the band of critical values, such that we can no longer reject the null hypothesis of equal responses. Thus, since then the stronger market response under unanimity disappears. The distinction between unanimity and dissent thus survives the adoption of forward guidance in 2013. Since mid-2014, the GovC was preparing the grounds for the eventual adoption of the Asset Purchase Programme (APP), which was eventually announced in January 2015. We interpret the non-significant role of the vote since then as a sign of the credibility of policy: dissent in the GovC became less important for the assessment of the future policy path. Markets believe the ECB moves forward with unconventional policies despite internal opposition.

## 6 Conclusions

In this paper, we studied the effect of dissent in the ECB's Governing Council on financial markets. Due to the opacity of the voting process, the role of dissent has not been studied before.

We present a narrative index of dissent that summarizes the sparse information given by the ECB president during the regular press conferences on meeting days. Our dissent index indicates that 28% of all meetings of the GovC since 2005 had at least one dissenting vote. The key result of our empirical analysis suggests that dissent weakens the transmission of policy impulses to longer-term interest rates. Our findings are robust with respect to several alternative model specifications.

The results imply that, besides the policy step itself, the extent of consensus on an important policy decision is a separate factor that drives financial markets. Hence, in order to maximize the impact of policy decisions, the Governing Council should decide unanimously and let markets know about it. Forward guidance, which particularly relies on the effect of ECB communication on the beliefs of market participants, could be made more effective if the council were to speak with one voice.

The results are also consistent with a slightly different interpretation. It could be the guesswork of the market about the identity of the dissenter(s) and the direction and intensity of dissent that reduces the effectiveness of policy, not dissent as such. We leave this hypothesis for future research. The policy implication in this case, however, would be clear: publish the votes to avoid this kind of guesswork. Under this alternative interpretation, transparency would increase the effectiveness of policy. Committees such as the FOMC or the MPC are designed to encourage dissent. Dissent should provide market participants with the full divergence of members' views in order to be able to anticipate future policy (Hoenig, 2011). To reap these benefits, dissent should be public. Since market participants do not know the name and the motivation of the dissenter in the GovC, they have to guess. Hence, more transparency about dissenting views could be one element of the ongoing review of the ECB's strategy. Such a reform could reduce the noise associated with dissent in the GovC.

## References

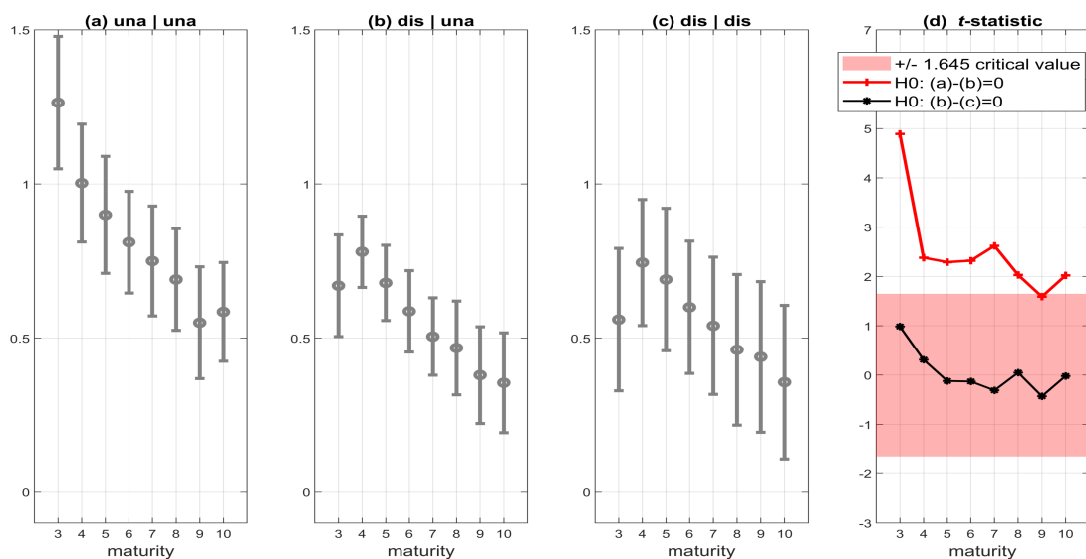
- [1] Altavilla, C., L. Brugnolini, R. S. Gürkaynak, R. Motto and G. Ragusa (2019): “Measuring euro area monetary policy”, *Journal of Monetary Economics* 108, 162–179.
- [2] Apel, M., M. Blix Grimaldi and I. Hull (2019): “How much information do monetary policy committees disclose? Evidence from the FOMC’s minutes and transcripts”, *Working Paper Series* No. 382, Sveriges Riksbank.
- [3] Baranowskia, P., H. Bennani and W. Doryña (2021): “Do the ECB’s introductory statements help predict monetary policy? Evidence from a tone analysis”, *European Journal of Political Economy* 66, article no. 101964.
- [4] Blinder, A. S. (2007): “Monetary policy by committee: why and how?”, *European Journal of Political Economy* 23, 106–123.
- [5] Brand, C., D. Buncic and J. Turunen (2010): “The impact of ECB monetary policy decisions and communication on the yield curve”, *Journal of the European Economic Association* 86, 1266–1298.
- [6] Brandao-Marques, L., G. Gelos, M. Narita and E. Nier (2020): “Leaning Against the Wind: A Cost-Benefit Analysis for an Integrated Policy Framework”, *IMF Working Paper* No. 20/123, International Monetary Fund.
- [7] Coenen, G., M. Ehrmann, G. Gaballo, P. Hoffmann, A. Nakov, S. Nardelli, E. Persson and G. Strasser (2017): “Communication of monetary policy in unconventional times”, *ECB Working Paper* No. 2080, European Central Bank.
- [8] Detmers, G. A. (2016): “Forward guidance under disagreement: evidence from the Fed’s dot projections”, *unpublished*, Freie Universität Berlin.
- [9] Ehrmann, M. and M. Fratzscher (2009): “Explaining monetary policy in press conferences”, *International Journal of Central Banking* 5, 41–84.
- [10] Ehrmann, M., G. Gaballo, P. Hoffmann and G. Strasser (2019): “Can more public information raise uncertainty? The international evidence on forward guidance”, *Journal of Monetary Economics* 108, 93–112..

- [11] Ehrmann, M., R. Tietz and B. Visser (2020): "Voting right rotation and the behavior of committees members – a case study of the U.S. Federal Open Market Committee", *unpublished*, European Central Bank.
- [12] Firrell, A. and K. Reinold (2020): "All together now: does macroeconomic uncertainty affect dissent on the Bank of England's Monetary Policy Committee?", *Staff Working Paper* No. 898, Bank of England.
- [13] Financial Times (2013): "Central banks send clear signal on interest rates", July 4, 2013.
- [14] Financial Times (2014): "Draghi looks to QE despite governing council split", December 4, 2014.
- [15] Gerlach-Kristen, P. (2004): "Is the MPC's voting record informative about future UK monetary policy?", *Scandinavian Journal of Economics* 106, 299–313.
- [16] Gerlach-Kristen, P. and E. Meade (2010): "Is there a limit on FOMC dissent? Evidence from the Greenspan era", *unpublished*.
- [17] Hansen, S., M. McMahon and C. Velasco Rivera (2014): "Preferences of private assessments on a monetary policy committee?", *Journal of Monetary Economics* 67, 16–32.
- [18] Hansen, S. and M. McMahon (2016): "First impressions matter: Signalling as a source of policy dynamics", *Review of Economic Studies* 83, 1645–1672.
- [19] Hoenig, T. (2011): "Monetary policy and the role of dissent", speech given to The Central Exchange, Kansas City, January 5, 2011.
- [20] Hanson, S. and J. Stein (2015): "Monetary policy and long-term real rates", *Journal of Financial Economics* 115, 429–448.
- [21] Horvath, R, K. Smidkova and J. Zapal (2012): "Central banks' voting records and future policy", *International Journal of Central Banking* 8, 1–19.
- [22] Horvath, R, M. Rusnak, K. Smidkova and J. Zapal (2014): "The dissent voting behaviour of central bankers: what do we really know?", *Applied Economics* 46, 450–461.

