

The Scientization of Central Banks

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Acknowledgment

A lot of life happens in four years. Unfortunately for me, most of the four years of my dissertation were filled with some of the most horrible moments of my life. Four months into my dissertation my two three-year-old nephews, Leon and Devin, went on an excursion with their kindergarten to a local playground. Devin ran away from his group, fell into a frozen river and died of a heart attack. Right afterwards the first Covid lockdowns hit and I spent about two months alone in my tiny Cologne flat, not being able to see my family, friends or girlfriend or be there for my brother and his wife. During the rest of my PhD a lot of other bullshit happened as well: I had to get a lawyer because I had an accident on the way to my nephews funeral and could not wait for the police to come, I became temporarily homeless, thanks to an asshole landlord in Copenhagen and over the last nine months I spent multiple weeks in hospitals and emergency rooms to figure out what the fuck is wrong with my back and legs.

To be honest, the first two years of my dissertation are a haze for me. I barely remember what I did or if I did much at all. It is a small miracle I finished this thing. Much credit for this getting done, goes to my now wife Nikky. Not only did she patiently help with my grief, but also supported me, while I was depressed, afraid and felt like my work was crap. Most of the happiness I experienced in the last four years is thanks to her. We moved in together, built a home and got married. Nothing makes me happier than hanging out with her and goof around. This dissertation would not have happened without her support, so a major part of it belongs to her.

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Edin Ibrocevic

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1.0 Introduction

Science has become ubiquitous in policy making for modern societies. Be it in education, climate change or more recently in the Covid-19 pandemic, scientists at the very least inform, if not directly make, policy decisions (Boswell, 2009; Jasanoff, 2009). The wide-spread adoption of science as the authoritative form for policy-making is however not as simple as a straight forward improvement of policy making. Rather changes in what knowledge counts as authoritative within policy making fields can reshape how policy maker position themselves inside and outside of their organization, the way inter-organizational struggles over policy making play out or, given that science can be produced on a global scale, which actors can make legitimate claims over what constitutes legitimate policy-making. The adoption of a seemingly norm-free and abstract form of knowledge does therefore not settle struggles over distributional outcomes of policy-making, but rather transform, shift and change them into new forms. The aim of this dissertation is to provide insights into some of the social processes, that occur during, what is often referred to as a scientization: the wide-spread adoption of science as an authoritative form of knowledge production and the subsequent increased production and use of science by policy-makers. Investigating scientization as a process, provides the opportunity to gain insights into the effects of changes in the what is considered authoritative knowledge on actors, organizations and the knowledge produced within a global policy-making field. For example, what patterns of scientization can we observe in a policy-making field from a comparative perspective? What kind of conflicts emerge during and after scientization has taken hold in a policy-making field? What kind of new actors does scientization enable or does it simply reproduce preexisting power relations in a policy making field? Does scientization, as a global process, drive countries towards convergence or differentiation in the respective policy making fields? How do policy-makers deal with the possibility of actors outside of traditional state bureaucracies contributing to knowledge used in policy-making itself? And finally, how do more abstract forms of knowledge such as science and more policy relevant such as expertise interact with the possibly strategic production of legitimacy by organizations?

One theoretical perspective to gain first insights into the questions of why organizations undergo a scientization process is grounded in, what Boswell (2009) calls, the instrumentalist view. Here, the assumption is that policy makers produce all forms of knowledge for the purposes of policy making (Haas, 1992; Radaelli, 1995). Key questions in this literature refer to how and when knowledge feeds into policy making (Krampf, 2013) or in more sociological accounts how knowledge is co-produced between academic science and regulatory science (Jasanoff, 2004, 2009). Policy making in this

literature is what generates output legitimacy via the production of useful policy outcomes (Scharpf, 1970), therefore knowledge is only produced to improve policy making, utility maximization by actors or used to delineate niches of policy making used for organizational survival (Carpenter, 2020; McGoey, 2012). Changes in the authoritative form of knowledge are thus interpreted as a rational choice by actors to produce knowledge which feeds into more effective policy making. A similarly instrumental account of the uses of knowledge can be found in the sociology of translation (Callon, 1984; Callon & Latour, 1981). While the production of knowledge is not exclusively to generate policy outcomes, the main point of actors is to translate their social reality i.e. to take control over an entire network of actors. Once successful at translation, actors then can claim the outcome produced by an entire network of actors for themselves. While all of the above literatures provide great insights into the relationship between knowledge production and policy making, organizations generate knowledge which cannot be applied to policy making (Boswell, 2009).

The literature on organizational sociology suggests, that knowledge production which cannot be applied directly to policy-making is not only not detrimental to organizations, but help them survive in their organizational environment. Here, the prime goal of organization is similar i.e. organizational survival. Organizations ensure their continuous survival by accumulating resources from their environment, be they social in the form of legitimacy or material. The environment itself, however, consists of heterogeneous actors, who require the organization to satisfy their demands in exchange for resources. To cope with possibly conflicting demands from a heterogeneous environment, organizations may adopt rationalized myths from their institutional environment ceremonially. Such adoption processes signal to the organizational environment, that the organizations is taking care of outside demands in ways legitimized within the institutional environment without interfering with the core tasks of organizations. This type of buffering between symbolic adoption of organizational norms and actual policy-making is referred to as decoupling (Boxenbaum & Jonsson, 2017; Bromley & Powell, 2012; Drori, Meyer, & Hwang, 2006; Meyer, Boli, Thomas, & Ramirez, 1997; Meyer & Rowan, 1977). In this literature, organizational survival is therefore not only secured by the production of outputs, but also by the symbolic adoption of organizational norms.

Applying the neoinstitutional logic described above to scientization, then provides distinct insights into the possible effects of shifts in what is considered authoritative knowledge in a policy making field. Actors do not only produce science exclusively to optimize policy outcomes, but also do to satisfy heterogeneous demands from their environments. Key problems like struggles over the state of the economy are not seen as threats to organizations, but rather as opportunities to signal the attentiveness of organizations to issues a variety of environments care about (Brunsson, 2002;

Weaver, 2008). While one could construe the production of symbolic legitimacy for organizational survival as a type of utility maximization of actors, therefore making it instrumental in the wider sense of the term, actors act out of a logic of appropriateness i.e. they enact organizational norms because they consider it the “right” thing to do, rather than a rational choice (Meyer, 2010). Further, studies on the adoption of norms have shown, that norm adoption can impose its own, unforeseen by the adopting actors, logic onto the behavior of organizations. For example, the promotion of previously sidelined actors to powerful position in organizations, which in return reorganize their environment or push the development of new organizational norms. These norms themselves can then transform the organizational field from within (Borum, 2004; Bromley & Powell, 2012; Dick, 2015; Michelson, 2019; Sandholtz, 2012; Tilcsik, 2010).

The goal of this dissertation is to contribute to both literatures by analyzing scientization as a process occurring in a policy-making field. Special attention is paid to the effects the adoption of science as an authoritative form of knowledge has on an organizational field, but also for the way legitimacy demands of organizations interact with knowledge production as well as under which conditions different types of knowledge can be transformed into policy making. To do so this dissertation picks up central banking as a policy making field to investigate the interplay between organizational legitimacy, changes in knowledge production and policy making. Central banks as organizations are an ideal case to analyze the effects of scientization in a policy making field. Compared to other policy makers like ministries of finance, central banks are largely independent policy makers, giving them more control over their own organization. Over the last few decades central banking has undergone multiple waves of organizational norm adoption ranging from them as organizations themselves (Marcussen, 2005), over their institutional set-up as independent policy-makers (Polillo & Guillén, 2005) to their policy instruments for monetary policy (Wasserfallen, 2019). Norms on what constitutes authoritative knowledge followed suit in the 90ies, when central banks underwent the scientization process under investigation in this dissertation (Marcussen, 2009). Central banks are an ideal case for the study of scientization, because knowledge and epistemic authority over economic and financial matters are also not only tools for the production of symbolic legitimacy, rather they are core policy instruments for monetary policy (Braun, 2015; Holmes, 2009; Walter & Wansleben, 2020; Wansleben, 2018). Over the past decades’ central banks on a global scale have built a vast network of workshops, conferences, training sites, research networks and publish thousands of working papers each year, all of which provides the infrastructure for the production and diffusion of policy relevant knowledge. Central banks as a global community of scientized policy-makers therefore provide an ideal case to study the intended and unintended consequences of scientization,

because knowledge produced in any point in the field can become relevant for policy-making in the entire field. Central banks also perceive themselves as members of an epistemic community (Johnson, 2016; Kapstein, 1992; King, 2005; Riles, 2011; Verdun, 1999), empirical analysis of them as a knowledge producing organizational field therefore can generate insights into possible convergence or divergence processes on the organizational field level. Lastly, the adjacent scientific field relevant for central banking, mainly macroeconomics and finance, are highly differentiated and hierarchical scientific fields dominated by the analytical core of the field located in the United States (Bornmann, Butz, & Wohlrabe, 2018; Fourcade, 2006), reducing confusion over what is considered as legitimate scientific knowledge (Whitley, 2000).

Because the goal of this dissertation is to study knowledge production in policy making fields such as central banking, it investigates the relationship between organizational legitimacy and knowledge production on multiple levels. Chapter 2 studies scientized knowledge production by central banks on the organizational field level. The chapter develops a new methodology for mapping dynamics of knowledge production in organizational fields and provides first insights into the emerging structure of knowledge production. Chapter 3 uses two central banks, the Bank of England and the European Central Bank, to investigate how central banks use their scientized knowledge production to built networks with other organizations. It introduces epistemic support networks as a concept to describe the active relationship building towards the professional environment of central banks. The last chapter focuses on the case of the Bundesbank after the introduction of the Euro. It shows, how internal dynamics of central banks interact with dramatic shifts in their organizational environment during institutional crisis to facilitate the production of knowledge on new policy fields. The chapter continues to show why the newly acquired expertise partially failed to construct sufficient policy authority in its new policy domain to recover the Bundesbanks previous position in its political and organizational environment.

