Alternative agendas

Measuring divergence among euro area central bankers

Katrijn Siderius MSc (katrijn.siderius@uni-konstanz.de)
Alumna Utrecht University / University of Konstanz

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Abstract

An important assumption in the mainstream literature on monetary policy is that central bankers are technocrats who make the best possible monetary policy decisions in response to macroeconomic circumstances. This firm stance lacks empirical evidence and is questioned by other economic perspectives. This paper aims to fill these gaps by measuring agenda differences between euro area central bankers with quantitative text analysis, a tool that is scarcely used in the field of economics and political science. The results show that euro area central bankers do have different agendas and that agendas are strongly linked with several national economic indicators, suggesting that central bankers are subject to different ideas and interests. The results indicate it is necessary to take policy measures to preserve the legitimacy of the Economic and Monetary Union.

1. Introduction

An important assumption in the mainstream literature on monetary policy is that central bankers are technocrats who are experts on monetary policy and, following a Taylor rule, make the best possible monetary policy decision in response to macroeconomic circumstances (Hanretty & Koop 2013: 197). This is also how for example the European Central Bank (ECB) profiles itself: as a technocratic expertise centre that is aiming to make the best possible decision in a consensual way (Jung et al. 2010). There are two problems with this firm stance. First, other, mainly political economy theories have a completely different perspective and assume that central bankers are individuals with different (national) interests and ideas (e.g. Blyth, 2002, p. 37; Segers & Van Esch, 2007). These differences imply that central bankers do not always agree with each other and the 'best' monetary policy may not exist. Second, there is no convincing empirical evidence for the assumption that central bankers do not have any differences in policy stances, especially in the case of the European Monetary Union (EMU). Existing research sometimes finds differences between central bankers (e.g. Segers & Van Esch, 2007; Schulz, 2017; Van Esch, 2014) and sometimes not (e.g. Jansen & De Haan, 2006; Bennani & Neuenkirch 2017).

This paper has two goals. First, to fill the empirical gap by measuring differences between euro area central bankers in a new way by measuring their *agendas* with *quantitative text analysis*. Following Princen (2011), an agenda is defined as the collection of topics that a central banker considers at a certain moment in time, containing the problems, possibilities and instruments that a central banker thinks are in important. Agenda dispersion is measured with quantitative text analysis, a tool that is scarcely used in the field of economics and political science (Hansen & McMahon, 2016; Bholat et al., 2015). 1155 speeches of central bankers in the period 2002-2017 are analyzed with two algorithms that detect which topics central bankers talk about based on word patterns in the texts. The second goals is to contribute to the theory on monetary policy and test which of the aforementioned economic theories has the best explanatory value (Blatter & Haverland, 2012, p. 27). Contradicting hypotheses stemming from two different perspectives on agenda dispersion and the influence of national interests are tested with interrupted time series and panel analysis.

The results show that central bankers in the euro area do have different agendas: they address different topics over time and compared to each other. Moreover, agendas are strongly linked with several national economic indicators, suggesting influence from national interests. And lastly, agenda dispersion has been growing significantly in the last years, with an emerging South-North axis. These conclusions support a political economy perspective: central bankers are not just technocrats who academically reflect on the one best solution for the euro area. National interests and paradigmatic differences also play a role.

The rest of this paper is structured as follows: The first section gives a short introduction into the monetary policy of the ECB. The second section introduces the two theoretical perspectives and formulates the main hypotheses. The third section discusses the methodology that is used to test the hypotheses, including a specification of the used data and sources. Because the methods used in this paper are relatively new and still in development, the methodology is discussed extensively. The fourth section presents the results and the last section concludes.

2. The European Central Bank

The ECB is the central bank of the euro area and was established in 1993 by the Maastricht Treaty. Since the creation of the euro area in 1999 the ECB took over the main decision-making powers from the national central banks (NCB's), who lost the control over monetary policy in their countries. However, the NCB's are still closely involved in the preparation and the implementation of monetary policy (De Grauwe, 2016, p. 171). The main decision-making body of the ECB is the Governing Council and consists of the presidents of the 19 NCB's in the euro area and six members of the Executive Board, who are appointed by the European Council by a qualified majority (Jung, Mongelli & Moutot, 2010). The ECB Governing Council has been heavily understudied as the ECB does not any voting records and only minutes since 2015 (Bennani & Neuenkirch, 2017, p. 1115).

The main goal of the ECB is to maintain price stability in the euro area (Article 282(3) TFEU), by the ECB itself defined as "in the pursuit of price stability it [The Governing Council] aims to maintain inflation rates below, but close to, 2% over the medium term" (ECB, 2018). To reach these inflation rates, the monetary policy is based on an approach that has not changed since 1998. The Governing Council assesses the economy on basis of two pillars and decides if adjustment of the monetary policy strategy is necessary. The first pillar consists of a

3

"prominent role for money, as signalled by the announcement of a reference value for the growth of a broad monetary aggregate" and the second pillar "broadly based assessment of the outlook for future price developments and the risks to price stability in the euro area as a whole" (ECB cited in Gerlach, 2004, p. 392).

3. Theoretical framework

3.1   Agenda dispersion

This paper studies the dispersion in agendas between national central bankers in the euro area. An *agenda* is defined as the collection of topics that a central banker considers at a certain moment in time (Princen, 2011, p. 927).[1] For example, central bankers can address economic concepts, such as inflation, GDP and employment. These can be discussed because presidents present their analysis of the current or future economic outlook, or as goals of monetary policy. Furthermore, central bankers talk about the different instruments of monetary policy (e.g. Coenen et al., 2017, p. 14; Jansen & De Haan, 2006; Picault & Renault, 2017). *Agenda dispersion*, consequently, occurs if central bankers consider different topics.

Agendas are important as they reflect "which issues are to be dealt with and in what terms" (Princen, 2007, p. 22). For a topic to be decided on, it needs to be on the agenda in the first place. For example, in the case of Quantitative Easing (QE), central bankers must first have a policy in goal in mind, such as inflation around 2%. Second, they need to consider the economic circumstances and notice that inflation stays low. Lastly, the idea of using QE must be available to them and their attitude towards the use of this instrument must be favourable. If all these conditions are satisfied, QE makes a chance (see also Kingdon, 1984).