- [23] Hubert, P. and F. Labondance (2018): "The effect of ECB forward guidance on the term structure of interest rates", *International Journal of Central Banking* December 2018, 193–222.
- [24] Hubert, P. and F. Labondance (2021): "The signaling effects of central bank tone", *European Economic Review*, forthcoming.
- [25] Leombroni, M., A. Vedolin, G. Venter and P. Whelan (2020): "Central bank communication and the yield curve", *Journal of Financial Economics*, forthcoming.
- [26] Madeira, C. and J. Madeira (2019): "The effect of FOMC votes on financial markets", *The Review of Economics and Statistics* 101, 921–932.
- [27] Meade, E. E. (2005): "The FOMC: preferences, voting and consensus", *Federal Reserve Bank of St. Louis Review* 87, March/April 2005, 93–101.
- [28] Neuenkirch, M. (2013): "Predicting Bank of England's asset purchase decisions with MPC voting records", *Applied Economics Letters* 20, 1275–1278.
- [29] Nier, E. W., T. T. Olafsson and Y. G. Rollinson (2020): "Exchange Rates and Domestic Credit – Can Macroprudential Policy Reduce the Link?", *IMF Working Paper* No. 20/187, International Monetary Fund.
- [30] Picault, M. and T. Renault (2017): "Words are not created equal: a new measure of ECB communication", *Journal of International Money and Finance* 79, 136–156.
- [31] Riboni, A. and F. Ruge–Murcia (2014): "Dissent in monetary policy decisions", *Journal of Monetary Economics* 66, 137–164.
- [32] Ruge–Murcia, F. and A. Riboni (2017): "Collective versus individual decision-making: a case study of the Bank of Israel Law", *European Economic Review* 93, 73–89.
- [33] Schmeling, M. and C. Wagner (2019): "Does central bank tone move asset prices?", *unpublished*, Cass Business School, University of London.

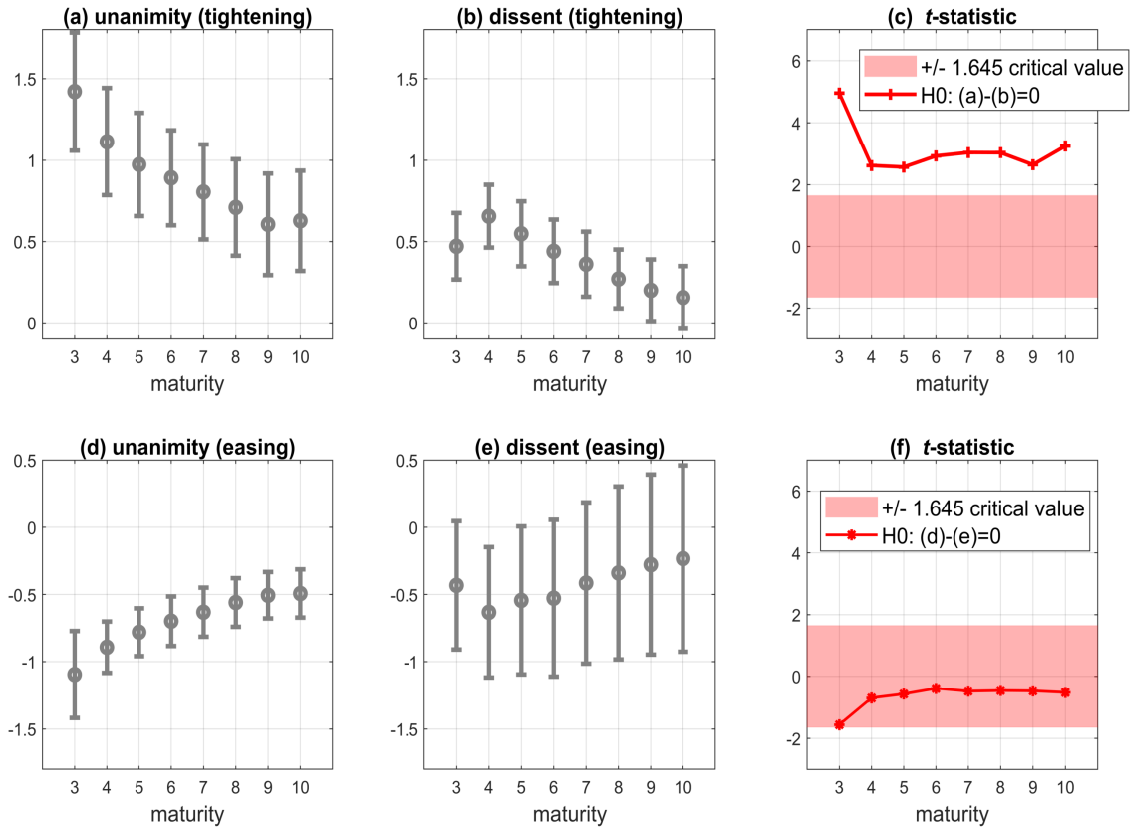
- [34] Thornton, D. L. and D. C. Wheelock (2014): “Making sense of dissents: a history of FOMC dissents”, *Federal Reserve Bank of St. Louis Review* 3rd quarter 2014, 213-228.
- [35] Tillmann, P. and A. Walter (2020): “ECB vs Bundesbank: diverging tones and policy effectiveness”, *unpublished*, University of Giessen.

Figure 3: Responses implied by extended model allowing for serial dissent



*Notes:* The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the conference window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panel (a) shows the effect for  $\widehat{Dis}_m = -0.25$  (unanimity), if the previous meeting was also unanimous. Panel (b) depicts the effect for  $\widehat{Dis}_m = 0.50$  (dissent), when the meeting in  $m - 1$  was unanimous, while panel (c) shows the effect under dissent in two subsequent meetings. In panel (d), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and first and serial dissent, respectively, and the corresponding 90% critical values.

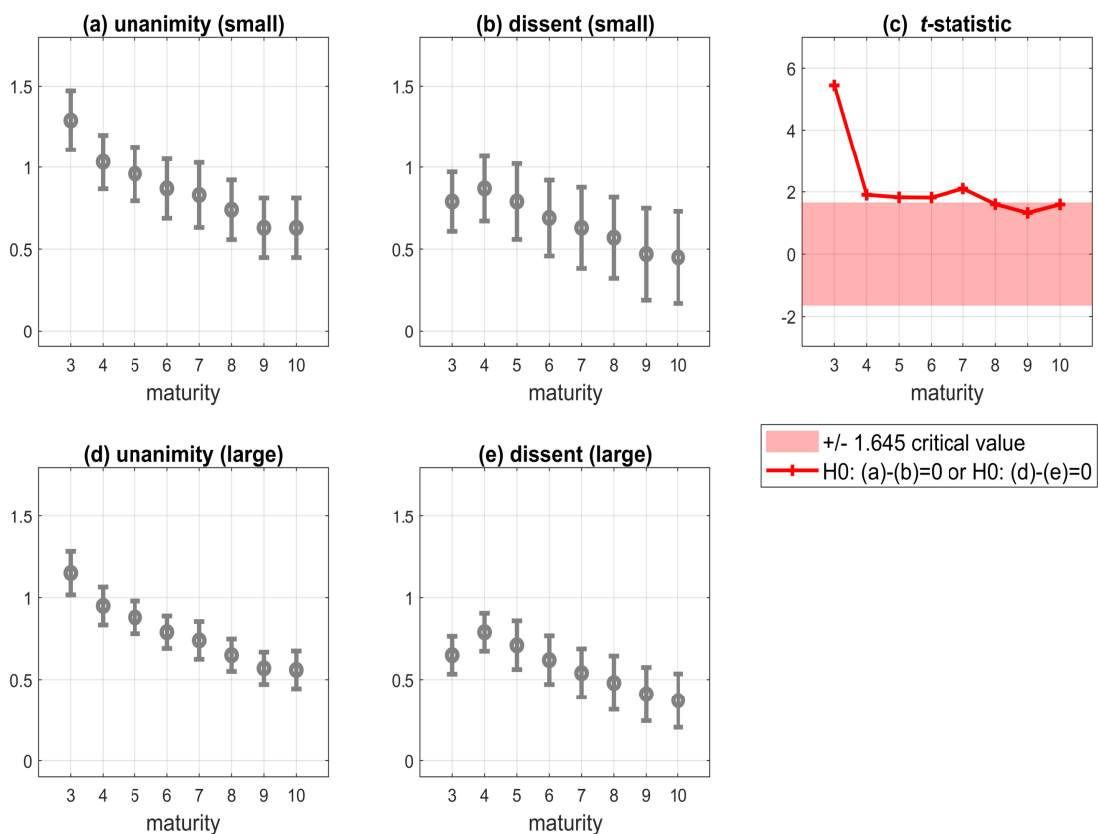
Figure 4: Responses implied by baseline model (tightening vs easing shocks)



*Notes:* The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the conference window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panels (a) and (d) show the effects for  $\widehat{Dis}_m = -0.25$  (unanimity), panels (b) and (e) for  $\widehat{Dis}_m = 0.50$  (dissent). In the first (second) row, we illustrate the effect of a tightening (easing) surprise. In panels (c) and (f), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