Another objective of this dissertation is to be attentive towards the property of different types of knowledge and how organizational demands for legitimacy shape their production. Previous research on this topics uses the terms expertise and science interchangeably (Boswell, 2009). However, science as a form of knowledge produces legitimacy precisely because it is considered a norm-free and abstract form of knowledge. It is the perceived objectivity of science and the cultural recognition it receives as a superior form of knowledge, which allows it to produce symbolic legitimacy. Its abstraction, however, is also what makes it unsuitable for actual policy making, because effective policy making requires the use of particular, context specific knowledge on the organizational environment. The effects of policy making also always produce distributional

conflicts, thereby putting the norm-free ethos of scientific knowledge into question (Quark, 2012). This dissertation therefore distinguishes between science and knowledge necessary for the production of legitimacy via policy outputs, output legitimacy. This type of knowledge is referred to as expertise (Eyal, 2013a). Chapter 2 uses the properties of science as an abstract form of knowledge to provide insights into the diffusion of knowledge within the central banking field. The adoption of science as an authoritative form of knowledge provides all central banks within the organizational field the ability, at least in theory, to signal their rationalized policy conduct to others in their pursuit of symbolic legitimacy. Chapter 4 in contrast focuses on moments of organizational crisis in which central banks cannot legitimize themselves via outputs. The chapter then shows how the accumulation of expertise produces symbolic legitimacy, which at least temporarily serves as a substitute for lost output legitimacy. Lastly, the chapter tracks under which conditions inside and outside the organization must be met for previously accumulated expertise for symbolic legitimacy to be transformed into output legitimacy once again.

The structure of this dissertation is as follows: the introduction provides an overview of the data and methodological innovations of the dissertation and provides short summaries of each of the included studies. Afterwards the introduction outlines the contribution of the dissertation to organizational sociology and the study of central banks and points out how future research can overcome some of the limitations of the studies presented in this dissertation. Next, the main body of this work comprises of three empirical chapters (chapter 2,3,4). Chapter 2 includes the study called “From Global Diffusion to Local Semantics: Unpacking the Scientization of Central Banks”, chapter 3 includes the second paper “Epistemic Support Communities: On the National Embeddedness of the Bank of England and European Central Bank” and finally chapter 4 the third paper “Independence without purpose? Macroprudential regulation at the Bundesbank”.

1.1 Data and Methodological innovation

As the linkage between organizational change, legitimacy concerns, and knowledge production still lacks empirical investigations, this chapter discusses the number of different methodological approaches used in each empirical chapter. Each chapter approaches organizations and knowledge production on different levels from the entire organizational field to in-depth research of one organization. All approaches, however, serve to improve our understanding of theoretical concerns of the interplay between policy-makers, their legitimacy and knowledge production. This section simply provides an over-view of the methods used in this dissertation. More in-depth descriptions of their utility to study the relationship between legitimacy concerns of central banks can be found in the individual chapters as well as possible limitations for each approach.

The second chapter of this dissertation analyzes the entire organizational field of central banking as a whole. The basic research question in this chapter is: does scientization, as a global phenomenon, drive convergence or divergence in the knowledge production of central banks? This level of analysis requires a decent amount of abstraction in terms of data collection and methodological approach. The data collection mainly focuses on a genre of texts widely adopted by almost all central banks: working paper. Working paper are the ideal genre of text for this analysis, because it is a well understood genre for economists to write, its adoption from the academic field homogenizes the type of knowledge put forward in them and lastly, they are often co-authored, which allows for cooperation and co-production of knowledge between organizations. The basis for the analysis is a data set of all working papers of all G20 and EU central banks in addition to all working paper of the IMF and BIS downloaded from the RePEc database. A total of about 33780 working paper and their abstracts were collected. Another unanswered question when it comes to the scientization of central banks, and scientization in general, is whether scientized organizations actually produce knowledge akin to science. To test this aspect, I additionally gathered all articles published in the top 5 economics, macroeconomics and finance journals according to commonly agreed upon rankings (Bornmann et al., 2018; Kalaitzidakis, Mamuneas, & Stengos, 2011; Kodrzycki & Yu, 2006; Kohlscheen, 2011; Rath & Wohlrabe, 2016; Wohlrabe, 2016). This totaled an additional 33664 articles were collected.

Establishing convergence in knowledge producing fields usually uses citation analysis. The RePEc database, however, does not provide citations for central bank working paper in sufficient numbers for such an analysis. To overcome this limitation, chapter 2 uses an innovative natural language processing called semantic network analysis. The goal of semantic network analysis is to establish similarity ties within and between texts or collections of texts. Their advantage compared to more commonly used approaches like topic modelling lies in their direct approach towards calculating similarity between documents, rather than misappropriating previous methods towards the same end. By applying semantic network analysis to the study of organizational fields, this dissertation provides a methodology to investigate the underlying structure of knowledge production in organizational field, something that has so far eluded the literature.

The third chapter moves down the level of analysis from the entire organizational field of central banking to the analysis of the organizational environment of two central banks: The Bank of England and the European Central Bank. The main research question in this chapter is how scientized central banks built network of epistemic support in their environment. To answer this question the chapter uses the above-mentioned data set of working papers for those two central banks, but adds

disambiguated author names, affiliations of working paper authors and full text to the dataset. Methodologically, the chapter investigates strong ties like co-authorship between authors of two different organizations using simple descriptive statistics and affiliations networks. This method improves common approaches of studying scientization for organizations, because it utilizes strong-tie like co-authorship in contrast to weaker ties such as citations, similarities in texts or mere mentions of other organizations common for the study of scientization in international organizations (Christensen, 2018; Zapp, 2018, 2022).

Finally, the last chapter investigates how organizations knowledge production changes when their main form of legitimizing becomes impossible and under which conditions knowledge can be utilized to create output legitimacy. Analyzing such processes requires in-depth knowledge of internal processes and practices ideally in the form of ethnography. For this chapter ethnography was conducted at the German Central Bank, the Bundesbank, for six months in the form of an internship in 2018. Studying the organizational response of the Bundesbank to the initial shock to its organizational legitimacy in the form of the creation of the European Central Bank, provided insights into how organizations adopt norms from their environment, organize symbolic legitimacy and crucially how expertise accumulated ceremonially can suddenly serve as a path for the production of output legitimacy if a sudden demand for expertise appears in the organizational environment. The use of ethnography, in-depth interviews with nine Bundesbank insiders and access to internal archives provided insights into previously understudied theoretical issues such as dynamics of legitimacy (Imerman, 2018) and conditions under which different types of legitimacy production become possible (Bromley & Powell, 2012).

1.2 Paper Summaries:

1.2.1 Paper 1

The first paper of this dissertation titled “From Global Diffusion to Local Semantics: Unpacking the Scientization of Central Banks” takes a birds-eye view of the scientized organizational field of central banking. It takes up central banks as a case of a scientized policy making field, but goes beyond only looking at the diffusion of formal organizational structures by interrogating the underlying semantic structure of knowledge produced in such fields. Previous research on scientization often only focuses on specific policy programs (Ban, Seabrooke, & Freitas, 2016; Thiemann, 2022; Thiemann, Aldegwy, & Ibrocevic, 2018; Thiemann, Melches, & Ibrocevic, 2020) or organizations (Kentikelenis & Seabrooke, 2017; Mudge & Vauchez, 2016, 2018; Quark, 2012; Zapp, 2018). Studies on the underlying semantics within such a policy field are still amiss, the literature therefore lacks an understanding of the structuring effects of scientization within an organizational field.

To overcome this short-coming, this paper hypothesizes on possible emerging semantic structures within organizational fields. From an organizational sociology perspective a common assumption for organizational fields are isomorphic processes (DiMaggio & Powell, 1983). Isomorphism in organizational fields leads to a convergence hypothesis i.e. it is assumed that shared concepts can be universally applied to local contexts. Therefore, semantics within an organizational field should become more similar over time. A competing hypothesis is derived from a translation perspective. Here, adopted organizational norms are subjected to localized political struggles. Such political struggles shape the knowledge produced by organizations. Following this hypothesis, the evolving semantic structure of central bank knowledge production is expected to be clustered around central banks with similar political-economic struggles.

By applying various forms of semantic network analysis on the dataset of working papers by all G20 central banks, the IMF and the BIS in addition to top economics journals, the analysis reveals three key features of scientized knowledge production: First, in spite of the diffusion of organizational forms of knowledge production, no convergence of knowledge production within the field can be observed. Rather, knowledge production becomes increasingly clustered within the field roughly separating into a Federal Reserve System cluster and a non-Federal Reserve System cluster. The latter further separates into smaller clusters over time. Second, only the Federal Reserve System and Mexico produce knowledge akin to what is produced in top economics journals. Third, differences between clusters are not easily reduced to variation of mandates or political economic contexts, but rather depend on the organizational environment of each central bank. A comparison between the Federal Reserve System cluster and the cluster including the European Central banks shows, that not only are there differences in how policy fields relate to each other, but also how each policy field is constituted on the semantic level.

1.2.2 Paper 2

While the first paper of this dissertation has investigated the developments of central bank knowledge production on the level of the organizational field, the second paper takes a closer look at the organizational environment of two specific central banks: The Bank of England and the European Central Bank. The second paper of this dissertation titled “Epistemic Support Network: On the Embeddedness of the Bank of England and European Central Bank” argues, that scientization as a shift in the authoritative knowledge for policy making opens central banks up to a new environment. Within this new institutional environment central banks are mainly faced with other actors who can make epistemic claims over monetary policy: economics departments and other central banks. Economics Departments in universities and other central banks could potentially lay claim on policy

relevant knowledge of central banks by contesting policy decisions or even the epistemic authority of one particular central bank. To prevent such contestation, this paper argues, that central banks built epistemic support networks i.e. professional networks of economists, who are enrolled into the research program of central banks by their mundane research activities such as writing working papers together.

Empirically, the paper shows the existence and development of epistemic support networks by analyzing the affiliations of Bank of England and European Central Bank working paper. The analysis shows, that the Bank of England faced with an entrenched economics profession based on elite networks, does mainly enroll economics departments based on prestige. The epistemic support network built by the Bank of England after it scientized can therefore be characterized as a prestige network. In contrast to this is the European Central Bank. The ECB was hyper-scientized at its inception as its research department became constitutive for its position within the European governance field. However, the ECB did not face an entrenched European economics profession and therefore was not able to fall back on specific professional structures. The analysis of ECB affiliations then shows a different pattern to the Bank of England, because it builds an epistemic support network based on avatars within its new organizational environment. The most common affiliations of the ECB are not the most prestigious economics departments but rather are based on a network of avatars built directly by the ECB such as the Goethe University in Frankfurt or are based on personal transfers from the ECB into the academic system like the Technical University of Lisbon. In addition to a different engagement with its academic environment compared to the Bank of England, the ECB also engages to a much higher degree with national central banks.