A central premise of the agenda-setting literature is that not all topics that are relevant at a certain moment are on the agenda of central bankers. Central bankers, just as all policy makers, face time-constraints and are subject to bounded rationality and so they process information on the state of the economy in a disproportionate way; some signals get attention and others do not (Jones & Baumgartner 2004: 334). Which topics central bankers address and if they are the same for all central bankers, depends on the theoretical perspective. From the independent

[1] Some authors define agendas more specific as a collection of *issues*; conflicts over certain matters (Princen, 2007, p.927). This paper intentionally choses the more neutral *topic*, as issues would imply almost automatically dispersion and thus no variation in the dependent variable.

authority perspective used by mainstream economists, technocratic goals and approaches work as convergent factors and central bankers have more or less the same agendas. However, from a political economy perspective there are also diverging factors to be considered, such as different ideas and interests. These perspectives are reviewed in turn below

3.2 The independent authority perspective: independence and expertise

The first perspective stresses that central banks should be designed like *independent authorities*. Independent authorities are public bodies characterized by formal independence from elected politicians and specialization in one particular domain, such as monetary policy (Gilardi, 2007, p. 304, Majone, 1997, pp. 152–155; Thatcher, 2002, p. 954). These characteristics have two clear benefits. First, the central bank is able to make *credible commitments*; central bankers are, in contrast to elected politicians, not tempted to change their policy plans because they do not face pressure from the electorate or interest groups. The result is, in theory, that policy announcements of central bankers have the desired effect and lead to stable inflation (Gilardi, 2007, p. 307; Hanretty & Koop, 2013, p. 197). Second, central banks independence and specialization enables central bankers to assemble expertise in order to make the best possible decision. Freed from political interests and daily issues, monetary policy experts can academically assess the economic situation, discuss these with each other in a consensual way and decide on the best monetary policy decision at a certain moment. There may be different viewpoints at first on how to interpret certain information, but those are resolved through deliberation. (Eberlein & Newman, 2008, p. 27, Hanretty & Koop, 2013, p. 197, see also Joerges & Neyer, 1997).

3.2.1 Juridical reality and empirical evidence

Juridically, the ECB is indeed designed like an independent authority (Gilardi, 2007, p. 302). Members of the Governing Council are formally independent from any influence from Member States and the European institutions and all have the same constitutional mandate with one specific goal: to maintain price stability in the euro area (Article 282(3) TFEU). There is a vast body of literature that tries to answer the question if this judicial reality is also the empirical reality. There are two types of research. First, a very large collection of mainstream econometric papers that uses a *Taylor rule*. (Lavoie, p. 15,16) The Taylor rule states that the central bank determines its interest rate on basis of economic indicators, such as inflation and

the output gap (the difference between GDP and target GDP)[2] (Taylor 1993: 202). Several studies have estimated a Taylor rule of the ECB, with mixed results. On the one hand, studies show that the ECB reacts to inflation and the output gap (e.g. Belke & Klose, 2011, p. 168; Caputo & Diaz, 2017; Hayo & Hofmann, 2006; Gerlach & Lewis, 2014), on the other hand other studies show that it does not (e.g. Caputo & Diaz, 201; Gerlach, 2011; Rühl, 2015).

Next to the econometric evidence, there are two qualitative studies that compare law and practice: First, Ehrmann & Fratzcher (2005) analyse the communication of central bankers of the Federal Reserve, the Bank of England and the ECB. Their conclusion is that ECB central bankers do not often contradict each other in their communication compared to the Federal Reserve (p. 526). Second, Jung, Mongelli & Moutot (2010) (all working for the ECB) describe how monetary policy decisions are made within the ECB on the basis of official policy documents. Their paper confirms the theoretical expectations of the independent authority perspective: the high level of expertise and the consensual decision making aimed at finding the 'best' policy. They conclude: "In practice, however, the Governing Council practices consensus voting" (p. 332), which means that when Governing Council members "reach consensus about the best policy reaction, they consider all available information" (p. 331).

3.2.2   Model I: Central bankers as technocrats

The literature above can be summarized as follows (see figure 3.1): Central bankers form a technocratic group, who try to manage monetary policy as good as possible. When information about the economy comes in, a central banker assesses what is important on basis of the two-pillar model of the ECB and what needs to be done in terms of monetary policy (arrow 1). This collection of considered topics together forms the individual agenda of a central banker. Next, central bankers discuss their views in the Governing Council in a deliberative way focused on consensus, resulting in central bankers' individual final agenda (arrow 2). Because the assessments and discussion are based on the same model and the discussion has the goal to reach consensus, the final agendas are expected to be quite similar and result, when compared to each other, in agenda convergence (arrow 3). This leads to the following null hypothesis:

Hypothesis 0: Agenda dispersion does not vary over time

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[2] The original rule has the following form, where r is the rate set by the central bank, p is the inflation over the previous year, y is the difference between GDP and target-GDP and r^* is the equilibrium interest rate: $r = p + 0.5y + 0.5(p - 2) + r^*$ (Taylor, 1992, p. 202).
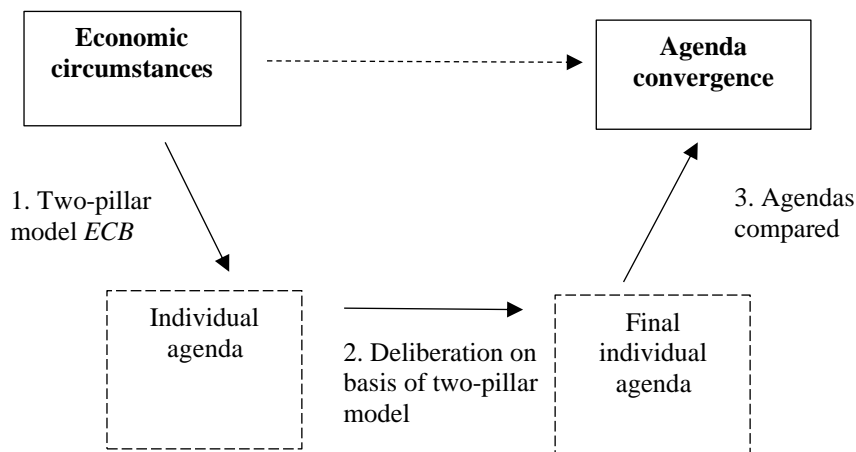
Figure 3.1: Information processing of central bankers I

3.3   The political economy perspective: ideas and interests

The model sketched above is problematic from a political economy perspective because it relies heavily on the assumption that all central bankers use the two-pillar approach. According to the political economy literature, there are three main sources of individual differences: ideas, interests and political bargaining. These concepts are discussed in turn.

3.3.1   Multiple ideas

The first source of differences between central bankers are their ideas on how the world works (Blyth, 2002, p. 37). Ideas constitute the concepts that are important in the economy (such as 'interest rate') and the relations between those concepts (such as 'increasing the interest rate increases the credit supply') (Blyth, 2002, p. 37). Ideas enable actors to make sense of the world and select the 'right' policy in response to a certain problem ('if the credit supply is too low, the interest rate needs to be increased') (Schulz, 2017, p. 97). In an impressive study, Schulz (2017) measures ideas by surveying central bank economists and presidents. Schulz shows that central bank economists and presidents differ highly in believes, especially in the euro area (p. 98, 118). Overall there is a great variety of schools within the euro area, but the two dominant schools are Monetarism and Keynesianism (p. 113). For monetarists, price stability is the one and only goal of the central bank. Furthermore, they pose that inflation in the end has one cause: money growth increasing at a faster pace than economic growth. If more

money is available in the economic system than real goods and services, aggregate demand raises, and prices go up. According to the monetarist view, central bankers can influence the money supply in the economy with their interest rate (Schulz, 2017, p. 69, see also Friedman, 1970).