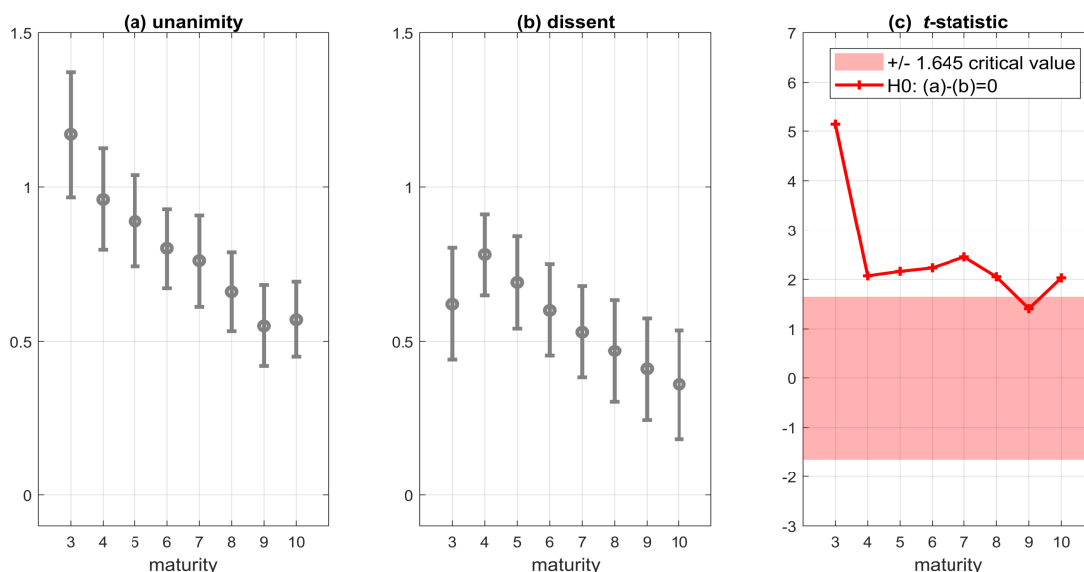


Figure 5: Responses implied by baseline model (small vs large shocks)



*Notes:* The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the conference window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panels (a) and (d) show the effects for  $\widehat{Dis}_m = -0.25$  (unanimity), panels (b) and (e) for  $\widehat{Dis}_m = 0.50$  (dissent). In the first (second) row, we illustrate the effects of a small (large) surprise of 0.05 (0.10) percentage points. In panel (c), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

Figure 6: Responses implied by baseline model (tone of Introductory Statement)



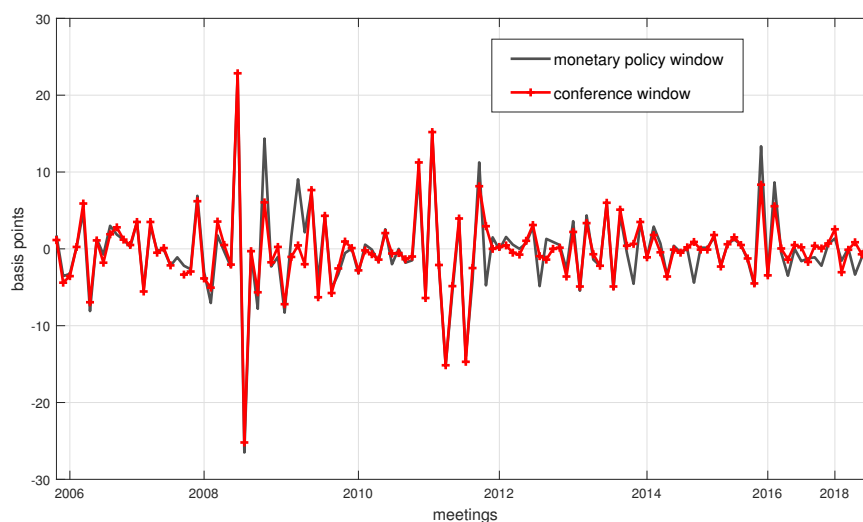
Notes: The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the conference window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panels (a) and (b) show the effect for  $\widehat{Dis}_m = -0.25$  (unanimity) and  $\widehat{Dis}_m = 0.50$  (dissent). In panel (c), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

Figure 7: Responses implied by baseline model (rolling window regressions)



*Notes:* The graph shows the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values obtained from a rolling window estimation of the baseline model for a fixed-width window of 40 meetings.

Figure 8: Monetary policy surprise



*Notes:* The graph shows the series of policy surprises, measured as the change of German two-year rates in the monetary policy window from 13:25 to 15:50 CET and the conference window from 14:15 - 15:50 CET on meeting days, respectively.

# Financial Markets and Dissent in the ECB's Governing Council

## ONLINE APPENDIX

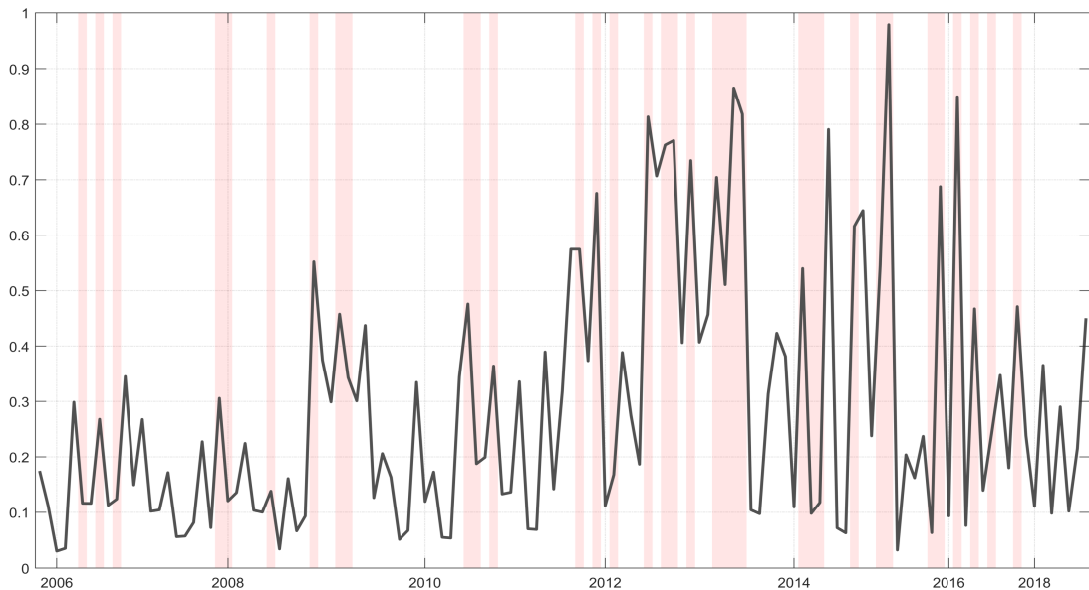
Peter Tillmann  
peter.tillmann@wirtschaft.uni-giessen.de

### A Additional data and results

#### A. *The forecastable component of dissent*

In the main paper, we estimate a probit model to explain dissent. While we focus the analysis on the non-forecastable part of, Figure (1) shows the forecastable part of dissent. After 2012, market participants can clearly forecast a larger part of dissent compared to the first half of the sample period.

Figure 1: The forecastable part of dissent in the ECB's Governing Council

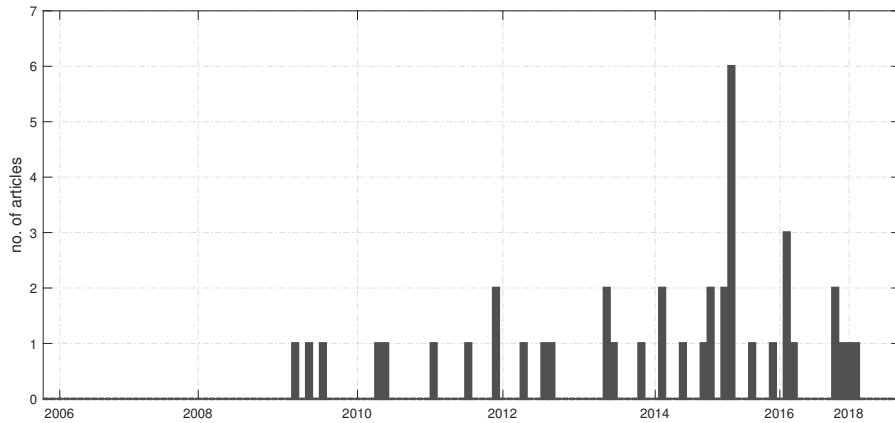


*Notes:* The graph shows the narrative index of dissent in the ECB's Governing Council,  $Dis_m$ , as a shaded area in red for each meeting day that includes a press conference. The non-forecastable component of dissent, which we obtain from the estimated probit model, is shown as a black line. In 2015, the frequency of meetings changed from monthly to a six-week cycle.

### B. Newspaper reporting

Figure (2) shows the number of newspaper articles from the *Financial Times* used as an explanatory variable in the probit model.

Figure 2: Reporting about dissent in the ECB's Governing Council in the *Financial Times*



*Notes:* The graph shows the number of articles in the *Financial Times* in the inter-meeting period, which contain the words "ECB", "Governing Council" and one of the following words: "dissent", "conflict", "resistance", "division" and "split". We use only those articles which explicitly address dissent in the upcoming GovC meeting.