1.2.3 Paper 3

The third paper of this dissertation titled “Independence without purpose? Macroprudential Regulation at the Bundesbank”. This paper takes up the Bundesbank as case for an organization that experienced a radical challenge to its way of legitimizing itself. During the 90ies the Bundesbank was the central bank of Europe, with strong political independence and full control over its policy instruments. However, the creation of the European Central Bank and a financial regulatory reform in the early 2000s put the Bundesbank into a difficult position: As a historically independent central bank it lost its core task, monetary policy, and due to the creation of a single supervisor in Germany it also lost its role in banking supervision. The Bundesbank therefore lost its ability to produce its main form of legitimacy: output legitimacy.

The paper then investigates how the Bundesbank deals with this shock towards its output legitimacy. It shows, that the Bundesbank engaged in symbolic knowledge production on the topic of financial stability and systemic risk to compensate for its lost ability to produce legitimacy via outputs. While this type of knowledge was only produced to gain symbolic legitimacy in the wider organizational field of central banking prior to the Great Financial Crisis, post crisis this knowledge became unexpectedly relevant. Previous literature on how the gap between symbolic knowledge production and policy outcomes can be overcome has only focused on practices within organizations (Bartley & Egels-Zandén, 2016; Glaese, 2020; Hallett, 2010; Lim, 2017; Michelson, 2019; Sandholtz, 2012; Tilcsik, 2010). Process outside of the organizations, which must align with organizational processes have so far been outside the scope of these studies, thereby lacking the conceptual framework to interrogate how organizations can overcome mismatches between their policy instruments and their organizational environment.

This is exactly the situation the Bundesbank found itself after the Great Financial Regulatory reform, because Germany adopted new policy instruments from transnational regulatory efforts (Basel III). While these new policy instruments matched reasonably well with the symbolic knowledge of the Bundesbank, conditioned outside of the organizations were not yet set for the production of output legitimacy. To explain under what conditions the Bundesbank can achieve output legitimacy once again the paper derives four conditions by combining neo-institutional theories and actor-network theory. The four conditions for this process are: First, the Bundesbank must recouple its internal practices with its policy instruments, because without this recoupling policy instruments would remain unused. Second, it must be able to create the discursive space for its intervention. This includes creating the relationships between the means (policy instruments) and a clearly defined and measurable policy outcome (financial stability). Third, the central bank must translate its expertise, that is, to reconfigure the entanglements in the state-economy boundary to produce outcomes. Fourth, within the institutional arrangements between itself and other state agencies, the central bank must become the obligatory passage point to claim the policy outcome for itself. As the case of the Bundesbank shows, until all four conditions are met an organization will have only limited abilities to use policy outcomes in its search for legitimacy.

1.2 Contribution, Limitations and Conclusion

This dissertation project set out to rethink central banks and their knowledge production from a purely technocratic, apolitical and bureaucratic policy makers into the more general conceptualization of organizations. Certainly, policy making, technocracy and politics are important fields for our understanding of central banks. However, this dissertation has shown, that by treating

central banks as organizations first and policy makers second, new phenomena become visible and previously understudied cases become ideal cases for the study of current policy problems such as policy making under uncertainty or overlapping institutional crisis.

One of the main results of this dissertation is that the interaction between knowledge production and organizational legitimacy go beyond the production of policy outcomes. Challenging the assumption of technocratic central banks is common in the literature on central banking (Baker, 2013b, 2013b; Ban et al., 2016; Mudge & Vauchez, 2016, 2018; Thiemann et al., 2020), the findings of chapter 4 indicate, that not all central banks produce knowledge purely instrumentally for policy making, but also for the production of symbolic legitimacy. Especially, the case study of the Bundesbank in chapter 4 shows, that the Bundesbank simply did not have policy instruments, much less the authority to use them, while they accumulated expertise on financial stability prior to the Great Financial Crisis. While a counter-argument to this result could always be, that the expertise was accumulated for future policy making purposes, the use of ethnography and archival work strongly indicates a symbolic engagement with financial stability. As chapter 4 shows, the symbolic production of expertise was done in an effort to adopt an upcoming norm of macroprudential central banks. This symbolic adoption was precisely done to substitute the loss of output legitimacy. Chapter 4 further conceptualizes the translation of such symbolic expertise into actual policy outcomes using the sociology of translation and outlines four conditions under which organizations such as central banks can generate output legitimacy. The chapter therefore provides a conceptual framework for previously unexplored processes in organizational sociology (Bromley & Powell, 2012; Kern, Laguecir, & Leca, 2018; Stål & Corvellec, 2022) of overcoming decoupling between means (policy instruments) and ends (financial stability).

A main result, which features heavily in all three chapters, is the relationship between the organizational environment, which grant legitimacy to central banks and their knowledge production. Previous studies have already shown the adoption of organizational norms from an international setting by central banks (Johnson, 2016; Maman & Rosenhek, 2009; Mandelkern, 2019; Marcussen, 2005; McNamara, 2002a; Mudge & Vauchez, 2016; Polillo & Guillén, 2005; Wasserfallen, 2019). This dissertation contributes to this literature by pointing towards the relationships, that develop due to the scientization process. Chapter 2 is clearest in its conceptualization of central bank knowledge production as an organizational field with its own dynamics. It shows, that contrary to commonly held assumptions of isomorphism, central banks do not produce increasingly similar knowledge, but rather increasingly form more distinct clusters. Chapter 3 on the other hand, shows how central banks open themselves up towards new epistemic environments and how this process

facilitates strong co-authorship ties to economics departments in these new environments. Beyond showing the adoption of a policy norm by the Bundesbank, the fourth chapter also shows how the expertise developed by the Bundesbank is partially determined by its position within the German political system. In sum, the dissertation was able to show, that organizational legitimacy and different environments are important factors for the substantial content of knowledge accumulated by organizations, but also its type i.e. is it policy relevant particular expertise or abstract quasi-scientific knowledge.

The last contribution to the wider field of organizational sociology, but also the central banking literature are methodological. While quantitative text analysis methods have become more popular in recent times, especially in IPE (Ban, 2021), it has so far largely been reduced to measuring the content of texts via methods like topic models. By applying more sophisticated analysis like semantic network analysis this dissertation provides a methodology to not only trace the content of texts, but also how these texts can be used to gain insights into the structure and dynamics of organizational fields. Using semantic network analysis accomplishes this on two different levels: First, the application of semantic network analysis to abstracts of a large variety of central banks allows mapping organizational fields beyond the diffusion of formal organizational structures. As the analysis of chapter 2 shows, significant differences in knowledge production among members of an organizational fields remain on the semantic level even though the conditions for isomorphism exist. Especially, the analysis of meaning structures in chapter 2 goes beyond typical content analysis methods such as topic models, precisely because they allow for a relational analysis of knowledge. This methodological adoption to research on organizational fields allowed for a fresh perspective to organizational sociology, offering a more comprehensive understanding of the structure of organizational fields.

While this dissertation has contributed to organizational sociology and the literature on central banking, a number of caveats, which are also avenues for future research, remain. Chapter 2 establishes a clustering effect in the knowledge production of central banks, but can only speculate on what might cause such patterns to emerge. Future research could for example consider other settings for knowledge production to tease out a more sophisticated explanation. For example, personal exchanges during conferences, common educational backgrounds or different audiences for research all could plausibly explain the results and should be investigated. Chapter 3 is similarly restrained, because it can only establish ties between affiliations once two authors have co-authored a working paper. This methodological strategy, however, blends out other settings such as conferences, but also informal input into academic research. Additionally, chapter 3 is limited to

providing evidence for the existence of epistemic support networks, but cannot yet establish the functioning of such networks. Future research should gain insights into the enrollment of epistemic support networks by central banks during episodes of epistemic contestations. Lastly, this dissertation as a whole has dealt with the role of knowledge production in central banks by differentiating expertise from scientific knowledge, however, it could not establish how boundary work within central banks purifies each type of knowledge, how such processes are organized and how this organization interacts with the actors involved. Ethnographic research in the future could plausibly provide such insights and would significantly improve our understanding of knowledge production in policy making organizations. Nevertheless, as discussed above, all papers included in this dissertation provide important insights into the interplay between organizations, their environments and the knowledge they produce. They further improve our methodological toolkit we use to investigate individual organizations and organizational fields as a whole.

1.3 Publication status of the Articles

1. Ibrocevic, Edin (2023) "From Global Diffusion to Local Semantics: Unpacking the Scientization of Central Banks", Revise and Resubmit: *Socio-Economic Review*
2. Ibrocevic, Edin (2023) "Epistemic support networks: How scientized central banks built networks with their professional environment", In preparation
3. Ibrocevic, Edin (2022) "Independence without purpose? Macroprudential regulation at the Bundesbank.", *Economy and Society*, 54(4), pp. 655-678

2.0 From Global Diffusion to Local Semantics: Unpacking the Scientization of Central Banks

Abstract:

This paper investigates the scientization of central banks and analyzes the evolving knowledge production. Existing literature assumes, that central bankers as an epistemic community contribute to a universal stock of economic knowledge, which depoliticizes policy decision. However, research on the structure of central bank knowledge production is lacking. To address this, I conduct semantic network analysis on 75000 central bank working papers and articles from top economics journals. Findings show global organizational forms of knowledge production have diffused, but semantics remain localized. The semantic structure becomes increasingly clustered over time, with a notable division between the Federal Reserve System (FED) and non-FED clusters. Only Federal Reserve's produce knowledge aligned with top academic journals. Cluster differences are not solely due to mandates or political contexts but depend on specific policy environments. This research illuminates the evolution of knowledge production within central banks and underscores the influence of organizational and policy contexts.