Keynesianists, on the other hand, state that inflation has its origins in the real economy, not the money supply. If economic demand increases or costs rise and prices rise accordingly, this can cause a 'wage-price spiral'; employees demand higher wages to pay the higher prices, which increases costs and demand, and so on. As demand and costs can rise as a result of multiple factors, such as climate change or demographic developments, inflation has various causes (Schulz, 2017, p. 69). More importantly, for Keynesianists price stability is not the only goal of central bankers (Van Esch, 2014, p. 290). As important are high employment levels, a stable business-cycle and financial stability (De Grauwe, 2017, p. 157).

Central bankers can get their ideas from various sources, according to several empirical studies. Education, could be a possibility (Adolph, 2013, p. 22; Farvaque et al., 2014, p. 23), but in their study of FED central bankers, Smales and Apergis do not see any effect (2015). Second, experiences of members with inflation developments in the past may be relevant (Malmendier et al., 2017; Smales & Apergis, 2015). Occupational experience is important (Farvaque et al., 2014, p. 23; Göhlmann and Vaubel, 2007) and lastly, national cultures could play a role (Schulz, 2017, p. 118).

3.3.2   Multiple interests

The second diverging factor are different interests (Princen, 2011, p. 929). In case of the Governing Council, members wear two 'hats'. On the one hand they are appointed to serve the euro area interest (Article 282(3) TFEU). On the other hand, they are national central bank presidents. Although they are formally independent, Adolph (2013) argues that central bankers have "shadow principals": "patrons who set implicit contracts with bureaucratic agents to implement policies that the shadow principal desires" (p. 17). Implicit contracts include for example dependency on re-appointment or further jobs. Furthermore, the existence of a national central bank depends on the legitimacy it enjoys in the eyes of national citizens (Scott, 2016, p. 71). These ties could lead central bankers to prefer national interests above euro area-interests (Jung & Latsos, 2015). For example, countries who faced high interest rates on their

government debt and countries with banks with high interbank deficits and non-performing loans had an interest in expansive and unconventional monetary policy, whereas the other countries did not (Frieden & Walter, 2017, p. 18; Schulz, 2017, pp. 37, 148, 153).

Benanni & Neuenkirch indeed show that the sentiment of national presidents' speeches correlates with the developments in national GDP, which could be seen as prove that central bankers attach value to national information. Moreover, several authors find that the interest decisions by the ECB are best predicted with a model where members follow national objectives (Hayo & Méon 2013, p. 138; Lee and Crowley, 2009, p. 3).

Although ideas and interests are often separated, they are highly connected. One the one hand, what is in an actor's interest depends on the idea of the actor of its interest and the instruments that are suitable to serve that interest (Blyth, 2002, p. 29). At the same time, interests can influence ideas. For example, the central bankers from the euro area countries that are highly dependent on exports for their economic growth may bias their interpretive framework towards exchange rates (Baccaro & Pontusson, 2016).

3.3.3   Bargaining and strategic positioning

Next to the differences in interest and ideology, there is a third factor that can intensify diverging interests. As explained above, the independent authority perspective assumes that within authorities, technocrats discuss economic circumstances and necessary policy measures in a deliberative way aimed at consensus. There is however, also literature that suggests that even in technocratic groups the decision-making process can be characterized by power struggles, debate and bargaining (e.g. Van de Kerkhof, 2006, p. 282, see for an overview Siderius & Brandsma, 2017, p. 1268). Hayo & Meon find evidence for this strategy in their analysis of the interest rate decisions of the ECB: output of models that are based on bargaining have a better fit with the real interest rate decisions that models based on consensus (2013, p. 152).

3.3.4   Model II: Central bankers with interests and ideas

With these new insights form the political literature, the model from Figure 3.2 can be *supplemented* (see Figure 3.3). Next to the two-pillar approach of the ECB, central bankers have their own ideas and national interests. These three factors determine the individual agenda

9

(arrow 1). Next, during discussions in the Governing Council, discussions do not necessarily have the goal to reach consensus and may even strengthen contradictions (arrow 2). When agendas are compared, in the end, it is thus possible that agendas are highly dispersed, depending on the alignment of ideas and interests at a certain moment (arrow 3). This leads to the following hypotheses:

Hypothesis 1: Agenda dispersion varies over time.
Hypothesis 2: Central bankers take national economic indicators into account in their agendas
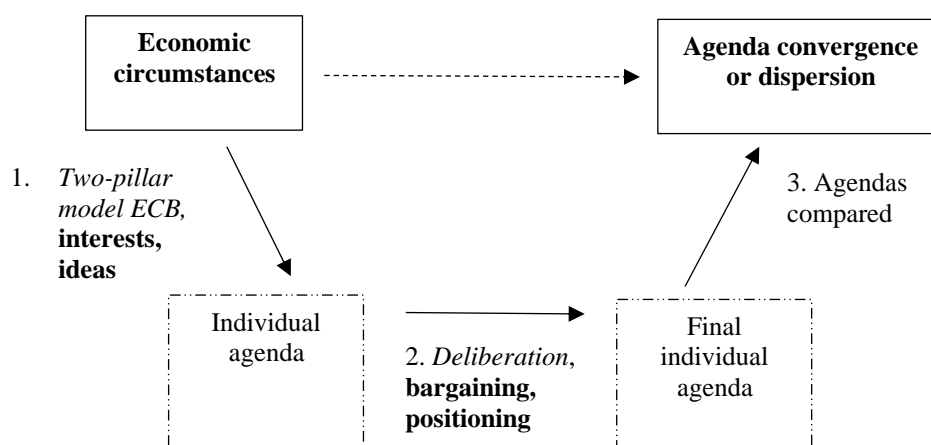
Figure 3.2: Information processing of central bankers II
Converging factors in *italic,* diverging factors in **bold**

4. Design and methodology

4.1 Scope, case selection and time frame

As mentioned before, the *scope* of this paper entails the national central bank presidents that are seated in the monetary policy committee of the euro area: the ECB Governing Council. The benefit of choosing one central bank and not multiple is that the institutional context is stable and thus can be ruled out as a potential explanation for differences in dispersion. A drawback is that the results cannot be generalized one-on-one to other central banks. Regarding *case selection*, this paper takes countries as the main unit of analysis and not individual central bankers. So, any effects of personal differences between consecutive central bankers of the same country are omitted from the analysis. Since the introduction of the euro in 1999, several countries have joined the euro area, bringing the total number of euro area countries to 19. To

10

keep the number of central bankers in the selection relatively stable only the 14 euro area countries that joined the euro before 2009 are selected.[3] The choice for the *time frame* is determined by data availability. As described below, the primary source for the dependent variable are speeches by central bank presidents. There not enough speeches before 2002 for reliable analysis. Therefore, the time frame is 2002-2017.