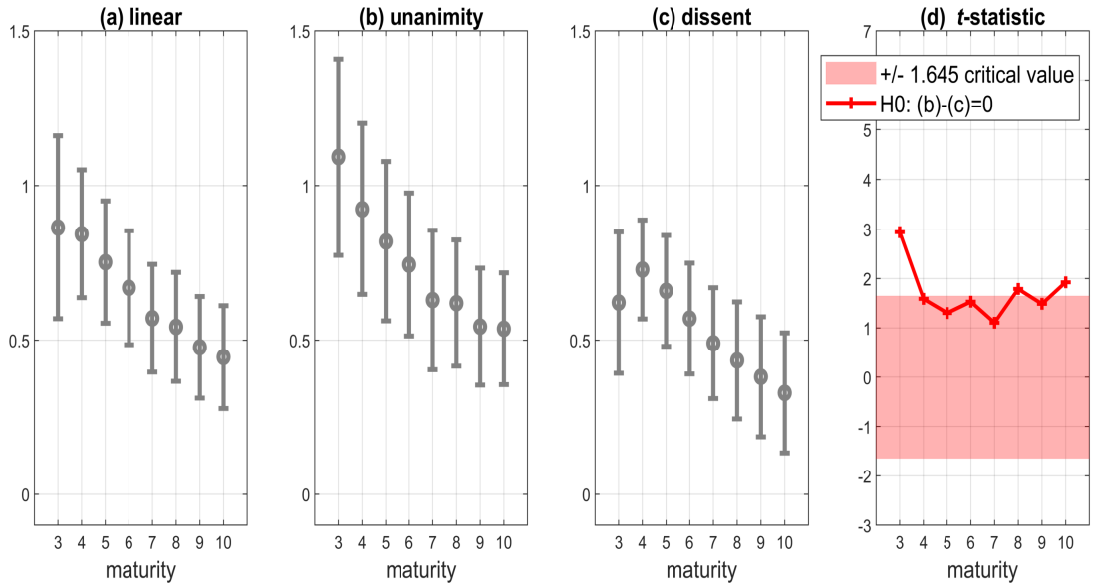
### C. Surprise measured in monetary policy window

Figure (3) shows the marginal effect of a policy surprise, measured as the change in German two-year yields during the full monetary policy window, on OIS rates. The evidence on the moderating effect of dissent becomes weaker. Only three of the seven maturities respond more strongly under unanimity. For the remaining maturities, the difference is no longer statistically significant. The monetary policy window includes the information from the conference window and the release window. Thus, the vote in the GovC matters for how markets price-in the information revealed during the conference window, but does not affect the response to information from the release window.

### D. Alternative policy surprises

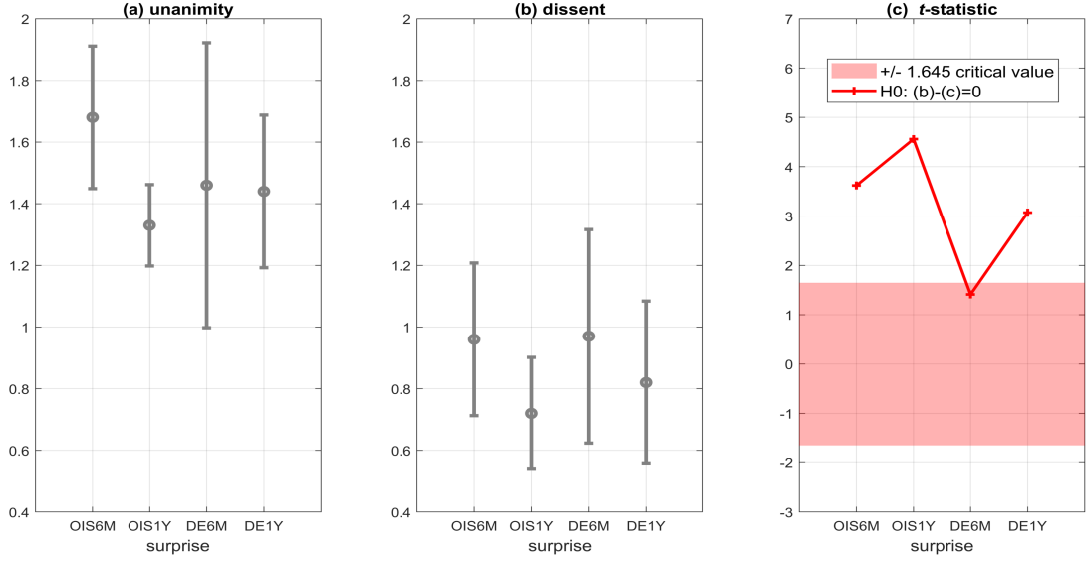
Throughout the paper, we use the change in German two-year rates in the conference window (see Altavilla et al., 2019) as a measure of the policy surprise on meeting days. Figure (4) shows the daily response of three-year OIS rates to alternative policy surprises, which we also take from the Altavilla et al. (2019) data set. The alternatives are six-month and one-year OIS rates and German rates. With the exception of six-month German rates, all alternative surprises generate a significantly higher response under unanimity compared to dissent.

Figure 3: Responses implied by baseline model (surprise from monetary policy window)



*Notes:* The graph shows the marginal effect of a policy surprise on OIS rates of different maturities. The surprise is the change in two-year Bund yields in the monetary policy window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panel (a) depicts the effect obtained from the linear model. Panels (b) and (c) show the effect for  $\widehat{Dis}_m = -0.25$  (unanimity) and  $\widehat{Dis}_m = 0.50$  (dissent). In panel (d), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

Figure 4: Responses of three-year OIS rates to alternative policy surprises



Notes: The graph shows the marginal effect of alternative policy surprises on three-year OIS rates. The surprise is the change in two-year Bund yields in the monetary policy window. The vertical bars reflect a 90% confidence band constructed using the delta method with HAC standard errors. Panels (a) and (b) show the effect for  $\widehat{Dis}_m = -0.25$  (unanimity) and  $\widehat{Dis}_m = 0.50$  (dissent). In panel (c), we show the series of  $t$ -statistics for the null hypothesis of equal effects under unanimity and dissent and the corresponding 90% critical values.

## B A bootstrap approach to the generated regressor problem

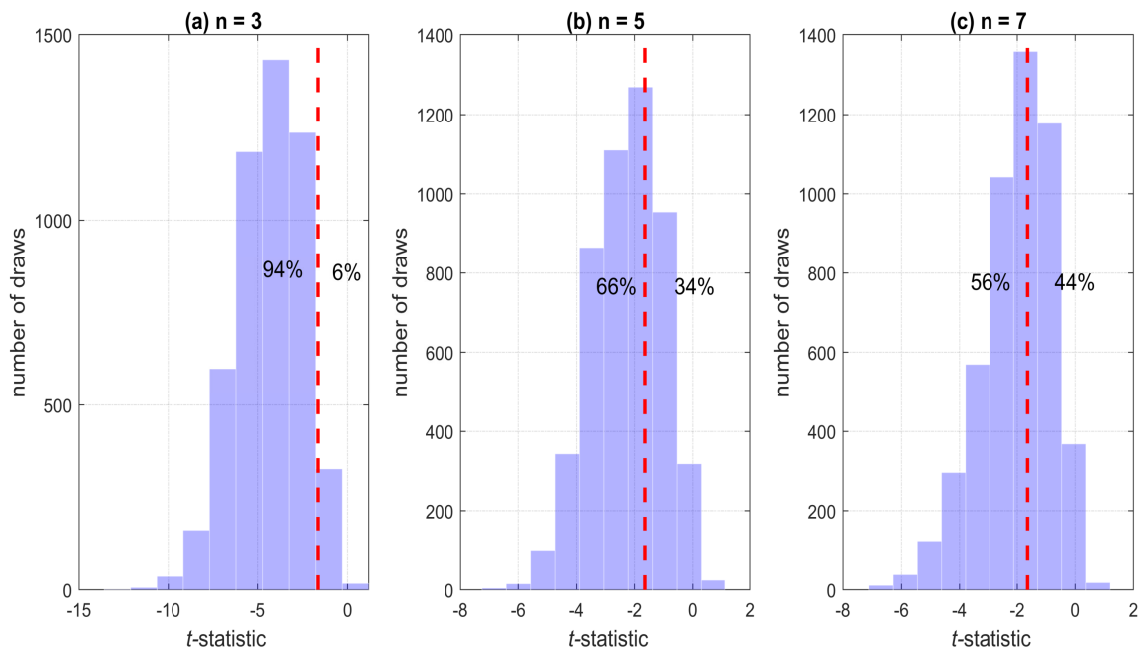
One key variable in the regression model is the non-forecastable component of dissent,  $\widehat{Dis}_m$ . This variable, however, is not observable but obtained as the difference between the discrete dissent index and the fitted values provided by a probit model. Hence, the non-forecastable component is itself surrounded by uncertainty. The resulting generated regressors problem can lead us to underestimate the standard errors of the coefficients of interest. We address this problem employing a bootstrap approach to sample alternative series for  $\widehat{Dis}_m$  from the probit-stage. For each alternative series we estimate the impact of a policy surprise and its interaction with dissent. This gives us a distribution of coefficients that not only reflects estimation uncertainty stemming from the second stage, but also the sampling uncertainty from the probit-stage.

