

# Opening the ‘Black Box’ of Central Bank Responsiveness: A Least Likely Case Study of the ECB

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*Work in progress, please do not circulate.*

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## Abstract

Central banks are set-up to be formally independent institutions and, thus, to be unresponsive to outside pressures (except eurozone economic circumstances) in the ‘standard’ (public choice) view. I take the *hard* case of the ECB as the formally most independent central bank to detect and theorise about central bank responsiveness. The ECB offers a unique research opportunity since it forms, together with 20 national central banks (NCBs), the Eurosystem. Exploiting this multi-level set-up, I focus on rhetorical responsiveness measured through unsupervised structural topic modelling of the Executive Board and NCB speeches from 1997 to mid-2022. Against the standard view, I juxtapose a Keynesian view which sees conditional responsiveness through agenda-setting to issues outside its primary mandate it cannot ignore, as essential for its independence. Paradoxically, I find that the ECB is asymmetrically responsive to the Bundesbank in various policy areas while Germany is simultaneously most vocally pushing for the standard view of non-responsiveness. Overall, these findings open the ‘black box’ of central bank responsiveness and, specifically, show that the role of NCBs should be taken seriously within the Eurosystem to understand the ECB’s independence.

## 1. Introduction

Responsiveness has been frequently studied in relation to political ‘elite’ decision-makers and whether they are responsive to the preferences of those they represent (Stimson, 1991). *De jure* independent institutions are set-up to be responsible and accountable and not responsive in the ‘standard view’ in the literature. However, the lack of responsiveness to, for instance, domestic political factors, has recently been challenged for courts, public bureaucracies and regulatory agents, *inter alia*. However, central banks, while rising in importance due to rapidly expanding (political) roles in the recent crises (e.g., Tucker (2018)) and recent questions whether their policies are ‘responsible’, are not thoroughly examined. This is due to several reasons, apart from its formal set-up, these reasons include high secrecy due to a lack of public or meaningful roll-call voting data, claims to expert knowledge among the central bank epistemic community (Haas, 1992), the ‘scientization’ of central banks (Marcussen, 2009), a permissive consensus and reliance on output legitimacy of central banks and a focus on accountability instead of responsiveness (e.g., Fraccaroli et al. (2018); Ferrara (2020)).

To examine central bank responsiveness, the case of the ECB is taken as a *hard* case. The ECB is formally the most independent central bank in the world and only votes with consensus in highly secret deliberations (ECB, 2022). Moreover, the ECB, as a supranational institution, is more isolated from domestic politics, domestic media and voter attention than other (national) central banks. Early research has mainly pointed towards ECB effective responsiveness of monetary policy decisions to financial markets (e.g., Ehrmann and Fratzscher (2005)). More recently, it has been found that in the ECB’s communications, the ECB’s Executive Board (EB) adjusts the topics it discusses under public pressure (Moschella et al., 2020). Other research finds that economic and domestic political considerations matter for communication disagreements among the Governing Council members (Moschella and Diodati, 2020). Although this points towards the presence of responsiveness, these authors do not engage with the responsiveness of the ECB directly.

The ECB offers a unique research opportunity to examine responsiveness since, unlike other central banks, it forms a currency area together with, since 2023, 20 national central banks (NCBs) – the Eurosystem. The NCBs have seats and voting rights in the ECB

Governing Council together with the six-headed EB. NCB chairs are nationally appointed and functionally and socially embedded in the member states and, thus, act as interlocutor between the member states and the ECB. Leveraging this multi-level set-up, this research examines responsiveness of central banks and, in particular, the ECB to NCBs. Building on insights from the political economy of central banking and EU studies literature, I put forward a theory of ECB responsiveness. I juxtapose the standard public choice view with a Keynesian view of central banks, taking as starting point that both theories agree that central banks are embedded within their member states. Public choice theory sees this embeddedness as a problem and has formulated a protection clause against any responsiveness, whereas the Keynesian view recognises embeddedness as solution allowing responsiveness as a means for conditional agenda-setting in order for central banks to defend its autonomy. To further examine these economic views, I look at observable implications regarding country and policy heterogeneity in terms of responsiveness.

Due to the lack of public voting data of the ECB governors but also given the importance of central bank communication, I focus on rhetorical responsiveness, i.e., responsiveness in public communications. I operationalise rhetorical responsiveness through unsupervised structural topic modelling of the EB and the ‘big 5’ (Germany, France, Italy, Spain and the Netherlands) NCB speeches from 1997 to mid-2022 (n=4098). The topics of speeches represent the narrative that the governors want to create and are increasingly common as a data source in the study of central banking (e.g., [Baerg and Lowe \(2020\)](#); [Schonhardt-Bailey \(2013\)](#)). I find that the EB, in the topics it discusses, is responsive to the NCBs, thus going against the standard public choice view in the literature which also drove the set-up of the ECB. Paradoxically, the Bundesbank is the conditional agenda-setter on most issues while the Bundesbank was the most vocal for the public choice view. I also find evidence for contemporaneous effects and responsiveness from the ECB to NCBs. I do not find conclusive support for alternative explanations such as the ECB being responsive to public and economic pressures. Overall, these findings offer a novel perspective on responsiveness of central banks in general and show, in particular, that the role of NCBs should be taken seriously within the Eurosystem to understand the ECB’s independence. These findings also display the complex multi-level set-up common to other

EU institutions which have been studied more frequently in the context of responsiveness (e.g., [Meijers et al. \(2019\)](#)).

This paper is structured as follows. First, I will briefly discuss how responsiveness can be studied regarding central banks with a focus on the ECB. I argue why NCBs are important and put forward a theory of ECB responsiveness. Second, I will discuss the data, topic modelling and methods. Third, I will provide descriptive data of topic engagement, followed by cross-sectional timeseries models testing responsiveness among NCBs and the EB and examining various alternative explanations, before concluding.

## 2. Responsiveness: applicable to independent central banks?

The primary outcome variable in this research is central bank responsiveness (studied through responsiveness of the ECB to NCBs). Responsiveness differs from related concepts such as representation and accountability. [Eulau and Karps \(1977\)](#) define responsiveness as a “complex, compositional phenomenon that entails a variety of possible targets in the relationship between representatives and represented” (p.241). They argue that responsiveness is only one component of the broader concept of representation. Political responsiveness to publics is either measured through effective responsiveness using legislative decisions (e.g., [Hagemann et al. \(2017\)](#); [Bølstad \(2015\)](#)) or rhetorical responsiveness often conducted through qualitative coding of, for instance, policy agendas (e.g., [Alexandrova et al. \(2020\)](#)). Rhetorical responsiveness is not just ‘cheap talk’ but is argued to set political directions and can lead to actual responses. Thus, placing an issue on the agenda can be the first step in representation. Moreover, responding rhetorically constitutes a political signal to the citizens that their demands are taken seriously and likely to be dealt with, possibly in the form of political action ([Alexandrova et al., 2020](#)).