Keywords: Social Networks, transnational diffusion, organizations, economics

JEL Classification: Z13: Economic Sociology; Economic Anthropology; Language; Social and Economic Stratification, B29: History of Economic Thought since 1925: Other

2.1 Introduction

Scientization, the increased production and utilization of scientific knowledge by modern organization has not only been a common feature of international organizations (Drori & Meyer, 2006; Kentikelenis & Seabrooke, 2017; Quark, 2012; Zapp, 2018), but has also spread within entire policy making fields (Claveau & Dion, 2018; Lebaron, 2008; Marcussen, 2006, 2009). Policy making fields are particularly interesting in this regard, because once scientization has taken hold, the knowledge produced in these fields continues to be productive and subject to internal politics (Ban, 2016; Ban et al., 2016; Ibrocevic, 2022; Kentikelenis & Seabrooke, 2017; Mudge & Vauchez, 2018). However, the literature on the scientization of policy makers either focusses on particular policy programs or on in-depth case studies of a policy making organization. Studies on the structure of knowledge production for an entire scientized policy field are still amiss. Studies on global diffusion mainly concentrate on the spread of organizational forms, rather than the knowledge produced within such forms, and thereby miss possible variation on the content of policy ideas. I take up central banks as an extreme case of a scientized field of knowledge production to fill this gap in our knowledge. In this article I analyze the semantics produced in the field of central banking research as the scientization process progresses over time. Thereby, I provide first insights into the structure of knowledge production on the semantic level during and after the scientization process has fully established itself within a global policy making field.

In recent years knowledge production within the field of central banking has become a focus for social scientists. Studies have shown that science as a form of authoritative form of knowledge has become the accepted norm by central banks (Backhouse & Cherrier, 2019; Claveau & Dion, 2018; Marcussen, 2009; Thiemann et al., 2018, 2020). This acceptance has coincided with the adoption of organizational forms such as working papers as genre, research departments, an increase in PhD holders in central banks, and the emergence of coordination structures for central bank research such as the Central Bank Research Association, International Banking Research Network or the South-East Asian Central Bank Research Centre. Furthermore, central bankers have built knowledge infrastructures in the form of training centers, which are used to diffuse scientized knowledge within their community (Broome & Seabrooke, 2015; Johnson, 2016). All of this research activity has bled over into academic economics, particularly macroeconomics and finance (Claveau & Dion, 2018). Lastly, several studies show that the research activity of central banks is not only for show, but can become productive in creating new organizational norms which transform the policy making field from within (Baker, 2013a; Ban et al., 2016; Thiemann, 2022; Thiemann et al., 2018, 2020).

While all of these insights have greatly contributed to our understanding of the scientization of central banking and the role of science in general for policy makers, a perspective which puts the organizational field and the semantic structure within this field at its core is still missing. Key questions on the dynamics of knowledge production within a scientized policy field are therefore left unanswered. For example, the literature on the diffusion of organizational norms in central banks would suggest that central banks research would become more similar over time. This is for three possible reasons: First, the type of knowledge produced in scientized organizations partially depends on organizational and institutional contexts. Central banks have over time become more similar to each other as research on the world-wide adoption of central bank independence (Polillo & Guillén, 2005), inflation targeting (McNamara, 2002b; Wasserfallen, 2019) and central banks as organizations (Marcussen, 2005) have shown. Second, central banks orient themselves towards a singular, highly centralized academic field in economics located in elite US economics department (Fourcade, 2006). Therefore, everybody is considering the same form of knowledge as a legitimate form of science. Third, the Federal Reserve as the most important central bank in the world could function as a hegemon within the field of knowledge production and thereby become the de facto arbiter of what is considered valid research within the central banking field. All of these factors would suggest that the semantic structure of central bank knowledge production would converge over time as scientized knowledge production becomes increasingly the norm within the organizational field.

A second literature, however, would suggest a different emerging structure. According to this literature translating organizational norms like scientization into local context always subjects these organizational norms to political struggles. Therefore, the knowledge produced by research departments would only to some extent adhere to global standards, but rather serve as resources in these struggles (Backhouse & Cherrier, 2019; Ban, 2016; Ibrocevic, 2022; Maman & Rosenhek, 2009, 2011; Mandelkern, 2019; Mudge & Vauchez, 2018, 2018, 2022). The exposure of scientized knowledge production to local political struggles would suggest, that, even though the organizational and institutional environment of central banks have become more similar over time, deviations and local varieties in semantics are considered legitimate forms of knowledge within the organizational field. This possibility would further conflict with our current understanding of central bank scientization, which often times treats central banks as homogeneous actors. This is to say that there are little differences made between central banks which act within vastly different contexts (Braun & Downey, 2020; Krampf, 2013; Wansleben, 2023).

In this study I take a first step in advancing our understanding of the emerging semantic structure of central bank knowledge production as scientization takes hold. To do so I collected data on all 33000

working papers written by the G20 and European Union central banks in addition to the International Monetary Fund and the Bank of International Settlement in the period between 1991 to 2020. Understanding the semantic structure of central bank scientization requires a relational approach, because knowledge produced within working papers can only be evaluated in the larger context of the organizational field. To facilitate this relational approach, I rely on more recent advancements in quantitative text analysis called semantic network analysis (Bail, 2016; Rule, Cointet, & Bearman, 2015). These approaches allow for a more direct analysis of the similarity in knowledge production in an organizational field. Beyond revealing the macro structure of knowledge production within the organizational field at large, these methods also allow an in-depth analysis of semantic networks produced by individual central banks or groups of central banks.

My analysis reveals three key features of the semantic structure of scientized central bank knowledge production: First, while global organizational forms of knowledge production have diffused in the central banking field, the semantics, however, remain localized. This is to say, that over time the semantic structure becomes increasingly clustered roughly splitting into a cluster for the Federal Reserve System and a non-Federal Reserve System cluster. The non-FED cluster further splits into multiple smaller clusters over time. Second, a further analysis of the relationship between central banks and top journals in economics show, that only the FED system tightly aligns with the knowledge produced in academic circles. Third, differences emerging in-between clusters are not merely down to variation in mandates or political economic context, but rather depend on the direct policy environment of central banks. For example, the comparison between the FED cluster and the cluster including the ECB, shows that individual policy fields are constituted differently on the semantic level. Beyond differences in how both clusters conceptualize policy fields, they also show differences in how these policy fields relate to each other.

The article continues as follows: the first section introduces central banking as a case of a policy field, which has undergone a scientization process over the past 30 years. The second section then conceptualizes this process in terms of dynamics within organizational fields and posits possible hypotheses on the emerging semantic structure within such a field. I then introduce my dataset and methods, followed by two analytical sections. The first analytical section presents the result of the semantic structure on the organizational field level, while the second section takes the cluster including the ECB and the FED cluster as examples to present differences on the semantic level itself. I conclude by discussing these results in the context of the current literature on the scientization of central banks and by providing possible explanations for the pattern observed in the analysis.

2.2 The Scientization of Central Banks

The following section will shortly introduce the case of central banks as an organizational field, which has not only adopted new norms of what is considered authoritative knowledge, but also has adopted formal organizational structures to effectively diffuse norms within its field.

Central banks as an organizational form have spread in accordance to world-polity style diffusion processes in the early 20th century (Marcussen, 2005; Martín-Aceña & Tortella, 2016; Singleton, 2010). Since then, we have seen the spread of specific organizational norms on their institutional embedding within nation states (central bank independence) and policy framework (inflation targeting) (Polillo & Guillén, 2005; Wasserfallen, 2019). Norms on knowledge production have followed suit in the mid 90ies when central banks underwent a rapid scientization process¹. This is to say, that they shifted from a bureaucratic and arcane towards a transparent and seemingly scientific form of policy making (Marcussen, 2006, 2009).

This type of shift in knowledge production was made possible by mainly two factors: First, a general agreement by the stake holders of central banks, financial markets and the political system, that inflation control was the primary task of central banks, inflation targeting was a legitimate way of conducting monetary policy and that central bank independence was the most efficient institutional setting for central banks (Braun & Downey, 2020). This agreement among the environment of central banks, then allowed for the formalization of inflation targeting as an easily diffusible policy paradigm (McNamara, 2002b; Walter, 2019), thereby providing the groundwork for its translation into common approaches within macroeconomics. Second, in response to the collapse of the Soviet Union, the central banking community at the same time built a large network of conferences, training sites and organizational training for the up-coming central banks in post-Soviet states. In the process of creating a training program for these new central banks², the global central banking community agreed upon cultural and organizational norms of central banking, thereby making them “diffusible” (Broome & Seabrooke, 2015; Johnson, 2016).

Since the move towards scientization, central banks have immensely increased their research capacity and now often consider themselves as one of the foremost economics departments in their respective countries. Research on this community of central bank researchers is still relatively new,

¹ Many central banks have actively engaged earlier with academia, however the large-scale adoption of scientific knowledge production by central banks themselves, only became a norm in the 90ies.

² The intellectual infrastructure built during this time persists until this day and is one of the underlying reasons central bankers around the world are often considered an epistemic community

although some studies were able to find that central bankers themselves either produce knowledge within their organizational field by themselves or entered into alliances with economists in academia to generate knowledge in an effort to transform their own organizational field (Backhouse & Cherrier, 2019; Baker, 2013b; Ban et al., 2016; Claveau & Dion, 2018; McPhilemy, 2016; Mudge & Vauchez, 2018; Thiemann, 2022; Thiemann et al., 2018, 2020).

Understanding the structure of knowledge production is therefore even more important in this organizational field, because the knowledge produced is not only for show, rather it can become instrumental in transforming the organizational field itself. However, the literature on the scientization of policy makers either focus on particular policy programs or on in-depth case studies of a policy making organization. Studies on the structure of knowledge production for an entire scientized policy field are still amiss. To gain further insights into how such a scientization process could be theorized the next section will examine central banking from an organizational field perspective and leverage this perspective to form expectations of the semantic structure underlying central bank scientization.