In a first step, we generate  $B = 5000$  samples of the observable variables consisting of contiguous blocks of ten consecutive observations each. For each sample  $b \in B$ ,

we estimate the probit model and thus obtain 5000 series of the non-forecastable component of dissent. In a second step, we then estimate the linear regression model and store the estimated  $t$ -statistic for  $\beta_1$ , the coefficient on the interaction term, where inference is based on Newey–West standard errors.

Figure (5) shows the distribution of the  $t$ -statistic for  $\beta_1$  for three alternative maturities. For the three-year maturity, see panel (a), 94% of all draws yield a  $t$ -statistic below the (negative) 90% critical value. Hence, we obtain overwhelming support for a significantly negative coefficient on the interaction between dissent and the policy surprise. Dissent weakens the transmission policy shocks. Accounting for the generated regressor problem does not seem to change this finding. For maturities of five and seven years, see panels (b) and (c), the evidence is somewhat weaker with 66% and 56% of the draws still yielding a significantly negative coefficient.

Figure 5: Distribution of  $t$ -statistics for the coefficient on the interaction term



*Notes:* The graph shows the distribution of  $t$ -statistics for the coefficient on the interaction term  $\beta_1$  for alternative maturities of the dependent variable. We bootstrap 5000 alternative series of the non-forecastable component of dissent and estimate the linear regression model for each of these draws. The vertical line corresponds to the 90% critical value.



## C Dissent at the FOMC

In the main paper, we studied dissent in the ECB's GovC. The ECB does not publish votes. The press statement released after meeting of the Federal Reserve's Federal Open Market Committee (FOMC), in contrast, contains information on the votes for and against a policy. Despite the institutional differences between the policy making process at the ECB and the Fed, we now estimate the impact of dissent in the FOMC on the transmission of Fed surprises on long-term market interest rates using the identical framework.

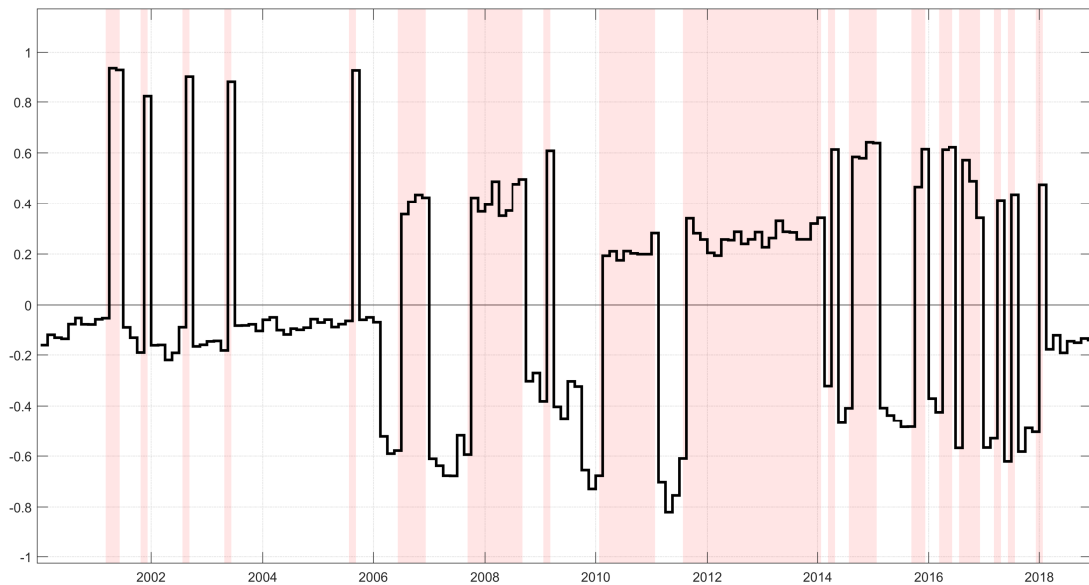
Using data from Thornton and Wheelock (2014), we construct an index of dissent between 2000 and 2018 such as the one used in the main part of the paper. Hence, we ignore the information on the name of the dissenter and the direction of dissent, both of which is available in the data set, and attribute an entry of one to a meeting with dissenting votes and an entry of zero otherwise. We estimate a probit model using the following variables: a dummy for FOMC chairs, a dummy variable indicating whether the chair held a press conference, the index of monetary policy uncertainty from Husted et al. (2020), the dispersion and the mean of four-quarter ahead forecasts for inflation and unemployment, the dispersion of employment growth across Federal Reserve districts, the VIX index, the latest inflation rate and the latest unemployment rate. The unexplained part of dissent is then used to construct the interaction term as in the baseline model in the main text. Figure (6) reports the surprise component.

As dependent variables, we use the change in long-term yields provided by Adrian et al. (2013) on FOMC meeting days, while the policy surprise is the the "unified" policy shock drawn from Bu et al. (2019). Figure (7) yields the  $t$ -statistics for the null hypothesis of equal responses under unanimity and dissent for a fixed-size regression window of 40 meetings, which we shift step-by-step over the sample period. The results are more nuanced than for the ECB. For samples ending between 2014 and 2016, we indeed find that the response of long-term rates to policy surprises is stronger under unanimity. Interestingly, this is exactly the time period in which the FOMC discussed the exit from Quantitative Easing and the timing of the lift-off of the federal funds rate from the zero lower bound. It appears that in this period, a unified message from the FOMC was particularly powerful. For samples ending between 2008 and 2013, in contrast,

the opposite is true: the market response is stronger under dissent compared to unanimity. These subsamples cover the unconventional monetary policy measures adopted in the aftermath of the financial crisis. In between these periods, i.e. before 2008 and after 2016, the equality of the responses between unanimity and dissent cannot be rejected.

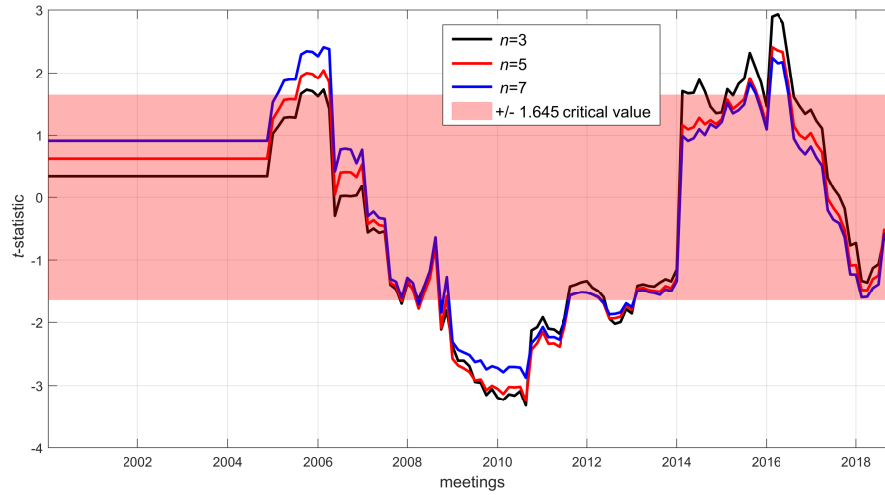
While there is more time-variation in the relationship between unanimity and dissent in the case of the FOMC compared to the ECB, we find subsamples for each central bank for which the transmission is stronger under unanimity than under dissent. While we should not over-interpret this finding in light of the institutional differences between the two committees, the similarity lends some support to the role of the vote for the impact of policy surprises.

Figure 6: Dissent in the FOMC



*Notes:* The graph shows the FOMC meetings with at least one dissent vote as a shaded area in red. The unexpected component of dissent,  $\widehat{Dis}_m$ , which we obtain from the estimated probit model, is shown as a black line.

Figure 7: Responses implied by baseline model for the FOMC (rolling window regressions)



*Notes:* The graph shows the series of  $t$ -statistics for the null hypothesis of equal responses under unanimity and dissent for the FOMC and the corresponding 90% critical values obtained from a rolling window estimation of the baseline model for a fixed-width window of 40 meetings.