4.2 Measuring the dependent variable: agendas

The primary source for the dependent variable are speeches by central bank presidents. The Bank of International Settlements (BIS) collects almost all speeches of central banks worldwide and translates them to English if necessary. A full overview of the used speeches per country and year is available in Annex I. The total number of retrieved speeches is 1155. To prepare the data for analysis, the speeches are read into data analysis software R. Punctuation, numbers and symbols are removed, capital letters are replaced with lower letters. Often occurring stop words ("and" "or", etc.), very rare words and country names are removed. The documents are grouped for country and year, so all speeches for a country in a year as taken as one document, which results in 194 documents *that represent the agenda of one country in one year.*

To compare agendas between central bankers and over time, this paper uses a combination of two algorithm that measure the positions of and the topics within the agendas based on word frequencies in the texts (e.g. Hansen & McMahon, 2015). The major advantage of this approach is that little subjective input is required. However, there are also drawbacks. First, the algorithms themselves make certain assumptions that can influence the output. And second, the output itself needs to be interpreted, which is not always straightforward, as will be shown below. The next paragraphs introduce the two algorithms.

4.2.1 WordFish

To determine dispersion between central bankers in one year, a unidimensional measure is necessary that indicates the agenda of a central banker in a certain year with *one score*. The algorithm *WordFish,* developed by Slapin and Proksch (2008), produces such a unidimensional measure (Slapin & Proksch, 2008, p. 708-709). WordFish estimates positions of documents on a one-dimensional scale based on word frequencies in documents. Simply said, countries with

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[3] This leads to the following selection of 14 countries: Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, The Netherlands, Portugal and Spain.

similar positions on the dimension use the same words in the same amount. From now on, this dimension is called the *agenda index.* Next to the agenda index scores, the algorithm returns another informative indicator. For every word, the algorithm estimates a word weight giving information on the importance of the word for distinguishing between positions on the scale. If the word weight is negative, this indicates that the specific word is more used by documents on the negative end of the scale and vice versa (Slapin & Proksch, 2008, p. 708, 709, 715).

The reliability of the WordFish estimators depends on the number of unique words in the entire sample. With 10000 unique words, the average confidence interval is 0.1 (Slapin & Proksch 2008: 721)[4].The number of unique words in the estimation in this paper is approximately 35000, which means that the average confidence interval around the scores is probably even smaller than 0.1.

4.2.2   LDA

The main drawback of the WordFish algorithm is that it does not provide an interpretation of the agenda index it scales the documents on. However, with the help of a Latent Dirichlet Allocation (LDA) algorithm, it is possible to interpret the two sides of the index. The LDA algorithm identifies different topics in documents on the basis of word patterns (for a good introduction see Jacobi, van Atteveldt & Welbers, 2015). Topics consist of groups of words that are highly likely to appear together. Topics do not automatically get a meaning or a name, this is subject to interpretation. Next to topics, the algorithm reports per document and topic pair the probability that the topic is present in the document. These occurrence probabilities can be compared to see if documents (are likely to) contain the same topics.

The number of topics has to be specified beforehand. There is no a-priori optimal number of topics and the selection is subject to multiple considerations. After analysing the interpretability of 5, 10, 25, 40 and 60 topics (as suggested by Jacobi, van Atteveldt & Welbers, 2015, p. 7,8), a choice is made for a simple model of ten topics. After ten, no meaningful different or interpretable topics are added to the already identified topics, nor do the already identified topics change considerably. The first column of Table 4.1 shows the ten topics that were

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[4] Slapin & Proksch use a standardized scale (mean = 0, SD = 1), just like this paper (2008, p. 721), so the results are more or less transferable.

identified by the LDA algorithm[5]. As said, the names of the topics are *not given* and chosen by the researcher on basis of interpretation of the word groups. The interpretation process is described in detail in Annex II.

To connect the ten topics with the agenda index, the word weights of the WordFish algorithm are used, giving information on the importance of the words for distinguishing between positions on the agenda index. The second column of Table 4.1 presents an overview of the average word weights of the words in the LDA topics. From the word weights, the conclusion can be drawn that agendas that are at the negative end of the index use more words from topic 'Price stability' and slightly more words from the topics 'Fiscal stability' and 'European integration' than agendas at the positive end of the index. Agendas at the positive end of the index, in contrast, use more words from topics 'Basel II', 'Growth and investment' and 'Government / bank debt' and slightly more words from the topics 'Financial risks' and 'Banking sector'.

Topic	*Average weight*
1. Financial risks	0.09
2. Basel II	0.22
3. Growth and investment	0.16
4. Banking Sector	0.09
5. Government / bank debt	0.29
6. Euro crisis	-0.02
7. Fiscal stability	-0.08
8. Not interpretable	0.55[6]
9. European integration	-0.09
10. Price stability	-0.23

Table 4.1: Average word weights of the LDA topics
A positive average word weight indicates that the topic is mostly used by central bankers who score on the positive side and vice versa for negative word weights.

[5] The word groups do not consist of a fixed number of words. The LDA algorithm reports per topic word pair the probability that it belongs to that topic. The 15 words with the highest probability are shown in the table.

[6] Although this topic is not interpretable, it has a very high positive average word weight and is thus important for distinguishing between countries according to the WordFish algorithm. When looking at the occurrence probability of this topic per country (see Annex II), it becomes clear that it is mainly Italy that uses this topic a lot. One possible explanation could be that Italian central bankers have an entirely own way of talking about their job.

The word weights show that central bankers with agendas at the negative side of the index have a *narrow focus*: these central bankers address the main goal of the ECB, price stability, a lot. This may indicate that these central bankers have a monetarist agenda and want to stick to the mandate of the ECB (see 3.3.1). The central bankers on the other side of the index have a *broader agenda*; they also consider other topics, which may indicate that they have a more Keynesian agenda. However, as the algorithm only reports on the occurrence of the topics and not the position of central bankers towards these topics, it is not possible to conclude that the two ends stand for 'Monetarism' and 'Keynesianism'. Instead, the negative end of the agenda index will be called 'Narrow agenda' and the positive end of the index 'Broad agenda'.

4.3 Economic predictors of agendas

The second hypothesis on the relationship between national economic characteristics and agendas is tested with a panel model with country-fixed effects. Because the agenda index scores are panel data it is possible to control for unobserved country-specific time-invariant effects (hereafter called: country-fixed effects), such as ideas, culture and the variety of capitalism in a country (Croissant & Milo, 2008, p. 3; Hall & Soskice, 2001). This is of great value for testing hypothesis 2, as exactly those country-fixed effects may influence both the economic characteristics of a country as well as the agenda of the central banker. The following linear model is used to estimate the effects of economic predictors on the agenda index score and is integrally taken over from Croissant & Milo (2008):

Panel model $$y_{it} = \alpha + \beta^T X_{it} + \mu_i + e_{it}$$

Where y_{it} is the agenda index score for country i ($i = 1, ..., 14$) at time t ($t = 1, ..., 16$), β^T a vector with effect parameters of selected economic predictors (X_{it}) and μ_i the fixed effect of country i.[7] It is important to note that the effect parameters estimated with this model indicate correlation between economic predictors and agendas and *not* causation. No conclusions can be drawn about causal effects on basis of this model.