2.3 Organizational fields and central banks

To gain a better understanding of scientization as a process the central banking field is undergoing and its effect on the semantic structure of the field, I take up a neo-institutional perspective on organizational fields. Organizational fields are defined as “those organizations that, in the aggregate, constitute a recognized area of institutional life” (DiMaggio & Powell, 1983, p. 148). In the case of central banking, the respective field is global and consists of all central banks in major economies. The world-polity literature suggests that in such a global organizational field, we can expect the emergence of a shared culture which diffuses globally (Meyer et al., 1997; Strang & Meyer, 1993). Expectedly, science becomes a dominant form of knowledge for decision making (Drori & Meyer, 2006; Drori et al., 2006). The rationale for this is that decision making based on scientific knowledge purports to be universal, objective and outside of possible distributional conflicts. The invisibilization of distributional conflicts through the application of scientific knowledge is what makes it applicable without any concern over the local context the knowledge is used in. The universality of scientific knowledge is therefore the property of science, which makes it easily diffusible within organizational fields such as central banking (Fourcade, 2006).

Indeed, a range of studies have shown that world-polity style diffusion of organizational forms has occurred in the central banking field. Marcussen (2005) has shown that central banks as organizations spread between nation states in the early 20th century (see Singleton, 2010 for a

historical overview). Studies on the spread of central bank independence, the now dominant institutional form of central banks, has shown similar patterns (McNamara, 2002b; Polillo & Guillén, 2005). Beyond pure organizational forms, policy making practices have spread within the organizational field as well. Studies on the worldwide spread of inflation targeting have shown that even policy practices spread within the organizational field of central banks (Johnson, 2016; Wasserfallen, 2019).

Given the state of the literature on organizational fields and central banks, one would expect a close relationship between the knowledge production of central banks. This expectation is supported by studies showing the creation of an epistemic community of central banks (Baker, 2013b; Haas, 1992; Kapstein, 1992; McPhilemy, 2016; Verdun, 1999; Westermeier, 2018). Epistemic communities are considered actors who collectively hold similar world-views and organize in ways to implement those world-views. Johnson (2016) for example shows how central banks in developed countries built training centers (this came in the form of specialized training centers, workshops, personal exchange to foreign central banks, training retreats and conferences) for upcoming central banks of post-soviet countries. As a side product of this training exercise, central bankers created cultural norms of what good monetary policy ought to be, while at the same time building the infrastructure to easily and rapidly diffuse policy knowledge within the organizational field. Given that central banks as an organizational field have built infrastructures of knowledge diffusion, adopted similar organizational forms for policy making and knowledge production itself, we would expect that over time the knowledge they produce would become more similar.

This expectation is however contradicted by a secondary literature on policy diffusion. In contrast to world-polity style diffusion, this literature assumes, that adoption of global norms requires translation efforts into local institutional contexts. Halliday and Carruthers (2007) show how changes made during the adoption of a global norm can recursively feed back into world polity, thereby effectively changing the norm itself. Chorev (2012) expanded on this and showed that nation states are more likely to adopt a global norm once nation states observe other seemingly similar nation states adopt the global norm with minor changes without losing legitimacy within world-polity. These studies on the diffusion of global norms would suggest that the underlying semantic structure of world-polity is localized, but not independent from each other.

This perspective is also supported by the literature on the adoption of organizational forms and knowledge by central banks. The literature has shown that the adoption of organizational norms requires a translation process, which in return makes the new organizational norm subject to

political struggles within and outside the organization (Backhouse & Cherrier, 2019; Ban, 2016; Ibrocevic, 2022; Maman & Rosenhek, 2009, 2011; Mandelkern, 2019; Mudge & Vauchez, 2018, 2018, 2022)³. Mudge and Vauchez (2018) for example show, that the European Central Bank (ECB) might have taken up science as a form of knowledge production due to its embeddedness in a global field of central banking, however the most important scientific export of the ECB, macroeconomic modelling techniques, were heavily influenced by the position of the ECB within the bureaucratic field of the EU, its position in global financial markets and the professional field of economics. The economic object created by these models, the European economy as a macroeconomic object separate from its constituent national economies, results in their analysis from the embeddedness of the central bank itself. Following this line of thinking and the literature of translation of global norms into local context, one would expect the semantic structure of scientized knowledge production to be fractured into central banks with similar positions within their global and national environments. This is to say that the resulting semantic structure should show a clustering of similar central banks, rather than a global increase in similarity.

To analyze the semantic structure in which knowledge is produced, I collected all available working paper written by all G20 and EU central banks in addition to all working papers by the International Monetary Fund (IMF) and the Bank of International Settlement (BIS). This dataset allows me to analyze the structural evolution within the organizational field of central banking within an ideal context for adoption: the production of abstract, scientized knowledge in the form of a well-standardized genre of economics working paper (Breslau & Yonay, 1999).

³ This notion is also reflected in studies on scientization in international organizations (Kentikelenis & Seabrooke, 2017; Quark, 2012; Zapp, 2018). Quark (2012) argues, that actors do adopt science as a standard for knowledge production, however this in itself leads to scientized politics i.e. conflicts over what is considered the right science for a given policy problem.

2.4 Data and Method

The analysis of the semantic structure of an organizational field like central banking requires to gather all working papers by central banks. Working paper were collected via the RePEc database, the biggest database for economics articles available⁴. I chose all central banks within the EU and G20 in addition to the IMF and BIS. This data collection process allowed me to gather 33780 working paper the period between 1991 and 2020. Beyond the publication itself, the data-collection yielded the abstract, keywords, title, and authorship data for each publication. For the purposes of this study only papers with abstracts were used⁵.

Establishing the semantic structure of knowledge producing fields usually uses citation and co-citation analysis. Citation analysis, however, is problematic for the purposes of this study, because these analytical tools require a reasonably complete citation record for all publication. This record is often provided by professional databases like Web of Science, which itself is provided the reference list by the publisher. This kind of data collection does not exist for working paper of central banks. While the RePEc database extract references from full-text PDFs automatically, the coverage ratio is too low to allow for reliable analysis via citation analysis.

Instead of citation analysis I use quantitative text analysis to infer the relationship between the knowledge production within the organizational field of central banks. More specifically, I use semantic network analysis to extract the content and, more importantly, the structure of the intellectual field created by central banks. Semantic network analysis has important advantages compared to more common text analysis algorithms. While topic models work just as well to extract the content of a large corpus of documents, it requires extra steps to show the relationship between topics, documents, and the organizations they stem from. Semantic network analysis on the other hand performs just as well at extracting topics, while at the same time having the relational approach required for the analysis built in (Bail, 2016; Fuhse, Stuhler, Riebling, & Martin, 2020; Hoffman, 2019; Lee & Martin, 2015; Roth & Cointet, 2010; Rule et al., 2015).

The specific semantic networks calculated here are similarity networks between the abstracts of working papers written by central banks. I use “textnets” an r-package, which implements the methodology of Bail (2016). I follow the bag-of-words approach, which assumes that texts can be

⁴ Some central banks do not work with the RePEc database, their working paper are therefore unavailable. For these central banks I used web-scraping to collect their working paper in December 2020.

⁵ The Saudi Central Bank and the Reserve Bank of India are excluded from this analysis, as their working paper are only available in full text PDFs.

represented by lists of words, rather than full sentences. Following this approach, I removed common stop words, numbers, and punctuations from the texts and lemmatized every token. Finally, I use a speech tagger which identifies nouns, proper nouns and compound nouns between adjectives and nouns. Previous studies have shown, that it is mostly nouns which make up the important content of documents (Bail, 2016; Roth & Cointet, 2010) This approach produces a document-term-frequency (DTF) matrix. The DTF matrix represents all documents as a frequency distribution over all remaining words in the text corpus. To avoid over-estimating the significance of terms appearing too often or too rarely, I weight the DTF matrix using term-frequency-inverse document frequency scores. To infer a network between groupings of documents, the package then uses the bipartite DTF matrix to link organizations based on the co-presence of terms within their abstracts. A weight within the grouped network “is defined by the sum of the term-frequency-inverse document frequency for the overlapping terms” (Bail, 2016, p. 11828). The last step of the analysis is to cluster the resulting network using the Louvain clustering algorithm.

Beyond calculating relationships between central banks, I also use the method by Bail (2016) above to determine the periodization for my analysis. For this, I group all texts written in one year together and calculate the similarity between all years for the entire period. Figure 2 shows the three periods found by this analysis. The first period ranges from 1991-1999 - the period when central banks began adopting institutional norms from their scientific environment. It is in this period when the working paper as a new genre for the dissemination of knowledge became established (see Figure 1). The next period is between 2000-2010. During this period almost all central banks have established working paper series. This also maps unto the time period which is commonly known as the Great Moderation in which the trifecta of inflation targeting, interest rate control and central bank independence as policy program, policy instrument and institutional arrangement of modern central banking came to prominence (Braun & Downey, 2020; McNamara, 2002b; Polillo & Guillén, 2005; Wasserfallen, 2019).

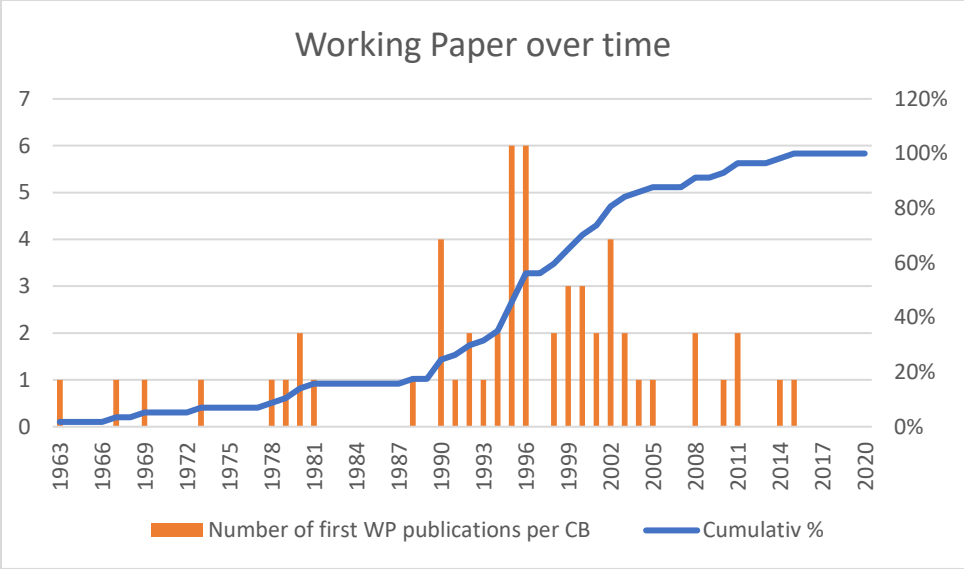


Figure 1: Number of newly established working paper series per year. First publication year was collected via the internet archives

The disruption of the Great Financial Crisis on the organizational and institutional arrangement also shows in the periodization found by my analysis. The last period matches events in recent economic history. The immediate post-crisis period was marked with a reconfiguration of large parts of the economics profession and saw the emergence of new subfields within economics. More importantly, central banks swayed from their heavy use of macroeconomic models such as Dynamic Stochastic Equilibrium Models (DSGE), which were partially to blame for the crisis itself (Fligstein, Brundage, & Schultz, 2014). It is also in this period, when large parts of the transnational regulatory framework were reworked and most central banks received mandates for financial stability (Baker, 2013b; Lombardi & Moschella, 2017; McPhilemy, 2016; Thiemann et al., 2020).