## D Press conferences

In this appendix, we document the classification of each GovC meeting as summarized in the dissent index. For each meeting, for which the press conference is informative about dissent or unanimity, we report the classification and provide an excerpt from the Q&A session. The quotes are from the ECB president unless noted otherwise. Meetings without information on dissent or unanimity are shown as n/a.

| meeting    | dissent | unanimity | n/a | excerpt from Q&A  |
|------------|---------|-----------|-----|---|
| 02.12.2004 |         |           | x   |   |
| 13.01.2005 |         |           | x   |   |
| 03.02.2005 |         |           | x   |   |
| 03.03.2005 |         |           | x   |   |
| 07.04.2005 |         |           | x   |   |
| 04.05.2005 |         |           | x   |   |
| 02.06.2005 |         | x         |     | "we were unanimous in thinking that our interest rates are at the appropriate level for ensuring price stability"   |
| 07.07.2005 |         |           | x   |   |
| 01.09.2005 |         |           | x   |   |
| 06.10.2005 |         |           | x   |   |
| 03.11.2005 |         |           | x   |   |
| 01.12.2005 |         | x         |     | "Question: Mr President, you spoke of divisions on the ECB Shadow Council. Were there any divisions on the Governing Council? Trichet: I said that we were unanimous."                        |
| 12.01.2006 |         | x         |     | "We were unanimous in taking today's decision"  |
| 02.02.2006 |         | x         |     | "Question: Would you say that today's decision was unanimous? Trichet: Yes, certainly."   |
| 02.03.2006 |         | x         |     | "We were unanimous that 25 basis points was the appropriate decision to take today."  |
| 06.04.2006 | x       |           |     | "Question: Was there a lack of consensus on a May move, and if so how much was lacking or how close to consensus were you? Trichet: I have said all that I have to say on both May and June." |
| 04.05.2006 |         | x         |     | "At today's meeting we were unanimous in our attitude, decision and overall analysis, which I have explained to you at length."   |
| 08.06.2006 | x       |           |     | "there was an overwhelming majority that thought that 25 basis points was more appropriate"   |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A  |
|------------|---------|-----------|-----|---|
| 06.07.2006 |         | x         |     | "Question: Was the decision unanimous today? Trichet: Yes, very much."  |
| 03.08.2006 | x       |           |     | "the decision in favour of a 25 basis point increase today was overwhelmingly supported by the GovC."   |
| 31.08.2006 |         | x         |     | "I would say that the decision was unanimous."  |
| 05.10.2006 |         | x         |     | "I would mention that we were unanimous in taking that decision."   |
| 02.11.2006 |         |           | x   |   |
| 07.12.2006 |         | x         |     | "On the second point, yes, we were unanimous."  |
| 11.01.2007 |         | x         |     | "Question: Was that a unanimous decision?" Trichet does not respond to question.  |
| 08.02.2007 |         | x         |     | "Question: I was asking you whether its use in the statement by the Governing Council was a unanimous decision. Trichet: Yes, indeed."  |
| 08.03.2007 |         | x         |     | "I would say that we were unanimous in taking the decision to increase rates today."  |
| 12.04.2007 |         | x         |     | "There was a unanimous agreement."  |
| 10.05.2007 |         | x         |     | "As regards your first question, yes, we were unanimous."   |
| 06.06.2007 |         |           | x   |   |
| 05.07.2007 |         |           | x   |   |
| 02.08.2007 |         | x         |     | "Question: Was the decision to use the word vigilance today unanimous? Trichet: I convey this message and this word on behalf of the Governing Council."  |
| 06.09.2007 |         | x         |     | "First, the decision taken today was unanimous."  |
| 04.10.2007 |         |           | x   |   |
| 08.11.2007 |         | x         |     | "we were unanimous in coming to the decision we took today"   |
| 06.12.2007 | x       |           |     | "as always, we examine all pros and cons, all assets and liabilities associated with the possible decisions, the possible decisions being increasing rates or maintaining rates as they were. We exchanged all views on the situation. We finally decided on the basis of a consensus after having exchanged all views and weighing up the two possibilities very, carefully" |
| 10.01.2008 | x       |           |     | "As you know, we do not vote and have never voted in the past. Today, we took a consensus decision on the basis of the explanation that I just gave in the introductory statement."   |
| 07.02.2008 |         | x         |     | "I will say that we were unanimous in deciding to maintain rates at 4%, which was our decision today"   |
| 06.03.2008 |         | x         |     | "We were unanimous in deciding to leave interest rates unchanged."  |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A   |
|------------|---------|-----------|-----|--|
| 10.04.2008 |         | x         |     | "we were unanimous in taking that decision after due meditation and discussion of the situation"   |
| 08.05.2008 |         | x         |     | "We were unanimous in taking the decision to maintain interest rates at the present level."  |
| 05.06.2008 | x       |           |     | "We had no unanimous views on the analysis and on what would be the best decision to take."  |
| 03.07.2008 |         | x         |     | "we were unanimous, taking into account all the information that we have and all the information that we received between the last meeting and today's meeting." |
| 07.08.2008 |         |           | x   |  |
| 04.09.2008 |         | x         |     | "We were unanimous in making that decision"  |
| 02.10.2008 |         | x         |     | "our decision was unanimous"   |
| 06.11.2008 |         | x         |     | "the GovC was unanimous in thinking that a significant decrease in rates was appropriate in the present circumstances"   |
| 04.12.2008 | x       |           |     | "I confirm that we had a consensus for the decrease of 75 basis points"  |
| 15.01.2009 |         | x         |     | "it is important to note that we were unanimous in deciding today"   |
| 05.02.2009 |         | x         |     | "We were unanimous in taking our decision, which does not mean that we all have the same view."  |
| 05.03.2009 | x       |           |     | "After this thorough discussion we concluded by a consensus on the decision which we took"   |
| 02.04.2009 | x       |           |     | "we had a very in-depth discussion, we looked at the situation from every possible angle and we took our decision by consensus"                                  |
| 07.05.2009 |         | x         |     | "the decisions were taken unanimously"   |
| 04.06.2009 |         | x         |     | "What counts is what was decided unanimously by the Governing Council"   |
| 02.07.2009 |         | x         |     | "And to give you more details we were unanimous in today's decision as regards the interest rates."  |
| 06.08.2009 |         | x         |     | "we were unanimous in our decision that the present level is appropriate"  |
| 03.09.2009 |         | x         |     | "let me mention that we were unanimous in judging that the present interest rates are appropriate"   |
| 08.10.2009 |         | x         |     | "We were unanimous."   |
| 05.11.2009 |         | x         |     | "in the decision we took today we were unanimous"  |
| 03.12.2009 |         | x         |     | "let me confirm that we were unanimous in considering the interest rates to be appropriate"  |
| 14.01.2010 |         | x         |     | "Good question – we were unanimous in our decision."   |
| 04.02.2010 |         |           | x   |  |
| 04.03.2010 |         | x         |     | "On interest rates, that decision was taken unanimously."  |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A   |
|------------|---------|-----------|-----|--|
| 08.04.2010 |         | x         |     | "we discussed what we have decided today. We did not discuss anything else."   |
| 06.05.2010 |         | x         |     | "we were unanimous in asking Greece to embark on a recovery programme. ... we had three major unanimous decisions by the Governing Council that explain the decision that we took on Sunday. ... I would say I have a unanimous Governing Council"   |
| 10.06.2010 |         | x         |     | "we were unanimous in taking that decision"  |
| 08.07.2010 |         |           | x   |  |
| 05.08.2010 |         |           | x   |  |
| 02.09.2010 | x       |           |     | "the decision on the liquidity operations was taken by consensus"  |
| 07.10.2010 | x       |           |     | "I would say that in the Governing Council, as is normal in such matters, each brain has a right half and a left half: we all assess the pros and cons of the situation. We do not in any way challenge the fact that we need the non-standard measures at the moment. So there is a consensus on that." |
| 04.11.2010 |         | x         |     | "I would say that the Governing Council on the introductory statement, we were unanimous."   |
| 02.12.2010 | x       |           |     | "As regards the decision we have taken, we have a consensus for the decision on the three-months, and we have an overwhelming majority as regards the SMP."  |
| 13.01.2011 |         | x         |     | "On your first question, we took the decision unanimously based on our assessment that the level of interest rates remains appropriate"  |
| 03.02.2011 |         | x         |     | "We were unanimous today in considering that interest rates were appropriate"  |
| 03.03.2011 |         | x         |     | "the interest rate decision today was unanimous"   |
| 07.04.2011 |         | x         |     | "as I said, we were unanimous. All colleagues were there, including Axel Weber. And, again, we were unanimous"   |
| 05.05.2011 |         | x         |     | "In response to your first question, yes – we were unanimous."   |
| 09.06.2011 |         | x         |     | "As regards today's decision on the interest rates, we were unanimous."  |
| 07.07.2011 |         | x         |     | "On your first question the response is, we were unanimous."   |
| 04.08.2011 |         | x         |     | "I would say that the decision we took on monetary policy was unanimous."  |
| 08.09.2011 |         | x         |     | "as I have already said, we were unanimous in considering that interest rates should not be changed"   |
| 06.10.2011 | x       |           |     | "As regards the decisions taken, we had a consensus."  |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A  |
|------------|---------|-----------|-----|---|
| 03.11.2011 |         | x         |     | "But, yes, the decision was unanimous."   |
| 08.12.2011 | x       |           |     | "Question: My second question is on rates. Was your decision today unanimous? The answer to the second question is 'no'"  |
| 12.01.2012 |         | x         |     | "the decision and the whole discussion were unanimous"  |
| 09.02.2012 | x       |           |     | "the discussion was not unanimous, but it was not particularly contentious. There was wide agreement, although there was no unanimity."   |
| 08.03.2012 |         | x         |     | "I do not think the Bundesbank is isolated. Do not forget, the decision on the LTRO was unanimous."   |
| 04.04.2012 |         | x         |     | "Question: Was today's decision taken unanimously? Draghi: Yes."  |
| 03.05.2012 |         | x         |     | "there is wide unanimity about the fact that an exit strategy is premature"   |
| 06.06.2012 | x       |           |     | "Today's decision was taken by very broad consensus"  |
| 05.07.2012 |         | x         |     | "The decision was unanimous on all grounds."  |
| 02.08.2012 | x       |           |     | "The voting was, as I said, unanimous with one reservation, with one position that reserved itself."  |
| 06.09.2012 | x       |           |     | "Well, it was not unanimous. There was one dissenting view. We do not disclose the details of our work. It is up to you to guess."  |
| 04.10.2012 |         | x         |     | "So it was a unanimous decision about interest rates."  |
| 08.11.2012 |         |           | x   |   |
| 06.12.2012 | x       |           |     | "There was a wide discussion but, in the end, the prevailing consensus was to leave the rates unchanged"  |
| 10.01.2013 |         | x         |     | "The decision was unanimous."   |
| 07.02.2013 |         | x         |     | "The decision not to change the interest rates was unanimous."  |
| 07.03.2013 | x       |           |     | "The prevailing consensus was to leave the rates unchanged."  |
| 04.04.2013 | x       |           |     | "the discussion was extensive. I would say that, all in all, the consensus was not to look at rates for the time being"   |
| 02.05.2013 | x       |           |     | "I was just wondering how long it would take to get this question. There was a very strong prevailing consensus towards an interest rate cut, and within that, there was a prevailing consensus for a cut of only 25 basis points." |
| 06.06.2013 | x       |           |     | "Well, on the first question, there was a consensus by the Governing Council in the assessment that changes were not enough to warrant immediate action."   |