Accountability is mostly studied in relation to central banks, because around the 1990s central banks were set-up independent and shielded from political manipulations by “tying one’s hands” ([Issing, 2018](#); [Barro and Gordon, 1983](#); [Giavazzi and Pagano, 1988](#); [Rogoff, 1985](#)). ECB’s independence implies independence from government and domestic political control while the ECB can be responsive to changing financial circumstances. Accountability was used as the necessary counterbalance to the ECB’s high level of independence and

refers to the ability of actors to explain and justify their conduct, while questions can be posed and actors may face consequences (Bovens, 2014). The ECB was specifically set-up with complete separation of monetary (by the ECB) and fiscal policy (by member states), with only weak channels of political accountability, mainly through the Monetary Dialogue in the European Parliament.

Provided that directly determining the responsiveness to domestic factors in the EB speeches is not possible due to the lack of benchmark and ways to measure responsiveness, the NCBs will be used as interlocutor to solve this problem. If one wants to determine political responsiveness of central banks from this case more generally, one would need to make the assumption that NCBs are the representatives of member states (for which there are several good reasons, e.g., governors are often appointed by the finance ministers, NCBs often have close relationships with governments and often advice them, there were several strategic resignations of NCB governors during the eurocrisis, etc.). Nevertheless, if this assumption is relaxed, one would measure the responsiveness of the EB to NCBs only, which in itself already goes against the standard view (i.e., central banks should only respond to general eurozone economic circumstances) and raises questions for the independence of the ECB. Below, I will first describe the formal set-up of the Eurosystem and then juxtapose two views of responsiveness of the EB to NCBs.

### 3. A Theory of ECB Responsiveness

The Governing Council is the main decision-making body of the Eurosystem and consists of the six members of the Executive Board and the chairs/presidents of the 20 NCBs. The primary objective of the ECB is the “maintenance of price stability” (Article 105) and if price-stability is not endangered, the ECB shall support the general economic policies, i.e., its secondary mandate. The implementation of monetary policy is based on the principle of subsidiarity, under which the operations of the Eurosystem are normally carried out by the NCBs. Other tasks of the NCBs are to ensure the monetary and financial stability of the system through operations with credit institutions, open market operations, standing facilities and management of required reserves. Some NCBs also have an important task as the supervisory authority under the Single Supervisory Mechanism (SSM). The

NCBs have relatively large research departments and extensive operational experience in financial and banking markets, publish statistics, conduct research and often provide advice to governmental organisations. Moreover, in various subcommittees within the ECB, representatives of the NCBs come together with the ECB staff.

The Governing Council meets every two weeks in Frankfurt. Every NCB chair has an equal vote in the Governing Council, regardless of the size of the country. However, since 2016, voting is conducted with a rotational system in which the 'big 5' NCBs (Germany, France, Italy, Spain and the Netherlands) have slightly more voting weight (ECB, 2022). Nevertheless, the procedure of decision-making within the ECB cannot be vetoed but is based on consensus. In this way, national concerns can be taken into consideration and sensitivities must be discussed. The EB has the agenda setting power for the Governing Council meetings. Although the EB has a strategic position, it must, however, look at the general eurozone interest and only propose policies for which it considers seeking support in the Governing Council. Members of the NCBs are also forbidden from having a national mandate and, therefore, cannot receive instructions from member states. The members of the EB are appointed by the European Council. Each member state can appoint the governor of its NCB with full discretion, determine the terms in office and re-elect them. Therefore, one might expect all Governing Council members to act, to some degree, in line with the preferences of their member state (Cancelo et al., 2011). The many resignations during the euro crisis shows this.

Among different theoretical views of central bank independence there seems to be a consensus that central banks are embedded within member states. Nevertheless, one can differentiate what this means for responsiveness depending on one's economic theoretical underpinning. A public choice view, described above as the "standard" economics view, sees embeddedness as problem (e.g., see Cukierman et al. (1992)). Independence, in their view, is strict independence from the government through some degree of legal or actual protection from direct political interference in the areas of monetary policy responsibility. Modelled on the Bundesbank, the ECB's statute follows this conception of independence which was mainly pushed forward by Germany. In contrast, a Keynesian (more political science) view sees embeddeness as a solution given that an isolated and lonely central

bank can be considered less effective (e.g., see [Mabbett and Schelkle \(2019\)](#)). One could argue, that the Keynesian view thus considers responsiveness to certain issues as a channel to defend their autonomy crossing through diverse economies and political traditions. They consider independence of central banks to be *within* the government as an internal separation of macroeconomic governance (e.g., see [Goodhart \(2015\)](#); [Pisani-Ferry \(2006\)](#)).

Following from the above portrayed contrasting views, the question becomes what kind of embeddedness manifests itself through responsiveness. I argue that two kinds of observable implications can offer identification leverage: (i) the asymmetric responsiveness to certain NCBs and (ii) responsiveness in certain policy areas. Leveraging these two kinds of heterogeneity, one can form hypotheses based on observable implications regarding responsiveness. A public choice hypothesis would see influence of member states/NCB across all policy terrains as problematic. Whereas, a Keynesian hypothesis sees influence in primary mandate as problematic, but in other areas responsiveness/conditional agenda setting can be a sign of embeddedness as a solution in order to keep central bank autonomy and achieve goals such as financial stability. That is, provided that it is not skewed towards the interests of certain member states.

## 4. Variables and Data

### 4.1. Responsiveness: speeches-as-data

For my dependent variable, I create a measure of rhetorical responsiveness using speeches. The EB governors and NCB governors often write their speeches in liaison with a communications team and, therefore, represent the institutional topics and narrative, they want to raise. I choose speeches and not Q&A sessions or announcements since governors are freer to choose the topic, format and audience of their speeches, which reveals important information. Using speeches-as-data is common in the central banking literature to study disagreement and preferences of governors under high secrecy and limited public information (e.g., [Baerg and Lowe \(2020\)](#); [Schonhardt-Bailey \(2013\)](#); [Bennani and Neuenkirch \(2017\)](#); [Moschella and Diodati \(2020\)](#); [Ferrara \(2020\)](#)). The speeches data set cover the establishment of the ECB until March 2022 and are all translated in English. The corpus consists of 4098 speeches of which 1829 are NCB (Germany, Italy, France, Spain and the

Netherlands) speeches and 2269 EB speeches (see Appendix A for more information). To determine responsiveness, I conduct topic modelling on the speeches.

There are three main possible limitations of this data. First, certain NCBs talk more. I do not consider this problematic since the public communication is meant to portray the topics concerning the NCBs at that point. Second, depending on the audience, the speeches can be meant to merely convey information (e.g., lectures given by governors at universities). Although those speeches seem to merely convey information, the preferences in terms of topic choice can still be observed, e.g., some governors choose to talk about and structural reforms instead of monetary policy issues. Third, I do not include the speeches of all NCBs due to the limited number of speeches of some banks and thus to avoid underpowered statistics. The NCBs I do include are the largest five NCBs in the eurozone and all founding euro members and, therefore, expected to be most important in terms of responsiveness.