The economic predictors are taken from the different theoretical perspectives mentioned above. First, the usual suspects from the Taylor rule: inflation and GDP growth. These indicators too

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[7] The model thus assumes parameter homogeneity: $\alpha_{it} = \alpha$ for all i, t and $\beta_{it} = \beta$ for all i, t.

form an important part of the economic pillar of the ECB approach, from which additionally GDP per capita, government surplus, sovereign debt and unemployment can be taken (Jung et al., p. 341). The second pillar of the ECB approach includes money and credit flows. Moreover, from a financial stability perspective, the capital level of banks and their ownership of non-performing loans are important. Lastly, the spreads of government bond vis-à-vis the German bonds as well as the net payment inflows of a country (target 2 balance) are an indicator for the trust of the markets in a country. Table 4.2 gives an overview of the different predictors, their time frame and the source of the data.

	Predictor	*Time frame*	*Source*
1	Inflation (%)	2002-2017	Eurostat
2	GDP per capita (EUR)	2002-2017	Eurostat
3	GDP growth (%)	2002-2017	Eurostat
4	Government surplus (% of GDP)	2002-2017	Eurostat
5	Sovereign debt (% of GDP)	2002-2017	Eurostat
6	Unemployment (% of total workforce)	2002-2017	Eurostat
7	Domestic credit to private sector by financial institutions (% of GDP)	2002-2016	WorldBank
8	Spread vis-a-vis German bonds	2002-2017	ECB
9	Target 2 balance (EUR)	2002-2017	IMF
10	Average capital level of banks (%)	2005-2016	WorldBank
11	Non-performing loans (% of average gross loans)	2005-2016	WorldBank

Table 4.2: Overview of economic predictors and data sources

5. Results

5.1   Topics over time

To get a first overview of the content of central bankers' agendas, Figure 5.1 shows the results by plotting the average occurrence probabilities per year for each topic. The probabilities indicate to which extent the euro area central bankers had a topic on their *collective* agenda for a given year. There are a few interesting observations. First, the peaks of the two crisis topics

confirm that the labels of the topics are intuitive: 'Financial risks' peaks right in 2008 and 'Euro crisis' in 2011. Second, 'Price stability' peaks right before the financial crisis and declines afterwards, whereas topic 'Banking sector' makes the opposite movement, suggesting a change in focus before and after the crisis period. Third, the topics ' Government / bank debt' and ' Fiscal stability' increase after the euro crisis, indicating a increased concern of central bankers with government policy.
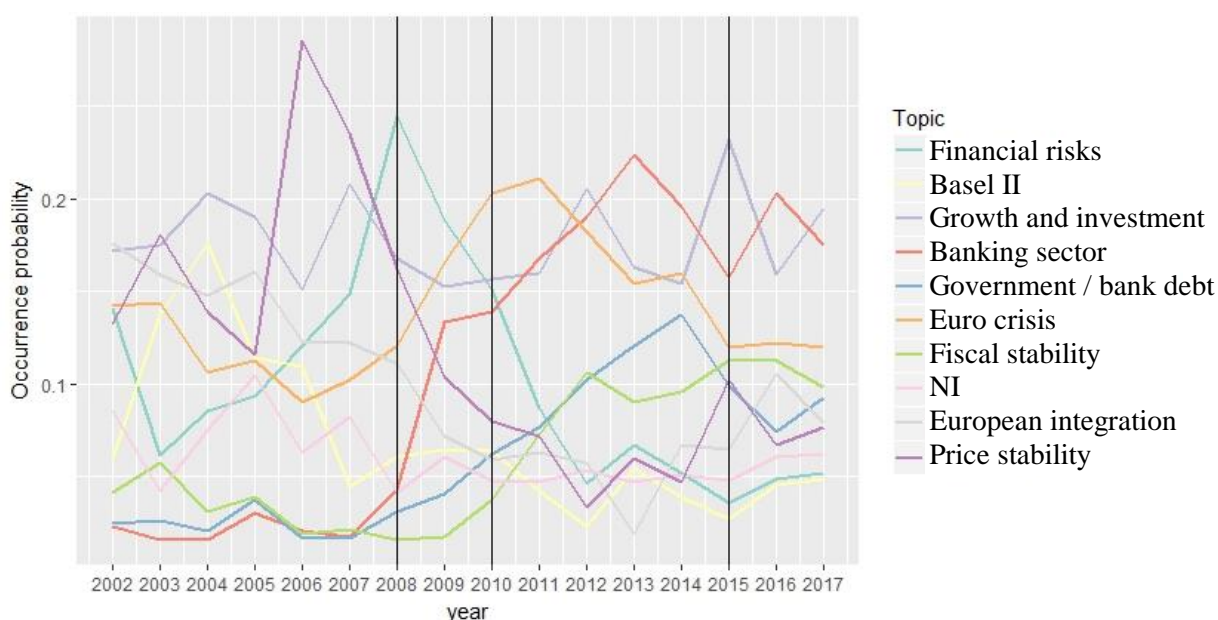
Figure 5.1: Occurrence probability per topic
The vertical lines indicate consecutively 1) the start of the financial euro crisis, 2) the start of the euro crisis and 3) the start of the QE programme.

5.2   Agenda dispersion

Figure 5.2 plots the development of the agenda index score per country. On the basis of the scores it is possible to compare countries' agendas and the development over time. As discussed above, scores at the negative end of the agenda index indicate a narrow agenda, and scores at the positive end of the index a broad agenda. From 2002 to approximately 2008, the start of the financial crisis, there is relative stability. Two aspects stand out. First, the difference between Italy and the others; Italy has a significant higher agenda index score over the period compared to the other countries. Second, there is no major change in countries' score, except for the Netherlands, that moves more to the broad end of the scale and Greece, which moves down and then up again.