| meeting    | dissent | unanimity | n/a | excerpt from Q&A   |
|------------|---------|-----------|-----|--|
| 04.07.2013 |         | x         |     | "The decision was unanimous, which is also quite important. ... we basically came to a unanimous agreement on the forward guidance."   |
| 01.08.2013 |         | x         |     | "we have unanimously confirmed the forward guidance we gave last time."  |
| 05.09.2013 |         | x         |     | "So, all in all, the Governing Council is fairly united – unanimous, actually – on the wish to maintain this type of forward guidance."  |
| 02.10.2013 |         |           | x   |  |
| 07.11.2013 |         | x         |     | "On the forward guidance, yes, the position was unanimous."  |
| 05.12.2013 |         | x         |     | "On the first question, once we have taken a vote on a decision, we never take another vote to decide, say three weeks later, whether that decision was justified or not. So, we vote only once, basically. In fact, we rarely vote. Sometimes we do – like last time."  |
| 09.01.2014 |         | x         |     | "Question: Were there any board members who were in favour of a rate cut at this meeting or was the decision to hold the rate unanimous? Draghi: As I said before, we had an extensive discussion on the state of the economy. We asked ourselves questions more about what sort of risk could undermine our baseline scenario. Could this modest recovery weaken all of a sudden? What would cause our medium-term assessment for inflation to worsen? And when I say “worsen” at this point in time, I mean to go down. Are the risks for inflation bigger in one direction or another? I said they’re limited on both sides and in the introductory statement I said they’re broadly balanced. And then we asked ourselves: what is an unwanted tightening on the short money markets, which could then translate itself into a threat to the recovery? These sorts of questions were discussed, and then of course we discussed all the instruments that would be used if such scenarios were to materialise." |
| 06.02.2014 |         |           | x   |  |
| 06.03.2014 | x       |           |     | "I think this was really the point of major consensus, if not unanimity, in the discussion we had"   |
| 03.04.2014 | x       |           |     | "There are obviously different viewpoints, but the final consensus that the Governing Council came to was exactly the one illustrated in the introductory statement."  |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A  |
|------------|---------|-----------|-----|---|
| 08.05.2014 | x       |           |     | "Let me say immediately that there wasn't a decision today, in the sense I said it's a preview of the next month's meeting, the discussion we had today. But certainly there is consensus or unanimity in not being resigned to the present low inflation for a too long, too protracted a time."                                     |
| 05.06.2014 |         | x         |     | "The first question you ask in these press conferences: 'Was it unanimous?' Now this time it was unanimous. I'm really very grateful to all my colleagues in the Governing Council because being able to agree to have unanimity on such a complex set of instruments means a very, very extraordinary, unusual degree of consensus." |
| 03.07.2014 |         | x         |     | "In fact, as I said, interest rates will stay low for an extended period of time, and the Governing Council is unanimous in its commitment to use also nonstandard, unconventional measures to cope with the risk of a too-prolonged period of time of low inflation."  |
| 07.08.2014 |         | x         |     | "Our monetary policy stance remains, and will remain, accommodative, and I can only reaffirm that the Governing Council is unanimous in its commitment to also use unconventional measures, like ABS purchases, like QE, if our medium-term outlook for inflation were to change."  |
| 04.09.2014 | x       |           |     | "The answer to the first question is no. It was not unanimous."   |
| 02.10.2014 |         | x         |     | "I would reiterate saying that the Governing Council is unanimous in its commitment to use other unconventional instruments."   |
| 06.11.2014 |         | x         |     | "Also, you correctly pointed out that this Introductory Statement has been signed by the whole Governing Council unanimously."  |
| 04.12.2014 | x       |           |     | "There was a vast majority of the members of the Governing Council, but the decision was not unanimous."  |
| 22.01.2015 | x       |           |     | "Second, there was a large majority on the need to trigger it now, and so large that we didn't need to take a vote."  |
| 05.03.2015 |         |           | x   |   |
| 15.04.2015 |         | x         |     |   |
| 03.06.2015 |         | x         |     | "the Governing Council was unanimous in its assessment that we should look through these developments and maintain a steady monetary policy stance."  |
| 16.07.2015 |         | x         |     |   |
| 03.09.2015 |         | x         |     | "Second question answer: no, there wasn't any discussion about changes in the size of the programme or pace."   |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A   |
|------------|---------|-----------|-----|--|
| 22.10.2015 | x       |           |     | "I would say there were a few members of the Governing Council who hinted at the possibility of acting today, but I wouldn't say it was a prevailing theme of our discussion today."   |
| 03.12.2015 | x       |           |     | "No, they were not unanimous, but there was a very large majority in favour of this package. Very large."  |
| 21.01.2016 |         | x         |     | "First question, let me disagree with your reading of the minutes. They don't show such divisions as you've hinted. Let me restate that this line of communication today was unanimous."   |
| 10.03.2016 | x       |           |     | "In the adoption of the decision, I would say that the majority in favour has been overwhelming."  |
| 21.04.2016 |         |           | x   |  |
| 02.06.2016 |         |           | x   |  |
| 21.07.2016 |         |           | x   |  |
| 08.09.2016 |         |           | x   |  |
| 20.10.2016 |         | x         |     | "In other words, to be more precise, we didn't go at all in the exercise of counting views or majorities – or not."  |
| 08.12.2016 | x       |           |     | "Yes, the two options that have been presented were the ones that had been studied by the committees in the preceding months. One foresaw the option of continuing with €80 billion a month for six months, and the other one is the one that received a very, very broad consensus by the Governing Council."   |
| 19.01.2017 |         | x         |     | "Now on the other point, it's too early to say. Let me say one thing about the Governing Council of today. The discussion was unanimous in looking back at the monetary policy decisions taken in December and stating that they were the right policy answer to the contingencies as viewed, as estimated in December. More generally there was a sense of satisfaction towards the monetary policy stance that we have been pursuing now since 2014. It's increasingly clear that this policy stance had been successful." |
| 09.03.2017 | x       |           |     | "Now, in your first question you're asking me how the consensus changes from time to time and meeting to meeting; I actually don't have a meter to measure that. I would say the discussion today was pretty consensual."  |
| 27.04.2017 |         |           | x   |  |