#### **4.2. Topic modelling**

Determining the topics of speeches can be done in various ways ranging from hand-coding to unsupervised machine learning. Due to the lack of pre-set topics, the large sample size and the possibility to discover systemically latent trends over time, quantitative text analysis is most appropriate. Since there are no strong priors regarding the topics, the topic modelling is more exploratory and will benefit from inductively extracting a small number of independent dimensions rather than being confirmatory which would measure pre-specified concepts. Thus, a fully unsupervised method is more appropriate than dictionary analysis or (semi)supervised machine learning model ([Grimmer and Stewart, 2013](#)). Topic models estimate iteratively the topics by randomly assigning topics to tokens at first and subsequently in each iteration maximising two goals: (i) tokens of the same type should belong to one topic and (ii) words in same document should belong to one topic. To identify the main topics, I specifically use Structural Topic Modelling (STM) of Roberts et al. (2014). One advantage of STM above other unsupervised topic models, e.g., Latent Dirichlet Allocation (LDA) ([Blei et al., 2003](#)), is that it relies on a logistic distribution which allows for covariates unlike, for instance, LDA which relies on a Dirichlet distri-



bution. Covariates are needed to enable inclusion of a time dimension and to run it for individual countries.

I use the simplified ‘bag of words’ approach which disregards grammar and word order since the added sophistication of, for instance, word embeddings based on neural networks is not necessary given the simplicity of the task. I conducted text pre-processing steps which follow standard methodology (e.g., [Gentzkow et al. \(2019\)](#)). See Appendix A for all the pre-processing steps. I then run the topic model using the *Quanteda* package for Structural Topic Models in R. Researchers typically consult a combination of quantitative metrics (i.e., diagnostic values) and human judgement based on manual interpretability to determine the optimal number of topics given the limitations of both (e.g., see [Chang et al. \(2009\)](#)). The optimal number of 20 topics has been determined using diagnostic metrics (see Appendix A). These are regrouped into broader topics if they showed enough similarity which was determined by manual interpretation employing the “highest probability” measure which indicates the words that are most likely to belong to a topic and “exclusive” FREX words, those that are likely in one topic and unlikely in another. Although there is the risk of reducing the number of topics too much and losing meaningful differences, I also needed enough observations per topic so reduced it down to 9 clear categories. In [Table 1](#), I depict the highest probability words of the topics, which is only one of the measures I used to determine the topics (see Appendix A for more information).

**Table 1.** The categories and highest probability words after regrouping the topic models manually.

<i>My categories</i>	<i>Highest probability words</i>
<b>Climate</b>	Topic 19: climate, financial, banks, risks, change, climate_change, risk
<b>Banking</b>	Topic 7: banks, banking, capital, risk, financial, credit, basel Topic 13: financial, payment, payments, market, banks, services, integration Topic 15: union, banks, banking, financial, national, monetary, area
<b>Euro area</b>	Topic 6: monetary, countries, europe, area, euro_area, policy, union Topic 8: area, euro_area, countries, currency, financial, economic, market Topic 12: euro_area, area, growth, inflation, economic, monetary, price
<b>Primary mandate</b>	Topic 11: policy, inflation, monetary, monetary_policy, rates, rate, interest Topic 16: monetary, policy, monetary_policy, stability, price, price_stability, economic Topic 18: policy, monetary, monetary_policy, financial, banks, market, liquidity
<b>Global finance</b>	Topic 1: financial, world, countries, global, international, economic Topic 9: financial, global, international, countries, economies, monetary, markets
<b>Financial stability</b>	Topic 3: financial, stability, market, economic, monetary, banks, policy Topic 14: financial, risk, banks, system, market, stability, markets
<b>National economics</b>	Topic 4: germany, financial, economic, german, pension, policy, market Topic 10: growth, economic, economy, labour, spanish, productivity, area
<b>Statistics</b>	Topic 2: financial, data, statistics, banks, international, information, policy
<b>Crises</b>	Topic 17: crisis, financial, pandemic, policy, banks, measures, monetary Topic 20: crisis, area, euro_area, fiscal, financial, countries, economic

### 4.3. Variable operationalisation

#### *Responsiveness*

In the literature two main methods to study responsiveness are used. Most common is cross-sectional dynamic timeseries (e.g., [Hobolt and Klemmensen \(2008\)](#)). Another, less frequently used method, is the use of vector autoregression (VAR) models mainly

used in timeseries forecasting. The main objective of VAR is to locate possible long-run relationships by calculating the maximum eigen-value and trace statistics (e.g., [Johansen \(1988\)](#)). These models can be used to study endogenous relationships between variables. For simplicity of interpretation and to include the possibility to add various interaction terms, I will use cross-sectional timeseries analysis.

In all models, the topic proportions of the EB are used as the dependent variable. I represent the quarterly year proportion of speeches devoted to a certain topic as a proportion of the total diversity of topics. The distribution in speeches is right skewed over time and non-stationary. I transform the data into a relative proportion to solve both problems. Given the frequency with which central bankers meet, a lag length of three months should be sufficient to respond to each other. This is also in line with framing cycle theory and previous research on ECB communication (e.g., [Müller and Braun \(2021\)](#)). Nevertheless, as a robustness test, I also test different lag lengths as well as correlational effects (see Appendix F).

The following models (1 and 2) will be estimated:

$$EB_{tp} = \alpha_p + \beta_1 NCB_{t-1,p} + \epsilon_{tp} \quad (1)$$

$$EB_{tp} = \alpha_p + \beta_1 NCB_{t-1,p} + \beta_2 T * NCB_{t-1} + \epsilon_{tp} \quad (2)$$

where EB captures the topic proportions of the EB at time t and topic p.  $\alpha$  is the intercept term with topic fixed effects.  $\beta_1$  captures the degree of responsiveness by using the lag of the previous period. I both test the lags of the various NCBs in independent regressions and all lags of the NCBs together. Besides only testing the lag, I also examine the effect of the lead of NCB topic proportion. I test a range of control variables at t=0 and their lags as an interaction with the lags of NCBs topic proportions. In all models I use panel corrected standard errors since I have a small number of topics (N) and a large number of time points (T) (e.g., see [Beck and Katz \(2006\)](#)).