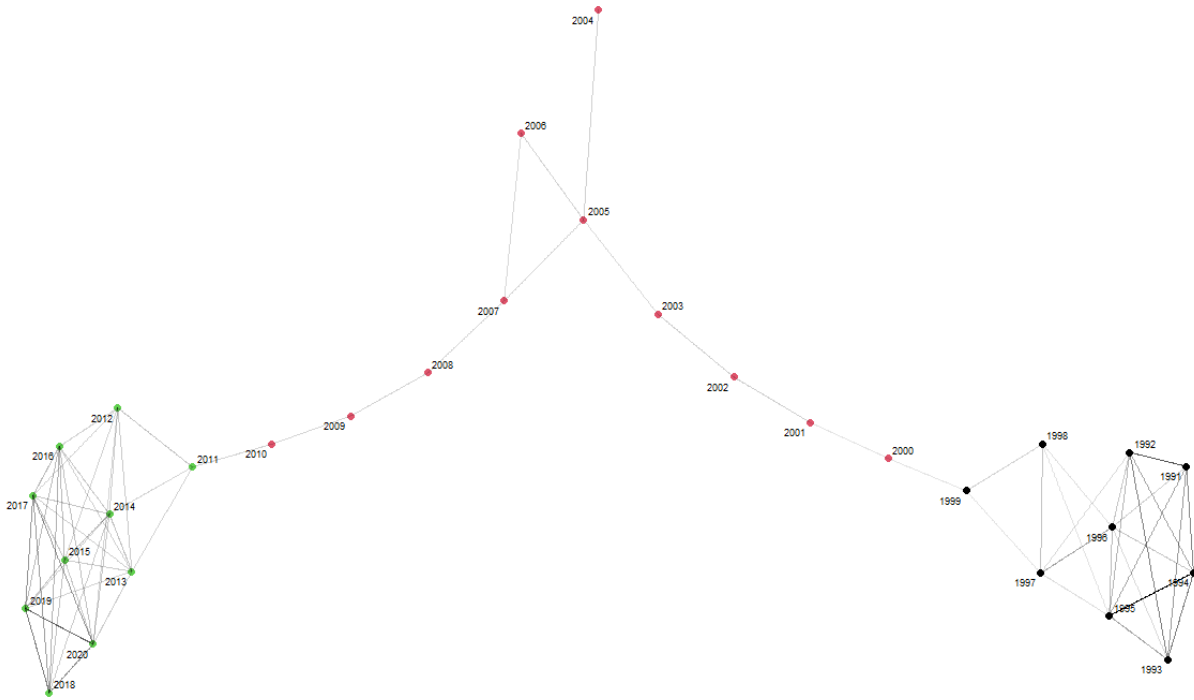


Figure 2: Similarity network between all years for all central banking working paper. Alpha = 0.25

To analyze the network structure, I rely the description of network visualizations and modularity scores. The visualization of networks requires a sparsification algorithm, because similarity networks of large quantities of texts are usually too dense to identify patterns or find clusters. Following Bail (2016), I use the disparity filter introduced by Serrano et al (2009), which removes ties below a threshold alpha. While the visual analysis provides insights into the relationship between different organizations to the professional field of economics, the calculation of modularity scores provides insights into the structure of the network. Modularity scores calculate the degree to which clusters form within a network. Clusters are defined as groups of nodes, which have dense connections within groups, but only sparse connections between groups. If the organizational field of central banks does become more similar to each other over time, the modularity should decrease over time⁶.

⁶ The results of the analysis are robust for different periodizations and alpha values (see Appendix A)

2.5 The semantic landscape of central bank knowledge production

The following section shows how the organizational field of central banks has evolved over time. In the networks an edge is produced if two organizations produce similar content in their abstract within one period. The thickness of the line indicates the level of similarity, while the color of the nodes indicates the results of the clustering algorithm.

Figure 3 shows the semantic structure of the central banking field for the entire period between 1991 to 2020. Two large clusters form between the Federal Reserve System and the rest of the field. The only exception to this pattern is Mexico, which clusters with the Federal Reserve System. The non-FED cluster is itself split into three separate clusters. The most distant cluster from the Federal Reserve System is the cluster including Germany, Netherlands, Finland, the ECB and Luxembourg. The second cluster can roughly be described as consisting of Eastern European and Emerging Market economies. This cluster roughly surrounds the ECB cluster and is itself surrounded by a cluster including international organizations such as the IMF and the BIS, but also most non-European emerging economies and mid-sized European countries. This last cluster is also what connects the larger organizational field with the FED cluster.

Figure 3 already provides us with few indications of the semantic structure underlying central bank scientization. The large central banks at the top of the monetary hierarchy, the Federal Reserve, ECB or the Bank of England, are not at the center of the similarity network, which would indicate a role-model position within the organizational field. This role is also not filled by organizations suggested by a world-polity approach i.e. the two international organizations BIS and IMF. Rather, the IMF and BIS at best could be considered facilitators between the two large clusters. Further, membership in the EMU does not seem to be a factor for central bank knowledge production. Central European countries like Luxembourg, Germany and the Netherlands form a cluster with the ECB, however other members of the European Monetary Union, independent of the size of their economies, do not seem to be closely aligned with this “core” cluster. Lastly, Eastern European central banks seem to cluster in their knowledge production, most likely due to their shared training experience in the 90ies, in spite of their vastly different political economies (Nölke & Vliegthart, 2009).

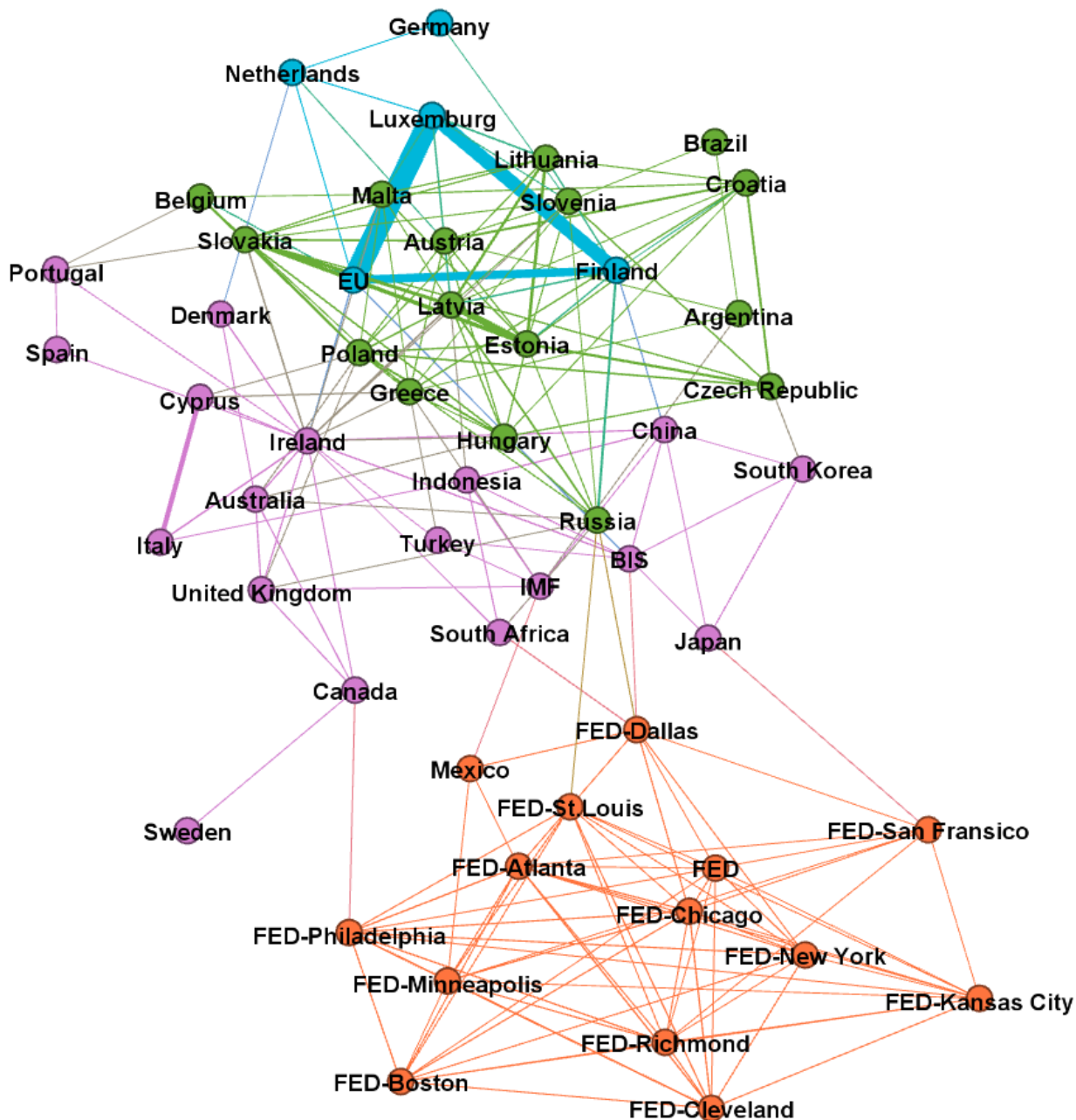


Figure 3: Similarity network of central banks between 1991-2020. Colors = clusters found by Louvain clustering. Alpha = 0.25.