| meeting    | dissent | unanimity | n/a | excerpt from Q&A   |
|------------|---------|-----------|-----|--|
| 08.06.2017 |         | x         |     | "we didn't have a vote, so I can't really say unanimity. But basically I didn't hear any dissenting voice by any Governing Council member with respect to the proposals that have been just stated in the introductory statement."   |
| 20.07.2017 |         | x         |     | "We also were unanimous in communicating no change to the forward guidance and also we were unanimous in setting no precise date for when to discuss changes in the future."   |
| 07.09.2017 |         |           | x   |  |
| 26.10.2017 | x       |           |     | "Now, on the second point, no, it was not unanimous. There were different viewpoints. I would characterise the discussion as ranging between consensus, broad consensus on several issues and large majority on other issues."   |
| 14.12.2017 |         | x         |     | "We didn't discuss this today, by the way, but the last discussion we had a month-and-a-half ago showed that the Governing Council, its vast majority, wants to keep, to retain the open-endedness feature of the asset purchase programme as it's been designed in the last monetary policy council."   |
| 25.01.2018 |         | x         |     | "Then of course you have nuances which were picked up by the market. But we are in the range of normal differences of views."  |
| 08.03.2018 |         | x         |     | "All in all, if you read this decision – by the way the decision was unanimous – that's what it is."   |
| 26.04.2018 |         | x         |     | "Well, the reason why we didn't discuss monetary policy per se is that the reading of the current developments since the beginning of the year is actually very important in deciding the next steps. Careful assessment, monitoring, the use of more information, are all important components in the next decisions. "   |
| 14.06.2018 |         | x         |     | "This was unanimously confirmed, so the decision was a unanimous one."   |
| 26.07.2018 |         | x         |     | "I think the best way to answer both questions is to give you a short account of what's been our discussion today. Well, first of all, the Governing Council took note that there hasn't been much of a change since last time; has not been a change in the assessment of the outlook – of the medium-term outlook – for growth or inflation, nor in the monetary policy message. " |
| 13.09.2018 |         | x         |     | "But the unanimous view of the Governing Council was that the present monetary policy stance is robust namely even if there are limited changes in policy parameters due to the various effects we've just discussed, the policy stance doesn't change."   |
| 25.10.2018 |         |           | x   |  |
| 13.12.2018 |         | x         |     | "Yes, the decision was unanimous, which is quite important, and it was unanimous."   |

## E Monetary policy accounts

In this appendix, we cross-check the classification of meetings with the information from the monetary policy accounts. Since 2015, the ECB publishes detailed accounts of the GovC meeting. The accounts are released four weeks after the meeting. Importantly, the accounts do not contain information on the formal vote. Instead, the ECB gives a verbal assessment of the council's views. We concentrate on the last section of the accounts titled "Monetary policy decisions and communication" and manually classify the meeting into dissent when a description such as "unanimous", "all members", "broad agreement" and "wide agreement" is used. A meeting is classified as dissent when the accounts refer to a "large majority" or a "general agreement".

If a meeting is classified as dissent or unanimity based on our reading of the accounts, while the press conference does not contain information in this regard, we do not include the meeting in the dissent index.

| meeting    | dissent | unanimity | excerpt from accounts   |
|------------|---------|-----------|---|
| 22.01.2015 | x       |           | "a <b>large number</b> of members were in favour of expanding the existing private sector asset purchase programmes"  |
| 05.03.2015 |         | x         | "Overall, the sentiment was <b>widely shared</b> that with the January 2015 monetary policy decisions the Governing Council had ... now deployed almost the full range of the instruments at the disposal of monetary policy"   |
| 15.04.2015 | x       |           | "members <b>generally agreed</b> that a steady hand and the firm implementation of the measures decided in January 2015 would best serve to support the economic recovery and a return of inflation towards 2%. There was hence no need to consider any change in the monetary policy stance at present or to reconsider any of the parameters of the PSPP decided on 22 January 2015." |
| 03.06.2015 |         | x         | "the President concluded that the Governing Council was <b>unanimous</b> in its assessment that it should look through recent volatility in financial markets and maintain a steady monetary policy course."  |

| meeting    | dissent | unanimity | excerpt from accounts  |
|------------|---------|-----------|--|
| 16.07.2015 |         | x         | "the President concluded that the Governing Council was <b>unanimous</b> in its assessment that a steady monetary policy course should be maintained. "  |
| 03.09.2015 |         | x         | "There was also <b>wide agreement</b> for stressing that the monthly asset purchases of €60 billion would be fully implemented until the end of September 2016, and beyond, if necessary, and, in any case, until a sustained adjustment in the path of inflation, consistent with the Governing Council's aim of achieving inflation rates below, but close to, 2%" |
| 22.10.2015 | x       |           | "monetary and financial conditions, members generally concurred with Mr Praet that these had remained broadly unchanged from the Governing Council's early September meeting"  |
| 03.12.2015 | x       |           | " <b>most members</b> were of the view that a recalibration of the prevailing monetary policy stance was warranted"  |
| 21.01.2016 |         | x         | "the President ascertained that the GovC was <b>unanimous</b> in concluding that the monetary policy stance needed to be reviewed and possibly reconsidered at the Governing Council's next monetary policy meeting in early March 2016 "  |
| 10.03.2016 | x       |           | "a <b>large majority</b> of voting members supported the proposed policy package"  |
| 21.04.2016 | x       |           | "There was <b>general agreement</b> that there was a need to counter the perception that monetary policy could no longer contribute to a return of inflation"  |
| 02.06.2016 |         | x         | "the President concluded that the Governing Council was <b>unanimous</b> in its assessment that it should look through recent volatility in financial markets and maintain a steady monetary policy course"  |
| 21.07.2016 |         | x         | "members <b>widely agreed</b> with the proposals presented by Mr Praet in his introduction"  |
| 08.09.2016 |         | x         | "members <b>widely agreed</b> that policy action at the present meeting was not warranted and that the focus should remain on ensuring the full implementation of the policy measures so far decided"  |
| 20.10.2016 |         | x         | "There was <b>wide agreement</b> among members that it was premature to make a firm assessment of the outlook for price stability and to discuss its implications for the monetary policy stance at the current meeting."  |
| 08.12.2016 | x       |           | "A <b>few members</b> could not support either of the two options that had been proposed"  |

| meeting    | dissent | unanimity | excerpt from accounts  |
|------------|---------|-----------|--|
| 19.01.2017 |         | x         | "Members <b>agreed</b> on the appropriateness of the current monetary policy stance and recent developments were generally seen to vindicate the decisions taken by the Governing Council at its meeting in early December 2016 "              |
| 09.03.2017 | x       |           | "members <b>generally agreed</b> with the proposals made by Mr Praet in his introduction to keep the communication with respect to the Governing Council's monetary policy stance and its forward guidance unchanged"                          |
| 27.04.2017 |         | x         | "there was <b>broad agreement</b> among members that the current monetary policy stance remained appropriate"  |
| 08.06.2017 |         | x         | "there was <b>broad agreement</b> among members that the current monetary policy stance remained appropriate. Accordingly, the view was widely shared that maintaining a steady hand with respect to the monetary policy stance was warranted" |
| 20.07.2017 |         | x         | "there was <b>broad agreement</b> among members that there was presently a continuing need for steady-handed and persistent monetary policy"   |
| 07.09.2017 |         | x         | "There was <b>broad agreement</b> to emphasise, as on previous occasions, the need for monetary policy to remain persistent and patient"   |
| 26.10.2017 | x       |           | "a <b>large majority</b> of members supported the proposal made by Mr Praet in his introduction"   |
| 14.12.2017 |         | x         | "there was <b>broad agreement</b> among members that the current monetary policy stance remained appropriate"  |
| 25.01.2018 |         | x         | "There was <b>broad agreement</b> among members that the current monetary policy stance remained broadly appropriate"  |
| 08.03.2018 |         | x         | " <b>all members</b> agreed with Mr Praet's proposal to remove the "easing bias" on the APP from the GovC's forward guidance"  |
| 26.04.2018 |         | x         | "members <b>widely agreed</b> that a steady hand with regard to monetary policy was warranted at the current stage"  |
| 14.06.2018 |         | x         | "members expressed <b>unanimous</b> support for the monetary policy proposal put forward by Mr Praet"  |
| 26.07.2018 |         | x         | "members <b>unanimously</b> agreed to maintain the current monetary policy stance and to reconfirm all elements of the Governing Council's forward guidance"   |
| 13.09.2018 |         | x         | " <b>all members</b> supported the proposal made by Mr Praet in his introduction"  |
| 25.10.2018 |         | x         | "members <b>widely agreed</b> that patience, prudence and persistence with regard to monetary policy remained warranted, as set out in the proposals made by Mr Praet in his introduction"   |
| 13.12.2018 |         | x         | " <b>all members</b> agreed with the overall package of monetary policy proposals made by Mr Praet"  |

## References

- [1] Adrian, T. R. C. Crump and E. Moench (2013): “Pricing the term structure with linear regressions”, *Journal of Financial Economics* 110, 110–138.
- [2] Bu, C., J. Rogers and W. Wu (2019): “A unified measure of Fed monetary policy shocks”, *Finance and Economics Discussion Series* No. 2019-043, Federal Reserve Board.
- [3] Husted, L., J. Rogers and B. Sun (2020): “Monetary policy uncertainty”, *Journal of Monetary Economics* 115, 20–36.
- [4] Thornton, D. L. and D. C. Wheelock (2014): “Making sense of dissents: a history of FOMC dissents”, *Federal Reserve Bank of St. Louis Review* 3rd quarter 2014, 213–228.