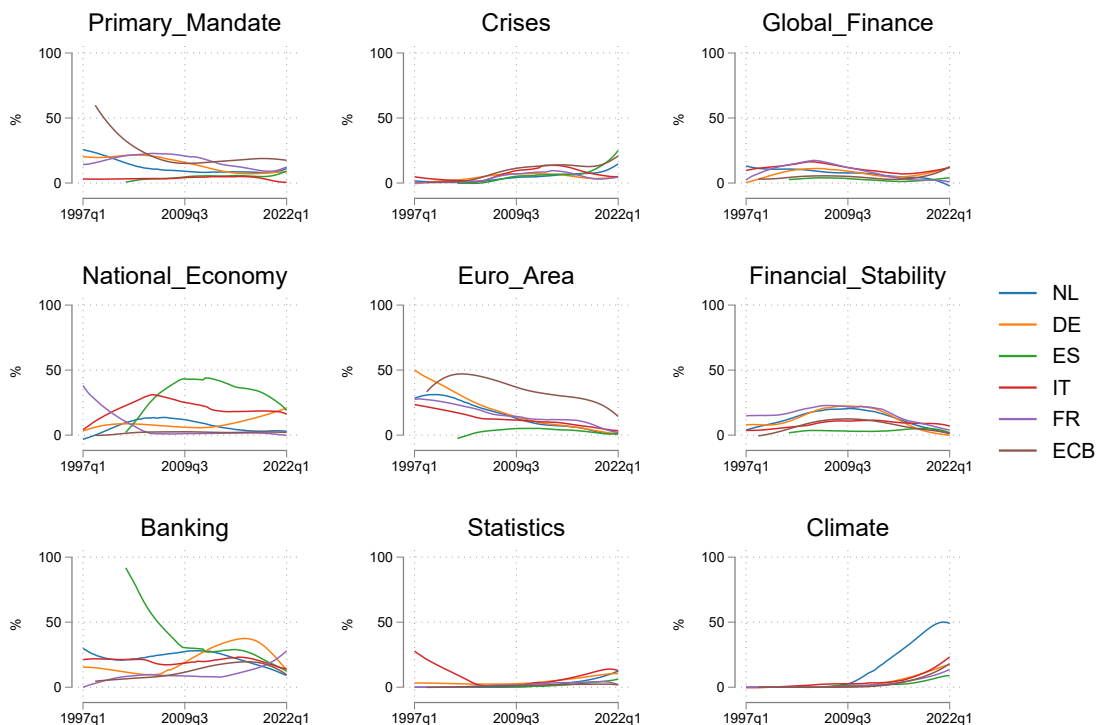
Model 1 shows the average of all topic's responsiveness per country. The topic fixed

effects ensure that topics that are discussed more frequently get their own intercept in the regression. Statistically, adding controls as variables into the models does not influence the results since an increase in one topic automatically means a decrease in another topic. For instance, assume there are two topics: national economics and the primary mandate, if an increase in unemployment increases how much the ECB talks about the national economy it automatically decreases how much is talked about the primary mandate, i.e., the effect cancels each other out. However, in Appendix B, I run robustness checks with the lags of unemployment, inflation and Target II interacted with the lag of NCB and the results deem robust. Inflation and unemployment are used as economic indicators since they are often used in the regional Fed governor’s literature to determine central bankers’ reaction functions (Chappell et al., 2008; Meade and Sheets, 2005; Moschella and Diodati, 2020). TARGET2 is used as a proxy for the vulnerabilities of domestic financial systems (Moschella and Diodati, 2020). TARGET2 (Trans-European Automated Real-time Gross settlement Express Transfer system) permits payments to be made in real time in central bank money and to be settled on a gross basis which are conducted through NCBs and thus keep track of the net positions of NCBs with the ECB. The results are also robust to the addition of an autoregressive lag (also see Appendix B). The two-way interactions in Model 2 are needed to determine the topic specific effects of responsiveness.

## 5. Results

Before presenting the results of the regressions, the descriptive statistics will be presented as a way of validation. Following Quinn et al. (2010), the results meet different notions of validity. The top scoring words for each topic demonstrate that the topics have a coherent meaning (semantic validity). Topic usage also corresponds correctly to external events (predictive validity) showing that spikes in their probability distribution can be matched to relevant political events. Figure 1 provides a face validity check using a smoothed local function to show that the data reflects expected trends over time. For example, the speeches concerning the primary mandate have decreased over time, while crisis and climate topics increased over time. Further, there is heterogeneity in topics discussed across central banks. For instance, Italy talks more about crises during the euro crisis and the Netherlands is more concerned with topics such as the climate, which is in line with

known trends.



**Figure 1.** Smoothed topic proportions over time (retrieved from unsupervised topic modelling)

I start with examining the correlations between the topics the EB and NCBs discuss. High correlation will already point towards a certain degree of responsiveness and interaction within the aggregation of three months and thus will capture quick effects while being less apt for slow moving effects or portray any directional indications. Appendix D shows the full results and shows clear heterogeneity in the correlation between topics and across banks. To further examine responsiveness over time, Table 2 depicts the results of Model 1, both per central bank and collectively with both the lags and leads. The positive coefficients of the lags of the NCBs show that if the German, Dutch and Italian NCBs talk more about a certain topic in the previous period, the ECB will talk more about it in the current period, i.e., responsiveness. The larger the coefficient, the stronger the effect which is substantial given that the topic proportion scale ranges from 0 to 1. The results offer support against the standard public choice view since the EB is responsive to NCBs, especially to the German Bundesbank in various topics. Table 2 shows this relationship is not only unidirectional, i.e., the NCBs are also responsive to the EB (although less strong).

**Table 2.** Model 1 regression with lags and leads

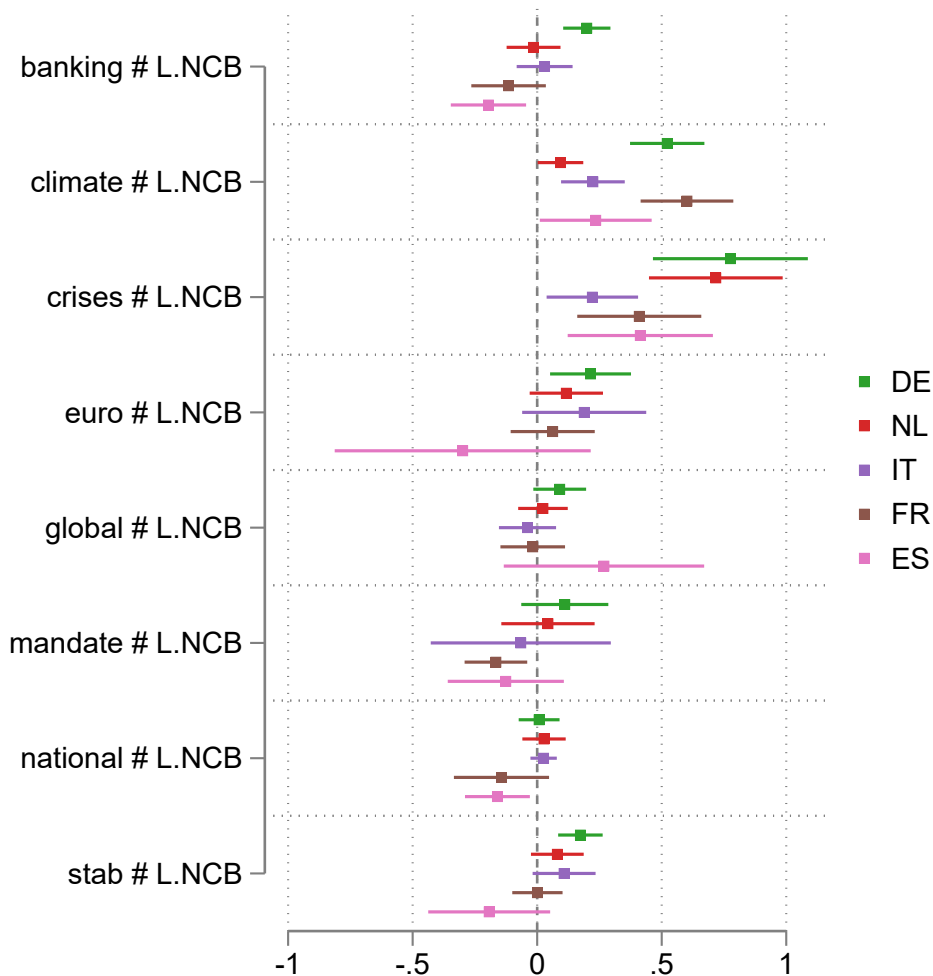
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ECB	ECB	ECB	ECB	ECB	ECB	ECB	ECB	ECB	ECB	ECB	ECB
Topic FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DE <sub>t-1</sub>	0.19*** (9.24)										0.20*** (6.78)	
DE <sub>t+1</sub>						0.17*** (8.15)						0.15*** (4.88)
NL <sub>t-1</sub>		0.08* (2.87)									0.02 (1.03)	
NL <sub>t+1</sub>							0.06* (2.37)					0.01 (0.39)
IT <sub>t-1</sub>			0.10* (3.20)								0.09*** (3.88)	
IT <sub>t+1</sub>								0.10 (2.30)				0.09** (2.87)
ES <sub>t-1</sub>				0.03 (0.61)							0.05 (1.79)	
ES <sub>t+1</sub>									0.02 (0.50)			0.06* (2.10)
FR <sub>t-1</sub>					0.08 (1.76)						0.04 (1.15)	
FR <sub>t+1</sub>										0.05 (0.86)		0.02 (0.70)
_cons	0.09*** (8.21)	0.11*** (19.22)	0.13*** (18.85)	0.14*** (8.74)	0.13*** (25.71)	0.09*** (8.24)	0.11*** (19.32)	0.13*** (14.35)	0.14*** (10.02)	0.14*** (24.76)	0.06*** (3.97)	0.07*** (4.45)
N	828	612	657	603	702	819	612	657	612	711	387	396
r2_a	0.60	0.57	0.54	0.55	0.56	0.59	0.57	0.55	0.56	0.54	0.60	0.57