While the analysis of the entire period already shows that the field of central bank knowledge production is not as homogeneous as the literature on diffusion of central banking norms would suggest, a closer look at the individual periods shows how the semantic structure becomes more modular over time. Further, the graph shows how late adopters of central bank scientization embed themselves into the existing field of knowledge production.

Figure 4 shows the semantic network for the first period between 1991-1999. At this point in time only few central banks have adopted working papers as a genre of writing. Most of them only have very few working papers, it is mostly the members of the FED system (FEDs), which have established working paper series. Three aspects appear important in this first period: First, the FEDs do not all cluster together, but rather are more dispersed between other central banks. Second, except for the large FED cluster, there does not seem to be clear cut regional clustering, beyond the fact that with the exception of the Canadian central bank, only the Federal reserve and European central banks have joined into the scientized knowledge production of central banks at this point. Furthermore, the IMF and BIS have yet to take their position at the heart of the semantic network.

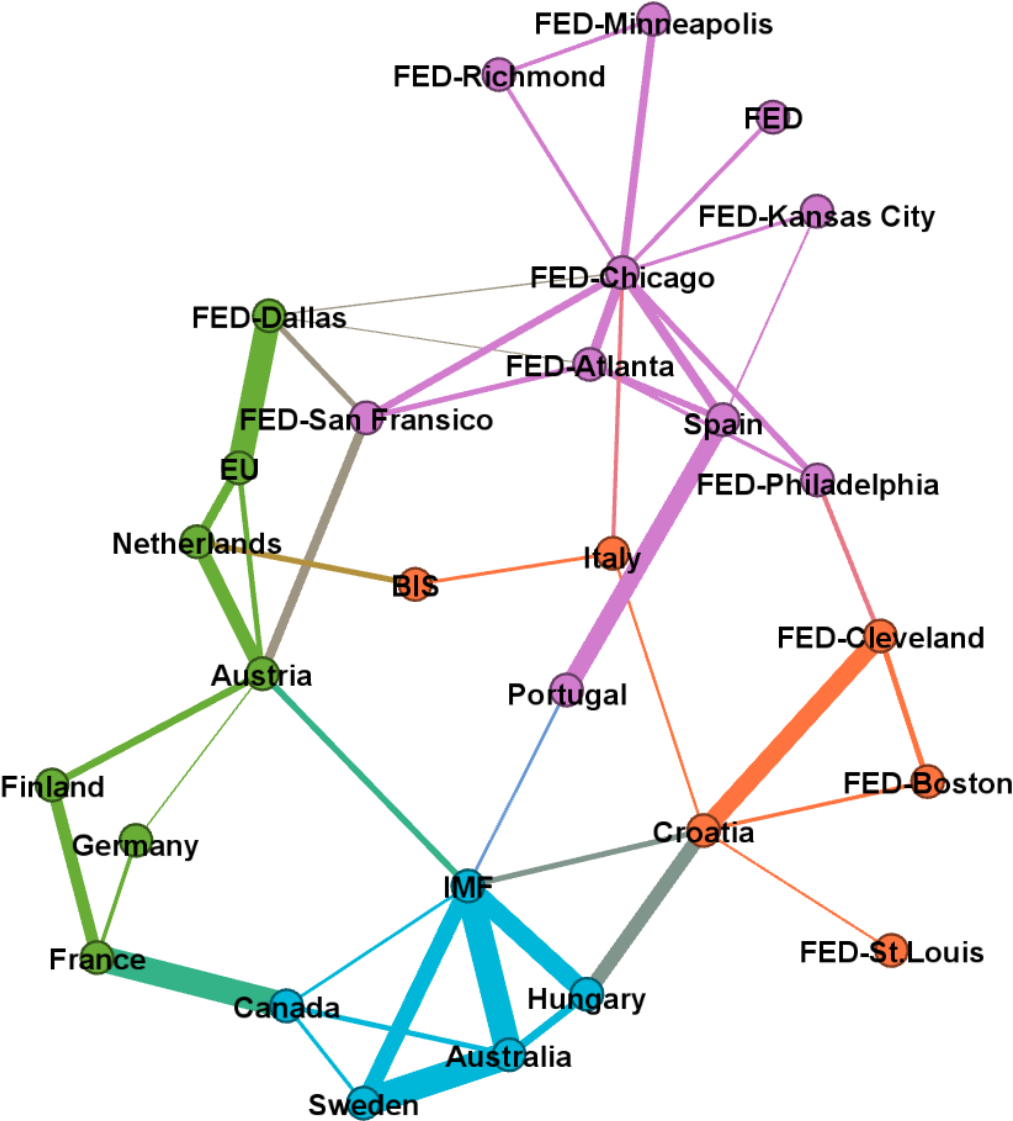


Figure 4: Similarity network between central banks in-between 1991-1999. Colors = clusters found by Louvain clustering. Alpha = 0.225. Modularity = 0.5

Figure 5 shows the network for the period of 2000 to 2010. By this point in time most central banks have adopted working papers as a genre of writing. In contrast to the previous period, the clustering of the network has progressed i.e. groups have higher in-group connections, than out-group connections. The FEDs largely begin to cluster together, however some exceptions remain. The non-FED part of the organizational field is barely connected to the Federal Reserve System, with the exception of the FED-Dallas and FED-San Francisco. The rest of the clusters begin to look similar to the clusters over the entire period. Eastern European countries begin to cluster together, however the cluster is surprisingly not as clear cut as in the network over the entire period or in the last period. The BIS during this period is closely connected to emerging economies in Japan, South Korea, Turkey, Mexico and South Africa, while the IMF shows greater similarity with European central banks.

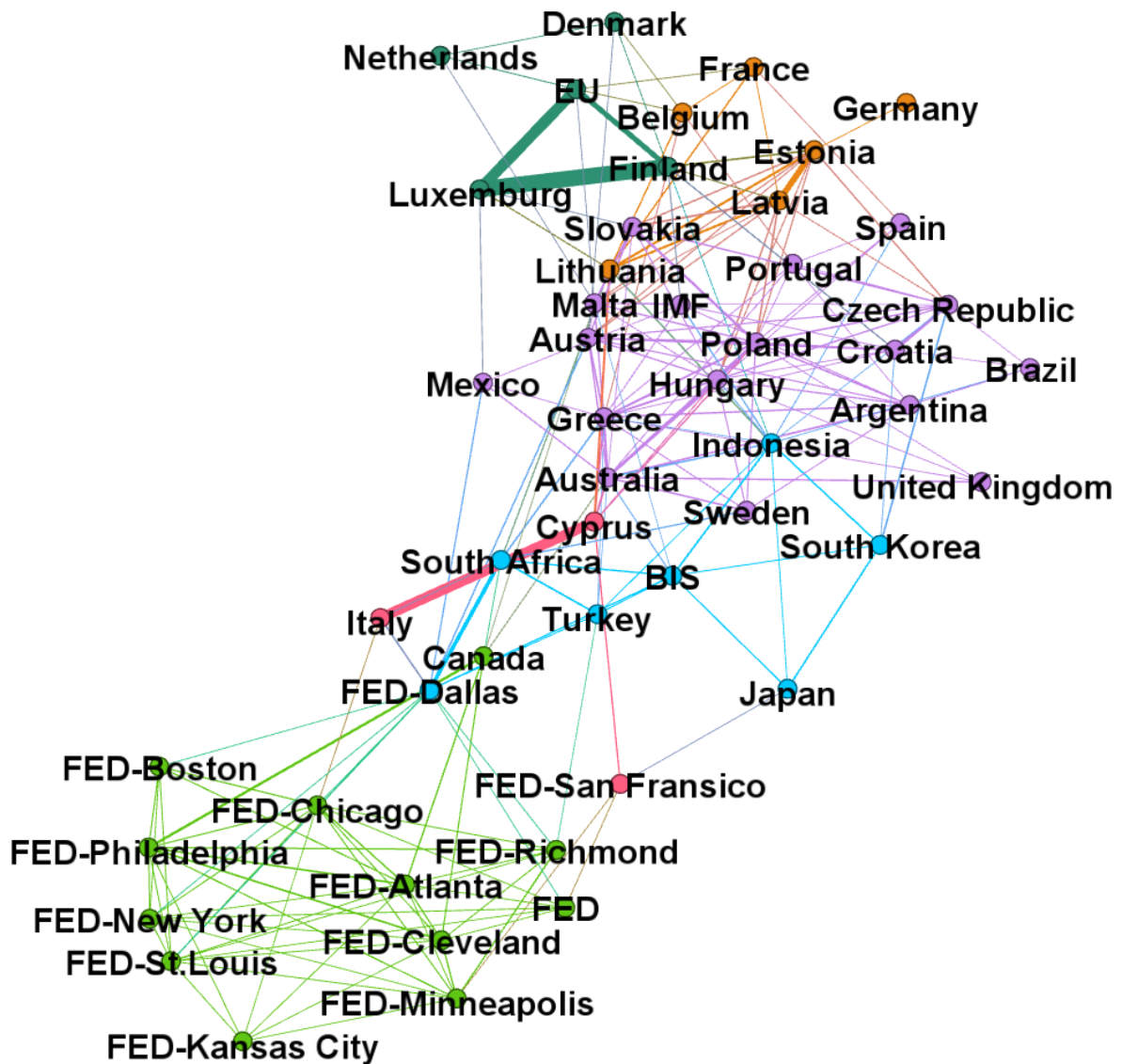


Figure 5: Similarity network between central banks in-between 2000-2010. Colors = clusters found by Louvain clustering. Alpha = 0.27. Modularity = 0.488.

The last period is between 2011-2020, continues the trend from previous periods (figure 6). The network has become even more clustered. Eastern European central banks form their own cluster, suggesting, that over time the training activities of the central bank community have yielded a common understanding of the economy in spite of differences in the political economies of Eastern European countries. The ECB still remains their close relationship with the central bank of Luxembourg, Finland and Germany. Compared to previous periods, the IMF and BIS are now position close to each other and connect a number of non-European emerging economies with each other.