16

In the second period, after 2008, countries scores disperse. It looks like the dispersion increase has taken place in two steps. First, Greece, Spain, Belgium, Ireland and Finland move to the 'broad' end of the scale, whereas Austria's score decreases. Germany and Italy stay stable. After 2010, the start of the euro crisis, Greece, Spain and Ireland continue with relatively high scores, whereas the Netherlands, Belgium and Finland and Austria move back to the 'narrow' end of the scale. The result is a bifurcation between the Southern and the Northern countries. The results of a time-series regression show that the growing dispersion between central bankers is significant over time ($p<0.05$) (see Annex III for extensive results).
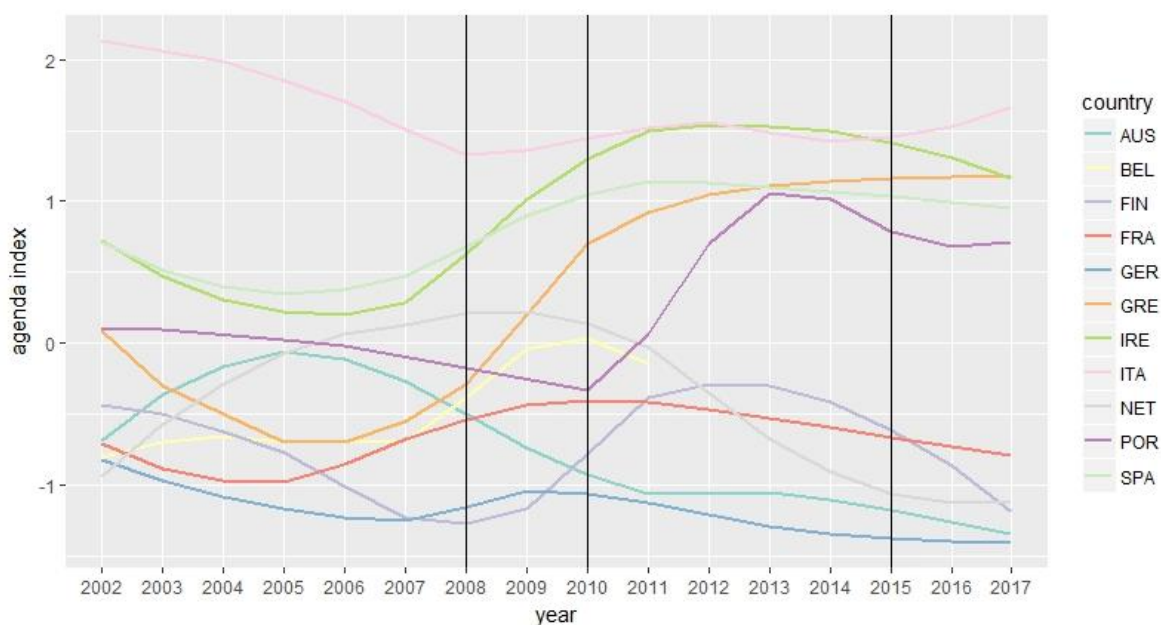
Figure 5.2: Agenda index scores per country and year
The vertical lines indicate consecutively 1) the start of the financial euro crisis, 2) the start of the euro crisis and 3) the start of the QE programme.
Time trend smoothened with Local Polynomial Regression Fitting, method = loess.

Another way to look at the dispersion in the euro area, is to look at the box plot of the agenda index scores per country (Figure 5.3). Italy and Germany represent the extremes: the scores from Germany are grouped at the negative end of the scale, whereas all scores from Italy are at the positive end. Italy is accompanied by Spain and Ireland, Germany by Austria, Finland, France and Belgium. The Netherlands, Portugal and Greece are more in the middle. From the

boxplots it becomes clear that some countries are quite consistent in their position, whereas others are more dispersed: The scores of Portugal, for example, are quite widespread.
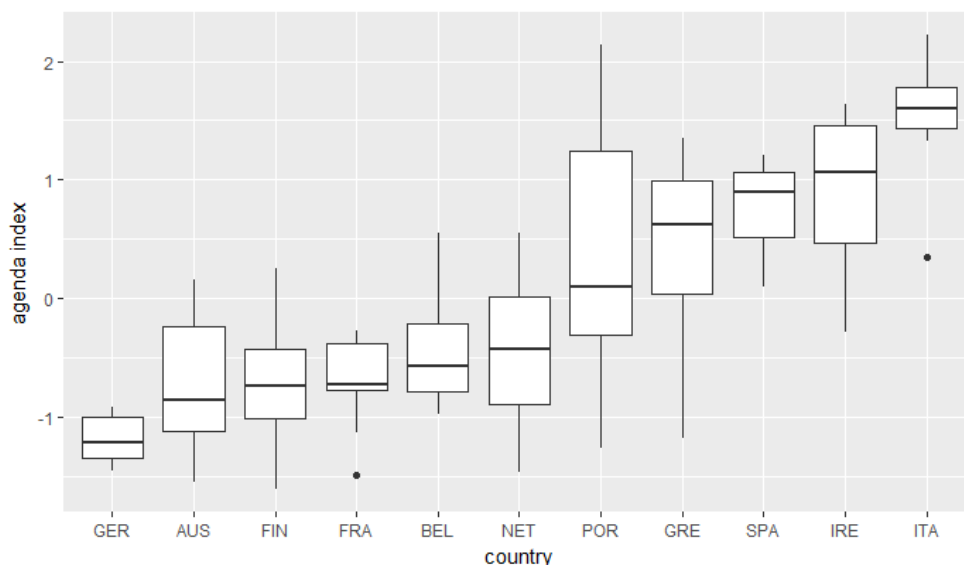
Figure 5.3 Boxplot agenda index scores per country
Countries sorted by mean agenda index score

5.3 National predictors of agendas

Table 5.1 shows the results of the panel regression of economic predictors on the agenda index. With 11 economic predictors, 14 country-fixed effects and a relatively low number of observations (n = 194), there is a risk of overfitting. Moreover, there is a high level of multicollinearity among the selected economic characteristics (see Annex IV). Therefore, two specifications with less economic predictors are selected with low levels of multicollinearity: a simple specification with four economic variables that are commonly used to describe the economic status of a country and second, an extended specification that in addition takes the financial sector into account.

Column 1 shows the estimated parameters of the first specification with inflation, GDP growth, budget surplus and unemployment as predictors. Only the parameter of unemployment is significant: if unemployment increases by one percent, the agenda index score increases, i.e. central bankers consider a broader range of topics. However, this effect disappears when financial sector predictors are added to the regression in the second specification (column 2). Now the budget deficit and the amount of Non-Performing Loans are significantly correlated

with the agenda index score. In other words, the status of government finances is a predictor for how central bankers score on the agenda index: if the budget surplus increases with one percent, the agenda index score decreases, i.e. central bankers move to the narrow end of the index. Furthermore, the status of the financial sector is important: if the percentage of NPL's of total loans goes up with one per cent point, the agenda index score increases, i.e. the central banker is more at the broad end of the agenda index.

The fact that unemployment is only significant in the first specification could be explained by missing values: there is almost no data on non-performing loans before 2006, which causes the drastic decrease in observations in columns 2 to 5. However, when the specification in column 1 is run again with only data from 2006 to 2017, the results stay the same (see Annex V). More likely, therefore, the results may indicate that unemployment acts as a sponge that soaks up all kinds of economic developments, also in the financial sector. If credit supply to the private sector goes down, for example, more businesses will fail, and unemployment goes up. When controlling for these financial sector predictors, unemployment in itself has no significant effect on the agenda index anymore. This conclusion is supported by further robustness checks. The effects found in the extended specification are robust for dropping unemployment from the model (column 4) and adding the full range of predictors (column 5).

Although these effects are correlations and not causal effects, the results indicate at least that there is a possibility that central bankers look at the fiscal status of their own national government and the status of their national banking sector when choosing their topics.