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

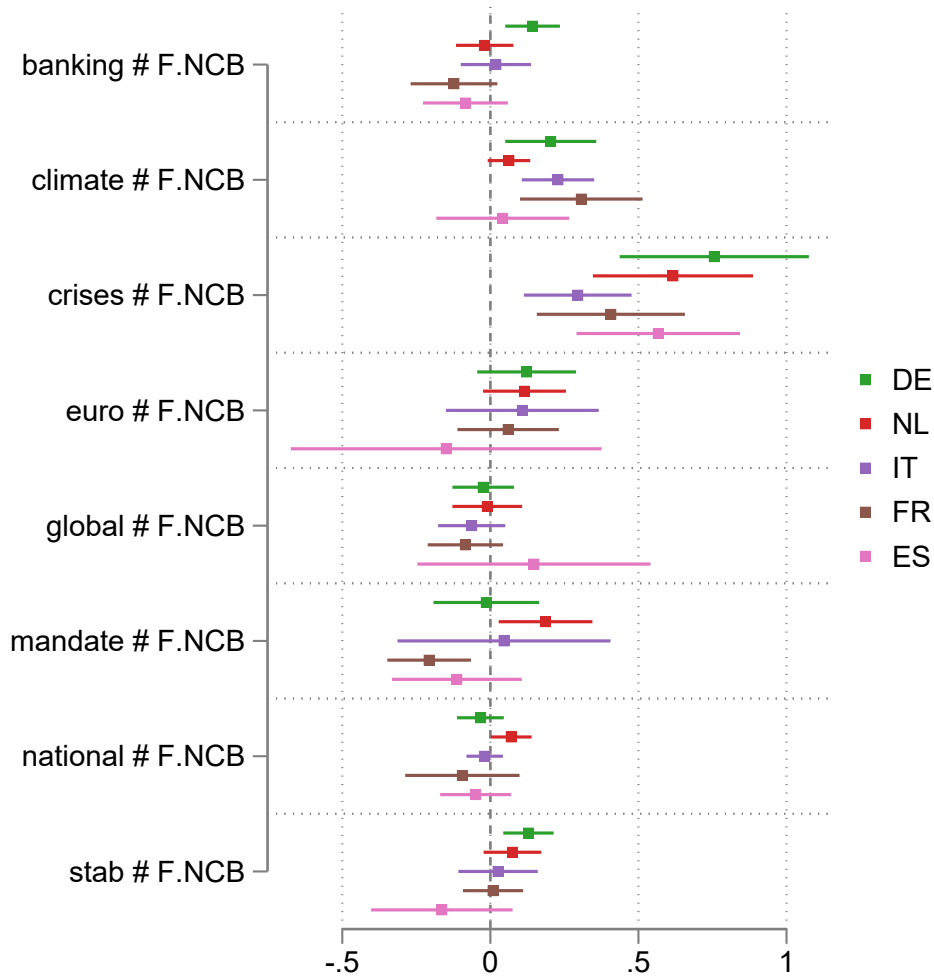
Panel corrected standard errors are employed.

Figure 2 depicts the two-way interaction coefficients of the various topics interacted with the NCB lag coefficient and Figure 2 (Model 2) and shows strong topic heterogeneity (see Appendix D for the full results). Responsiveness is significantly higher than zero regarding crises and climate topics for all NCBs while financial stability, the euro area and banking is only significantly responsive in the case of the German Bundesbank. Figure 2 also supports the previously presented results that the EB is more responsive to the Bundesbank in most topics. Figure 3 shows that similar results (although slightly weaker) can be found regarding the lead interaction coefficient, pointing towards responsiveness not being unidirectional.



**Figure 2.** Coefficient plot following Model 2. The dependent variable is the topic proportion of the EB aggregated per 3 months and the coefficients displayed are interaction terms of the NCB lags with the various topics. A coefficient larger than zero implies responsiveness of the EB to the NCB. The coefficients include 95% confidence intervals. The topic of statistics is the baseline value.





**Figure 3.** Coefficient plot following Model 2. The dependent variable is the topic proportion of the EB aggregated per 3 months and the coefficients displayed are interaction terms of the NCB leads with the various topics. A coefficient larger than zero implies responsiveness of the EB to the NCB. The coefficients include 95% confidence intervals. The topic of statistics is the baseline value.

In what follows below, I will further leverage the given data and examine two other explanations that could explain responsiveness, namely economic and public pressure.

## 6. Examining alternative explanations

### 6.1. Economic pressure

The eurozone consists of 20 diverse countries with diverse political economies. This is well-known issue in the economics and EU political economy literature. For instance, the Optimal Currency Area (OCA) theory asks what the appropriate domain of a currency

area is and discusses the possible problems which could arise if multiple entities (e.g., countries or regions) together form a currency area (Mundell, 1961). Discussions among the supporters and critics of OCA have shown that the Eurozone falls short in many aspects of what an optimal currency area constitutes of (de Grauwe, 2020). For instance, the eurozone has always been marked by an economic divide between the ‘core’, i.e., Austria, Belgium, Germany and the Netherlands and the ‘periphery’, i.e., Greece, Ireland, Italy, Portugal and Spain, with France in between (e.g., Gräbner et al. (2020)). The Varieties of Capitalism literature Hall and Soskice (2001) also highlights that the EU has a wide diversity of institutional variation which also has implications for the currency area. For instance, Coordinated Market Economies (CMEs) and Liberal Market Economies (LMEs) have different ways to adjust to demand shocks. LMEs can use discretionary monetary and fiscal policy while CMEs have more difficulties (Soskice, 2007). The Eurozone countries also have different growth models, different labour markets, different pension systems and different mortgage structures which cause different reactions at different speeds to a one-size-fits-none monetary policy (de Grauwe, 2020). Given the large and populous region and many different political economies the ECB covers, the NCBs know best which policies are optimal for them and their institutions since the NCBs have a deeper understanding and specialised knowledge of local economies, industries and businesses which can be used to, for instance, better determine credit assistance for troubled banks. The research departments of NCBs are also independently larger than the research department of the ECB<sup>1</sup>. The economic analyses carried out by the NCB’s staff are thus an important source of information in the Eurosystem’s technical committees and working groups and the competence of the Eurosystem will depend on the ability of the ECB to draw on the staff at the NCBs. This could turn into the ECB taking more into account NCBs which are suffering economic pressures.

In terms of empirically observable implications, I would expect, regarding cross-time variation within countries, that if economic issues are more pressing in a country than average, the EB is more responsive to NCBs. Between countries, I would expect there

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<sup>1</sup>Estimates are that the ECB employs 4500 employees of which about half works on SSM related tasks while the larger NCBs have 8000-10000 employees doing the same work.

to be more responsiveness to countries with more pressing economic issues within the eurozone. Across topics, I expect there to be more responsiveness in topics regarding economic pressures. Over time, I expect no changes in responsiveness, since the economic pressures remain important throughout time.

### 6.2. Public pressure

Central banks are dependent on public support to operate and survive over time (Tucker, 2018). Therefore, they recognize the importance of public trust in their institutions. Trust in central banks is essential for maintaining price stability. For instance, high trust helps anchor inflation expectations which, if deviations from its target occur, do not considerably affect the wage and price decisions of households and firms (Christelis et al., 2020). This makes it easier to reach the inflation target, which may, in turn, help build trust. Trust also generates acceptance of central bank independence amongst the public at large (van der Cruijssen and Samarina, 2023). NCB embeddedness is essential for creating this trust. The ECB is socially not as embedded as NCBs were and currently are. From a Polanyi (1944) perspective, NCBs are arguably better embedded in society since the ‘social’ countermeasures are also taken on a member state level. The trust in NCBs is traditionally also very high. As Delors famously said in 1992: ‘Not all Germans believe in God, but they all believe in the Bundesbank’. The European public, however, traditionally had little natural affinity with the ECB and lacked embeddedness.

Moreover, the EU in general has been increasingly politicised in national politics arguably ending the EU’s ‘permissive consensus’ (Hooghe and Marks, 2009). Following this, Schneider (2018) argues for the EU Council that governments undertake ‘electioneering’ in the EU, which implies that EU representatives demonstrate responsiveness. She argues that this can also be applied to EU institutions more generally if they are being politicised. The ECB has recently been increasingly involved in the political realm in mainly two ways. First, their unconventional monetary policies have redistributive consequences (e.g., quantitative easing raises asset prices, resulting in redistribution from those who owe assets to those who own assets) and with the Outright Monetary Transactions (OMT) program, the ECB *de facto* became the lender of last resort (de Grauwe, 2020) without

strong accountability to elected politicians. In crisis times, solvability and liquidity measures are also no longer clearly distinct and the ECB is drawn into bailing out sovereigns and insolvent banks because the fiscal counterpart of monetary policy is lacking (Schelkle, 2012). Second, the ECB has intervened in the policy-making of member states directly. During the eurozone crisis, the ECB was part of the Troika and thereby intervened in sovereign lending conditions and the member states' budgets (Diessner et al., 2020). The ECB also directly tried to influence national policies by sending letters, e.g., they sent letters to Italy and Spain requesting implementation of reforms in exchange for buying securities and they requested Ireland to apply for a bail-out and threatened to cut down the Emergency Liquidity Assistance (Tortola and Pansardi, 2019).

These interventions in the political realm, paired with overall (rhetorical) expansion of topic engagement (e.g., see the next section), have resulted in increased politicisation of the ECB. de Wilde et al. (2016) argue that politicisation of EU governance is driven by the critics of the EU rather than its supporters. Thus, the ECB has to endure strong critical voices and high levels of criticism, raising salience negatively. Although the scrutiny differs in terms of politicisation levels and the type of criticism per member state (Högenauer and Howarth, 2019), especially among North and South, in any case the ECB will want to respond to this.

One way to counteract this lack of embeddedness is through communication. However, there is a lack of a European media space and there is also still a lack of a European demos in general (Weiler, 1999), i.e., a lack of common identity and European-wide discourse. The lack of a common language also complicates EU-wide ECB communication. National presence of NCBs helps the ECB create a closer link with publics. NCB governors make frequent public appearances, e.g., governors often appear on talk shows to explain the latest monetary policy decisions and make policy recommendations beyond that. In sum, responding to NCBs can provide a response of the EB to public pressure, thus one could expect that the ECB will respond to NCBs when topics are salient and public pressures is low.

In terms of empirically observable implications, I would expect, regarding cross-time variation within countries, that if trust in the ECB is lower than average and salience

is higher, the EB is more responsive to NCBs to obtain/regain public support. Between countries, I would expect there to be more responsiveness to countries with lower public support and higher salience. Across topics, I expect there to be more responsiveness in topics that have more public embeddedness among NCBs than the ECB. Over time, I expect an increase in responsiveness since trust has declined among the publics and salience increased over time. Table 3 presents an overview of all observable empirical implications in accordance with the rationales.

**Table 3.** Explanations and observable empirical expectations

Explanations	Cross-time variation within countries	Country variation	Topic variation	Time variation
<i>Economic Pressure</i>	If national economic issues are more pressing, the EB is more responsive to NCBs under pressure.	More responsiveness to countries with a more pressing economic needs	More responsiveness in topics which relate to economic pressures.	Constant over time.
<i>Public Pressure</i>	If public opinion and salience are more pressing, the EB is more responsive to NCBs.	More responsiveness to countries where trust in the ECB is low and salience is high.	More responsiveness to topics in which NCBs have more public embeddedness.	Increasing over time.

In order to test these two alternative explanations, the following model (3) will be estimated:

$$\begin{aligned}
 EB_{tp} = & \alpha_p + \beta_1 NCB_{t-1,p} + C_t + \beta_2 T * NCB_{t-1} + \beta_3 C_t * NCB_{t-1} \\
 & + \beta_4 C_t * T + \beta_5 T * NCB_{t-1} * C_t + \epsilon_{tp}
 \end{aligned}
 \tag{3}$$

where EB captures the topic proportions of the EB at time t and topic p.  $\alpha$  is the intercept term with topic fixed effects.  $\beta_1$  captures the degree of responsiveness by using the lag of the previous period. I both test the lags of the various NCBs in independent regressions and all lags of the NCBs together. Besides only testing the lag, I also examine the effect of the lead of NCB topic proportion. To test the rationales of responsiveness (albeit indirectly), I include interaction terms. T are topic specific dummies and C represents the proxies for the various responsiveness rationales. The proxies for the different rationales will be discussed below. I also test a range of control variables at t=0 and their lags as an interaction with the lags of NCBs topic proportions. As in the models above, I use panel corrected standard errors since I have a small number of topics (N) and a large number of time points (T) (e.g., see [Beck and Katz \(2006\)](#)).