	Dependent variable:			
	Agenda index			
	(1)	(2)	(3)	(4)
Inflation (%)	-0.06	0.004	0.01	-0.01
	(0.04)	(0.04)	(0.04)	(0.04)
GDP per capita (EUR)				-0.0000
				(0.0000)
GDP growth (%)	-0.004	-0.01	-0.01	-0.01
	(0.01)	(0.02)	(0.02)	(0.02)
Budget deficit (% GDP)	-0.01	-0.04**	-0.04**	-0.04**
	(0.01)	(0.01)	(0.01)	(0.01)
Sovereign debt (% GDP)				-0.01
				(0.01)
Unemployment (%)	0.07***	-0.02		0.01
	(0.01)	(0.02)		(0.03)
Private credit supply (EUR)		-0.004	-0.004	-0.01*
		(0.003)	(0.003)	(0.005)
Spread vs German bonds				0.05
				(0.03)
Target-2 imbalances (EUR)				0.00
				(0.00)
Average capital level banks (%)				0.02
				(0.07)
Non Performing Loans (%)		0.05***	0.05***	0.06***
		(0.01)	(0.01)	(0.01)
Observations	193	117	117	110
R^2	0.27	0.42	0.42	0.49
Adjusted R^2	0.19	0.32	0.32	0.35
F Statistic	15.81*** (df = 4; 175)	11.97*** (df = 6; 98)	14.29*** (df = 5; 99)	7.46*** (df = 11; 86)

Note: *p<0.05; **p<0.01; ***p<0.001

Table 5.1: Panel regression results of economic predictors on the agenda index score
Data sources: see Table 4.3
Differences in the number of observations are due to missing values

Two other results are worth highlighting. First, inflation and GDP growth are insignificant in all specifications. This is striking, as almost all models on monetary policy use these two indicators to explain monetary policy choices (see paragraph 3.2.3). Second, it is interesting

that the budget surplus parameter is significant, and the government debt parameter is not, although excessive debt is a larger threat for the stability of a country in the long term than an occasional high budget deficit (De Kam, Koopmans & Wellink, 2011, p. 49). This may indicate that central bankers rather take a short-term perspective instead of a long-term perspective.

6. Conclusion and discussion

6.1   Agendas and the crisis: answering the research question

This paper chose to study dispersion between central bankers in light of two perspectives. First, from an *independent authority* perspective, it was expected that technocratic goals and approaches work as convergent factors and central bankers have more or less the same agendas, before as well as after the euro crisis. Second, the *political economy* perspective posed that there are also diverging factors to be considered; different ideas and interests.

The results presented in the previous section tend to support the second perspective. To begin with, central bankers have different agendas in two ways. Firstly, the topic analyses showed that the topics that central bankers address change over time. 'Banking sector' is such a topic: after the crisis years, central bankers use more words that are related to stability and resolution in the banking sector. Secondly, and more important, central bankers from different countries have different agendas at the same time. When looking at the overall agenda index, there are substantial differences over time. Before 2008, Italy was isolated at the broad end of the index, with all the other countries close to or on the narrow end of the index. Countries started to move in 2008 and since 2010 there is a bifurcation between the Northern and the Southern countries on the agenda index. The increase in dispersion over time on the agenda index is statistically significant. Altogether, this does not support the null hypothesis: 'Agenda dispersion does not vary over time' and does support hypothesis 1: 'Agenda dispersion varies over time'.

Moreover, the results of the panel analysis are also in support of the second perspective. National economic predictors are significantly correlated to central bankers' position on the agenda index. These results cannot prove that central bankers take national economic indicators into account when constructing their agendas, but do point in the direction of this conclusion. Surprisingly, these factors are not the standard factors inflation and GDP growth, but

government budget surplus and non-performing loans. These results support hypothesis 2: Central bankers take national economic indicators into account in their agendas.

6.2   Theoretical and methodological implications

Before turning to the theoretical and methodological implications of the results, it is necessary to reflect upon the used algorithms. The great benefit of the WordFish algorithm is that it produces results that are comparable over time and across country. A drawback of the WordFish algorithm is that the dimension has no a priori meaning and relies on interpretation. This paper has based this interpretation on word scores, but the question still remains what a score of 0.1 on the agenda index or a difference of 0.2 between countries actually *means*. The same goes for the interpretation of the LDA scores, the occurrence probabilities. What does it exactly mean that a central banker has a 0.4 probability to talk about 'Growth and investment'? These questions indicate the need for more fundamental research in the area of quantitative text analysis.

With these critical reflections in mind, the theoretical and methodological implications of the results of this paper can be considered. To begin with the theoretical implications; all in all, the above summarized results offer support for the view on central bankers that was derived from the political economy perspective: central bankers are not just technocrats who academically reflect on the one best solution for the euro area. They are individuals with different (national) interests and ideas. This does *not* mean that they do not consider the two-pillar approach or do not want the best for the euro area. It means that next to the converging forces, central bankers are also subject to diverging forces.

As a consequence, for the field of economics and especially econometrics, it is time to take a broader set of factors into account when talking about monetary policy and the priorities of central bankers. It is time for economics to take *political ideas and interests seriously*. As long as there are different ideas about the aim and means of monetary policy and different national interests, central bankers will not have the same agendas and not the same priorities.

Moreover, quantitative text analysis – although not fully matured (see above) – is a promising methodology. There are thousands of documents that turn into valuable data from a quantitative text analysis perspective. Moreover, quantitative text analysis provides a way to take less

tangible factors, such as ideas, into account. Researchers who study lobbying in the European Union, for example, it is until now very difficult to trace down influence from interest groups (Joosen, Haverland & De Bruijn, 2018). With quantitative text analysis, similarities between interest group position papers and documents throughout the whole decision-making process can be tracked and analysed.

6.3 Broader implications

The results have a number of important implications for the EMU. First, the current bifurcation puts the legitimacy of the ECB as an independent technocratic authority under pressure. Independent authorities owe their exceptional status outside the political arena to their expertise and independence (see paragraph 3.2.1). Dispersing agendas, however, indicate that the decision-making process is more of a political nature. The second problematic consequence concerns the decision-making capacity of the Governing Council. The bifurcation in the agendas of central bankers, with two groups of countries that oppose each other, may put appropriate and fast decision making in jeopardy (Van Esch, 2014, p. 288). This would be a problem if a next crisis hits the euro area. Third and related, different agendas and national interests endanger the EMU in a more existential way. How long can the euro live with such (structural) economic imbalances (Frieden & Walter, 2017)?

All in all, the practical policy implications discussed here show that understanding of central bankers' agendas in the euro area is not only relevant and necessary from a theoretical perspective, but also matters in practice. This paper has set a first step in the direction of increasing this understanding. May other researchers put the topic on their agenda soon too.