***Economic pressure: debt-to-GDP ratio***

To test the informational rationale, an economic variable is used since the EB is expected to rely on the NCBs for economic forecasts. Although the ECB may not be in the position to respond with actual instruments, it is expected that the EB will rhetorically respond to this information. Debt-to-GDP ratio is used as a proxy for the sustainability of domestic public debt ([Moschella and Diodati, 2020](#)).

***Public pressure: public opinion and salience***

To proxy public pressure I use two measures. First, I use Eurobarometer data which over the entire timespan of the ECB has asked the same questions. I include the question which asks about trust in the ECB. The answer options include: “tend to trust”, “tend to not trust” and “I don’t know”. I subtract “tend to not trust” from “tend to trust” and omit “I don’t know” (since it does not fluctuate a lot over time). Second, I use Google trend searches of the term “ECB” are used to assess salience of the ECB. Google trends are

often used as proxy for salience in previous research (e.g., see Mellon (2014)). The values represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A score of 0 means that there was not enough data for this term, thus salience was low.

#### ***Time heterogeneity: post-2008 dummy***

I include a dummy that takes the value of 1 for all years after 2008 (excluding 2008 itself) and the value of 0 for 2008 and before. This is rather crude measure, however, due to the limited sample size it is needed to obtain a high enough statistical power. Moreover, although the financial crisis started earlier, I take a year lag to allow responsiveness to possibly change to the new circumstances (however, I conduct robustness tests regarding cutoff date, see Appendix C).

#### ***Topic heterogeneity***

Based on the topics presented above, we can differentiate the following topics. Regarding the economic pressure rationale, I classified mainly topics for which NCBs which could advantage countries under economic pressure, e.g., banking supervision, national economics and inflation (primary mandate), crises, financial stability and global finance. Regarding public pressure, I classified topics which have more social embeddedness in the member states, e.g., in crises and regarding topics also falling under member state competence such as climate, the member state publics are more accepting of NCBs.

#### ***Between country heterogeneity***

Before one can determine between country heterogeneity, one must know which countries score higher than average on the three proxies. See Table 4 for an overview of this. Based on this we would expect more responsiveness to a country with higher-than-average salience, lower trust and a high debt-GDP ratio compared to other countries.



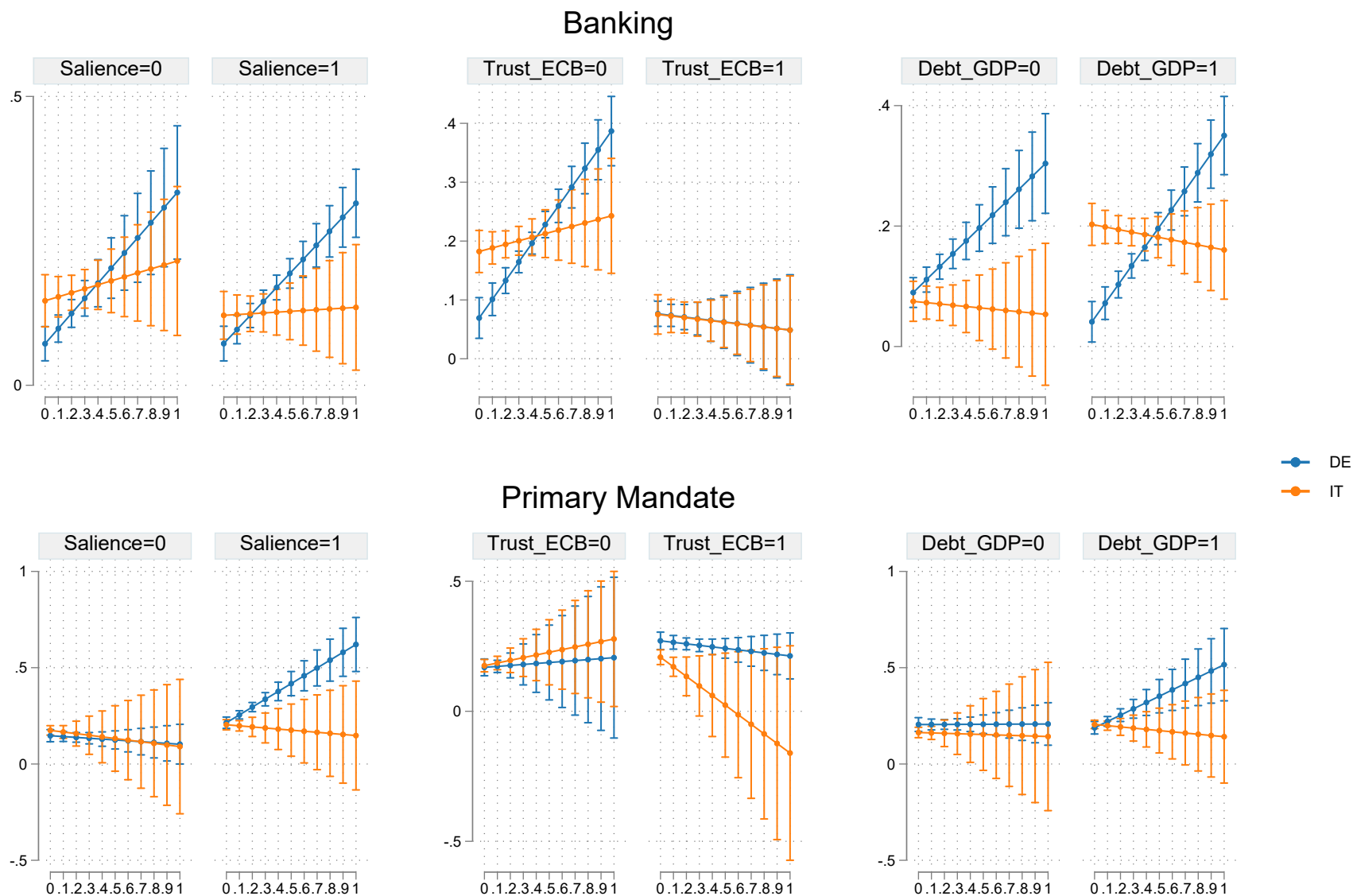
**Table 4.** Country heterogeneity in terms of variables

<i>Country</i>	<i>Saliency</i> <i>(mean)</i>	<i>Trust in ECB</i> <i>(mean)</i>	<i>Debt/GDP</i> <i>(mean)</i>
<b>Germany</b>	0.614 (2)	0.524 (5)	0.545 (1)
<b>Spain</b>	0.663 (3)	0.693 (1)	0.733 (5)
<b>France</b>	0.584 (1)	0.554 (4)	0.683 (3)
<b>Italy</b>	0.634 (4)	0.584 (3)	0.703 (4)
<b>Netherlands</b>	0.703 (5)	0.604 (2)	0.634 (2)

### 6.3. Results: taking serious alternative explanations

Figure 4 below presents the results of cross-time variation within Germany and Italy regarding responsiveness to the different rationales based on the three-way interactions based on Model 3. I choose to depict Germany and Italy as two very opposing countries in terms of economic structure yet both having very large NCBs. To enable easier interpretation, I created binary variables for saliency, debt-to-GDP ratio and trust in the ECB. The dummy takes the value of 1 if there is above average debt in the country compared to the country average and 0 if it is below average. In the main text, I display two topics: banking and the primary mandate, two topics that have been constantly discussed over time (see Appendix A for all topics and all NCBs). A positive slope represents responsiveness, namely, if the NCB starts talking more about a topic in one period ( $t=-1$ ), the EB responds in the next period ( $t=0$ ).

If the EB would be responsive to public pressure, there would be more responsiveness when the ECB is highly salient and public opinion is low regarding banking but not the primary mandate. This is not the case for saliency but is the case for Germany in case of banking, however, the results are not clear cut. The economic pressure rationale expects more rhetorical responsiveness if the debt-to-GDP ratio is high. The results show that this only (slightly) holds for Germany regarding banking, providing, however, I conclude again, that there is mixed evidence.



**Figure 4.** Marginsplots of the three-way interaction terms regarding the topics of banking and the primary mandate for Italy and Germany (following the regressions as depicted in model 3). The proxies of salience, trust in the ECB and debt-GDP are binary representing a lower and higher within country average. A positive slope implies more responsiveness of the ECB to NCBs under the value of the binary dummy variable. The figures include 95 percent confidence intervals.

There are no significant differences in responsiveness over time. Pre and post 2009 differences only show significant responsiveness to the topic of crises after 2009, in line with the average topic responsiveness presented previously. Similar results are found for other cut-offs (see Appendix C).

## 7. Discussion

Following from the results above, one can conclude that the alternative explanations cannot be fully supported. However, in the results presented before that, a paradox seems to arise. One can clearly see that the Bundesbank is the conditional agenda-setter on most topics (crisis management, banking, euro area issues, global finance, financial stability), while the Bundesbank is the one central bank that wanted Central Bank Independence as protection from embeddedness, thereby mainly in conflict with France's view ([Brunnermeier et al., 2016](#); [Pisani-Ferry, 2006](#)). Nevertheless, by pushing the agenda, the Bundesbank indirectly admits that the ECB is embedded. One could even argue that the Bundesbank does this in a self-interested way (e.g., in crisis management they push their agenda upon the ECB). Thereby in terms of asymmetric influence they go beyond the Keynesian view. Even more interesting, Germany is also against further EU fiscal integration which would solve having to be embedded (due to the ECB being lonely ([Mabbett and Schelkle, 2019](#)), fragile and incomplete ([de Grauwe, 2020](#))) in the first place. Thus is the Bundesbank keeping a structure in place which benefits them?

To further elaborate, the ECB was established in 1998 after a long negotiation process transferring monetary policy away from (at the time) 11 NCBs to the EU level. Although all NCBs were treated equal, the German ordoliberal Bundesbank had a prominent position. Before the establishment of the ECB, the Bundesbank was already at the centre of European monetary arrangements, e.g., the 'snake' in the 1970s and the European Monetary System in the 1980s and 1990s. In these regimes Germany's currency, the Deutschmark, was the anchor currency ([Feldstein, 1997](#)). In the Delors committee, which created a blueprint for the ECB, besides Delors, the German Bundesbank president Pohl was also very dominant. In many ways the ECB is a near complete copy of the Bundesbank's organisation ([Kaltenthaler, 2005](#)). For instance, the ECB had adopted the

Bundesbank's definition of price stability and their monetary targeting strategies. Moreover, there was a consensus among central bankers that the German model was the best for the ECB. The most important reason is the success of the Bundesbank in maintaining price stability in post-war Germany – ‘the postwar economic miracle’ – which it already had shown by taking an effective and credible lead previously. The German model prevailed over the French model, with, for instance, a focus on rules over discretion, liability over solidarity, solvency over liquidity and austerity/reform over a Keynesian stimulus (Brunnermeier et al., 2016).

One exception to the overall responsiveness mainly being to Germany is on the topic of climate. Regarding climate, the conditional agenda setter is France. In practice, France is also one of the leaders of the Network for Greening the Financial System and its secretariat is run by the Banque de France. A major global framework, within which cross-border central bank cooperation has been developing is the BIS, which – together with the Banque de France – published in 2020 a book calling for strengthening of global coordination to address the emerging risks. “The green swan: central banking and financial stability in the age of climate change” accordingly became a point of reference for the discussion. Moreover, France incorporated climate change considerations into their actions, e.g. in their own portfolio management, eliminating certain types of carbon-intensive assets and has taken leadership in greening their own portfolios, developing new analytical methodologies and building up cooperation cross-border and with the financial sector. This kind of responsiveness is less problematic as one can argue it to be less self-interested and thus the ECB being responsive to France regarding climate can be a sign of embeddedness as the Keynesians meant to see it.

## 8. Conclusion

This paper examined responsiveness of central banks by examining the responsiveness of the EB to NCBs in the case of the ECB. Leveraging the responsiveness between NCBs and the EB allowed for unique insights into whether central banks are responsive. I contrasted the standard public choice view with a Keynesian view and paradoxically found that the Bundesbank is (self-interested) the conditional agenda setter on most issues whereas they

were the most vocal in favour of the public choice view. Only regarding climate there is an exception of being responsive to France. I do not find evidence for economic and public pressure as drivers for this responsiveness.

These findings have several implications regarding central bank responsiveness and, more specifically, regarding the ECB. First, in a broader trend of researching the responsiveness among technocratic institutions, courts, bureaucracies, etc., this research shows that even one of the most independent institutions cannot be unresponsive. Is it time to rethink delegation to independent institutions in our current highly politicised environments in which rules are questioned and discretion is looked down upon? Second, I have shown that the NCBs play a fundamental role in the Eurosystem, which thus far seems to be largely overlooked in the literature.

This research has various limitations. First, it is difficult to differentiate empirically between the responsiveness explanations, nevertheless, I have attempted to (albeit indirect) exploit all the heterogeneity available in the data to distinguish between the various rationales. Second, by only looking at between topic responsiveness, I overlook within topic changes, e.g., how, for instance, the way in which the topic of financial instability is discussed changes over time. Third, I do not test the extent to which NCBs are interlocutors between the ECB and member states. Do NCBs represent the national interests, are NCBs self-interested or do they follow the political positions of the member states? Further research can delve into the opinions/stances discussed in the topics and whether there is also responsiveness in taking over certain views, i.e., within topic changes. Moreover, more research can be conducted in the importance for the ECB's public standing in the member states and how the multi-level set-up of central banks (e.g., as is also the case for the Fed) influences actions and views of (independent) institutions.

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