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Annexes

Annex I: Overview of used speeches

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
AUS	5	6	9	8	1	4	2	6	2	4	2	3	5	5	2	1	65
BEL	2	1	3	1	2	6	2	1	3	2	0	0	0	0	0	0	23
CYP	0	0	0	0	0	3	8	6	7	4	6	2	6	1	1	3	47
FIN	1	1	3	2	9	9	6	2	4	5	5	7	6	5	6	7	78
FRA	5	1	1	3	5	12	16	9	10	11	11	8	9	8	17	27	153
GER	3	3	8	4	8	5	12	12	14	11	9	18	19	15	13	16	170
GRE	1	3	0	2	2	1	7	3	2	3	1	4	9	2	12	11	63
IRE	1	3	4	4	6	5	7	7	13	5	11	11	8	9	9	12	115
ITA	14	0	6	5	6	3	8	14	8	14	8	12	5	13	11	8	135
LUX	1	2	1	1	3	2	6	4	7	8	0	0	0	2	0	0	37
MAL	0	0	0	0	0	0	4	3	4	3	3	2	0	2	0	5	26
NET	8	3	3	4	3	6	13	8	8	6	4	3	2	2	1	8	82
POR	3	1	0	1	3	0	0	0	7	3	1	4	3	1	1	5	33
SPA	2	10	11	9	4	5	3	10	7	8	10	14	11	8	6	10	128
Total	46	34	49	44	52	61	94	85	96	87	71	88	83	73	79	113	1155

For some countries (Austria, Cyprus, Finland and Portugal), the BIS has little or no speeches in certain years and for these countries an extra effort was made to retrieve speeches (in English) from the websites of the central bank in question.

Annex II: Topic word groups and interpretation

	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
	Financial risks	*Basel II*	*Growth and investment*	*Banking Sector*	*Government / bank debt*	*Euro crisis*	*Fiscal stability*	*Not interpretable*	*European integration*	*Price stability*
1	financial	basel	growth	banks	banks	euro crisis	monetary	per	european	policy
2	banks	risk	economy	financial	bank	countries	union	cent	euro	monetary
3	market	capital	economic	euro crisis	central	euro	policy	must	countries	inflation
4	risk	banks	area	banking	government	policy	central	bank	eu	central
5	markets	new	euro	central	debt	area	financial	firms	economic	price
6	review	committee	public	bank	banking	us	fiscal	banks	europe	stability
7	system	ii	european	european	programme	central	banks	public	integration	bank
8	credit	supervisors	year	bankers	capital	first	stability	capital	bank	rate
9	liquidity	framework	labour	speeches	bankers	now	can	countries	currency	interest
10	stability	management	investment	sector	much	new	economic	economic	growth	euro
11	institutions	banking	sector	capital	losses	financial	european	billion	financial	rates
12	global	supervisory	fiscal	policy	speeches	economy	debt	year	exchange	economic
13	international	bank	gdp	stability	banco	rates	however	gdp	union	expectations
14	risks	requirements	years	measures	restructuring	need	bankers	growth	states	eurosystem
15	current	accord	system	resolution	can	economic	speeches	years	national	area

For some topics, the interpretation is quite straightforward, for example for Topic 10. Central bankers that use the words monetary, policy, price, stability, inflation and interest are most likely talking about monetary policy in the sense of the ECB's official monetary policy goal (see paragraph 3.2.2). This topic is called 'Price stability', after the goal. The same goes for Topic 1 (Financial risks), Topic 2 (Basel II), Topic 3 (Growth and investment), Topic 6 (Euro crisis) and Topic 9 (European integration). For the other topics the interpretation is more ambiguous. Topic 4, for example, consists of a lot of words connected to the banking sector, and a more specific description than this is not feasible. The only not interpretable is Topic 8 and is therefore labelled "Not interpretable".

Topic 8 (NI)
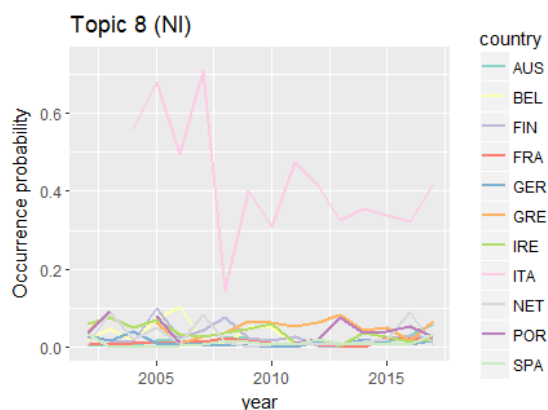
Annex III: Interrupted time-series regression

	Dependent variable:	
	Dispersion (IQR)	
	(I)	(II)
Dummy debt crisis (year > 2009 = 1)	0.69**	-0.18
	(0.18)	(0.26)
Time after (DT)		0.04
		(0.06)
Time (T)		0.09*
		(0.04)
Constant	1.17***	0.77**
	(0.13)	(0.20)
Observations	16	16
R_2	0.52	0.79
Adjusted R_2	0.49	0.74
Residual Std. Error (df = 12)	0.35	0.25
F Statistic (df = 3; 12)	15.20**	14.91***

Note:	*p<0.05; **p<0.01; ***p<0.001

To measure the development of dispersion in agenda index scores between central bankers over time, an interrupted time-series (ITS) regression is used. The measure for dispersion at time t is the interquartile range, i.e. the difference between the upper and lower quartiles of the agenda index scores of central bankers in year t. The following specification is used:

ITS model $\qquad y_t = \beta_0 + \beta_1 T_t + \beta_2 D_t + \beta_3 DT_t + e_t$

Where y_t is the agenda dispersion at time t, determined by time (T), the presence of the euro crisis ($D = 1$) or absence ($D = 0$), the time after the interruption of the euro crisis (DT) and an error term. The β_1 can be interpreted as the time trend, the β_2 as the direct effect of the euro crisis and β_3 as the structural effect of the euro crisis (Penfold & Zhang, 2013, p. 41). Only under the assumption that the euro crisis was an exogenous shock can the estimates of β_2 and β_3 be interpreted as the *causal* (direct and structural) effect of the euro crisis.

Annex IV: VIF test to check for multicollinearity

Results of the Variance Inflation Factors (VIF) tests for the three panel specifications (model = pooling)

	VIF		
	Full	*Specification 1**	*Specification 2**
Inflation (%)	2.010094	1.168490	1.382868
GDP per capita (EUR)	2.383977		
GDP growth (%)	2.160604	1.219918	1.230353
Government surplus (% of GDP)	1.606627	1.450441	1.440278
Sovereign debt (% of GDP)	7.186054		
Unemployment (% of total workforce)	2.934945	1.487381	1.966013
Domestic credit to private sector by financial institutions (% of GDP)	4.153470		1.309260
Spread vis-a-vis German bonds	2.404520		
Target 2 balance (EUR)	2.186092		
Average capital level of banks (%)	5.444223		
Non-performing loans (% of average gross loans)	1.282561		2.041863

* See paragraph 4.3

Annex V: Additional specification panel model

Panel model specification 1, time window 2006-2017

	Dependent variable:
	Agenda index
Inflation (%)	-0.06
	(0.04)
GDP per capita (EUR)	-0.01
	(0.02)
GDP growth (%)	-0.01
	(0.01)
Budget deficit (% of GDP)	0.08***
	(0.02)
Observations	148
R^2	0.29
Adjusted R^2	0.19
F Statistic	13.01*** (df = 4; 130)
Note:	*p<0.05; **p<0.01; ***p<0.001