Most strikingly, the FED system has now fully split of into their own cluster with the exception of Mexico.

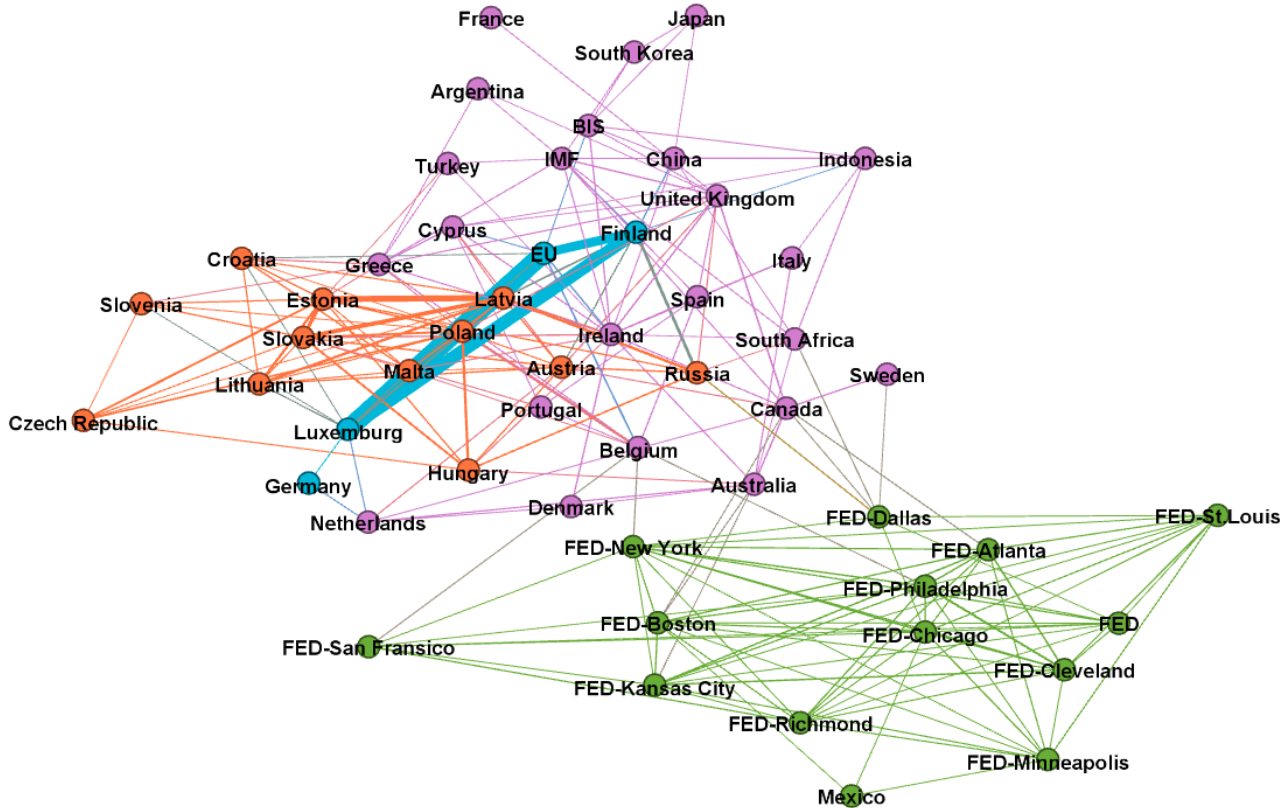


Figure 6: Similarity network between central banks inbetween 2011-2020. Colors = clusters found by Louvain clustering. Alpha = 0.25. Modularity = 0.53

So far, the analysis of the organizational field of central bank knowledge production has shown that the semantic structure of the organizational field has not become more homogeneous. Rather, the organizational field has clustered into two large clusters. The FED cluster as a distinct area of economic thinking from the rest of the organizational field. The non-FED field in return has clustered into three smaller groups based roughly on either regional similarity in the case of the Eastern European cluster or seemingly similar economic ideology in the case of the ECB cluster. The third cluster in part shows a similar pattern. The central banks surrounding the IMF and BIS are all either emerging economies or under conditionality of the IMF (Greece). While the rest of the cluster seems to be rather ambiguous in their relationship towards the rest of the network. None of these clusters

are however entirely clear cut. The FED cluster includes Mexico, while the Eastern European Cluster contains Malt and Austria.

2.5.1 The exception to the rule: The Federal Reserve System's position in academic economics

Even though the above analysis of the semantic network suggests an increased clustering of central banks into relatively distinct groups of economic thinking, one question remains: How can the most prolific producer of central bank knowledge the Federal Reserve System, the guardian of the world currency, be separate from the rest of the organizational field it regularly serves as a role model for?

One plausible explanation lies in the development of the economics profession and its relationship with the US bureaucracies. As Fourcade (2009) argues, the lack of a traditional role for public servants and a general distrust of state intervention meant that US government officials derived their legitimacy as policy makers from their membership in a profession. The identification with professional standards set within elite US economics departments (Fourcade, 2006), allowed policy makers to supply seemingly non-partisan, technical expertise, which would banish political considerations from policy making. Both state bureaucracies and academic economists view the free market and market economies as the default reference category for an ideal relationship between the state and the economy.

Against the historical and institutional background of the US economics profession, one expectation could be that a scientized Federal Reserve System would align itself with the institution it partially derives its professional legitimacy from: academia. To test this explanation, I repeated the above analysis, but this time I included the most important journals in economics, macroeconomic and finance⁷. Figure 7 shows the network for the period between 1991-2020. The network does indeed split into two large clusters: The Federal Reserve System (and Mexico), which is tightly connected to

⁷ Academic journals were chosen based on two factors: their prestige within economics and their topical relation to central banks (macroeconomics and finance). This resulted in the inclusion of the big 5 journals in economics (Rath & Wohlrabe, 2016; Wohlrabe, 2016). To determine the top journals in finance and macroeconomics I compared several different rankings and made an accumulated list of top journals. Most rankings of economic subfields come to comparable results on the importance of the top journals (Kalaitzake, 2019; Kodrzycki & Yu, 2006; Kohlscheen, 2011; Rath & Wohlrabe, 2016; Wohlrabe, 2016). A total of 33664 journal articles were collected.

the output of academic journals and the entire rest of the organizational field. The only smaller cluster left consists of finance journals, which are however still mostly connected to the FED/journal cluster.

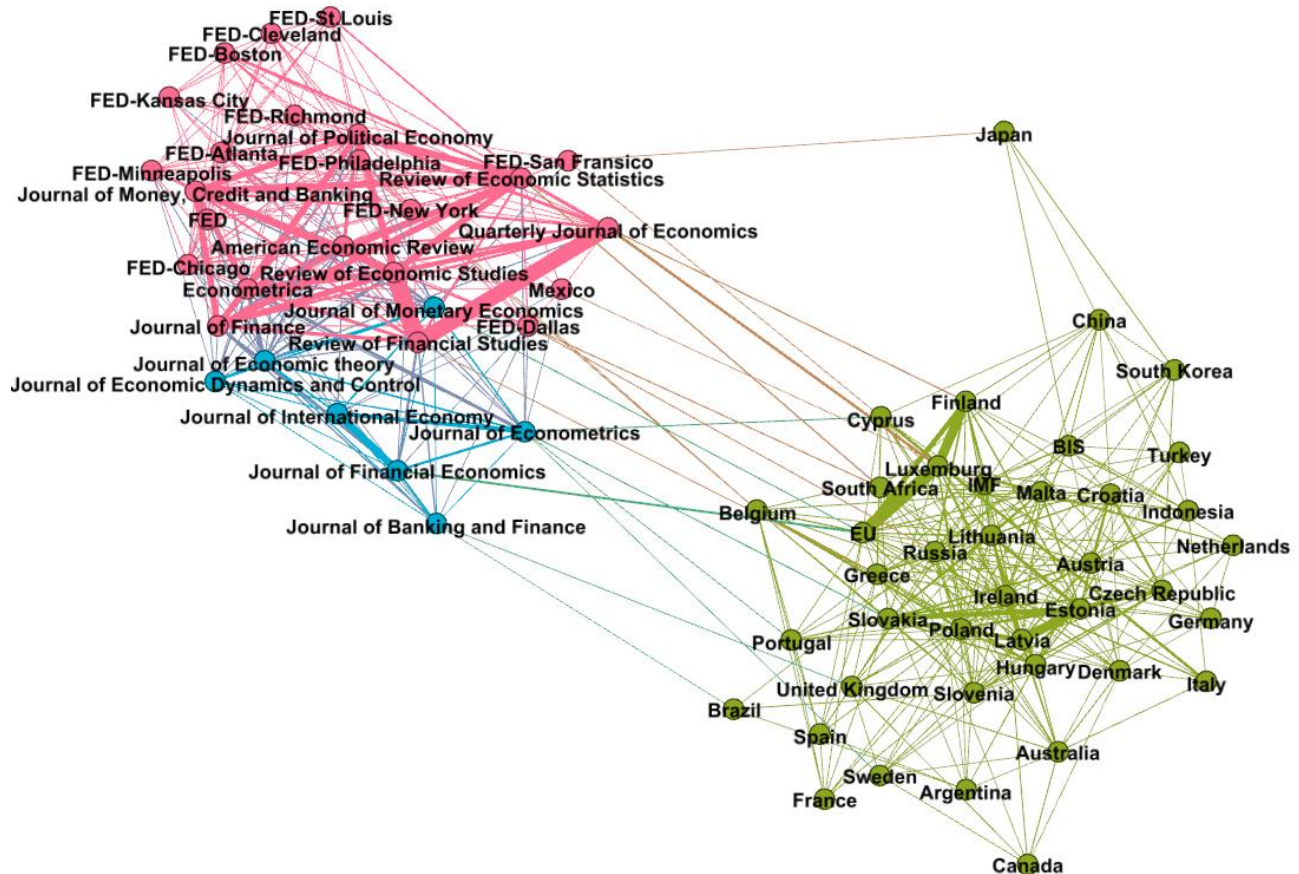


Figure 7: Similarity between central banks and top economics journals in the period in-between 1991-2020.

The semantic network observed between the scientized central banking field and economic science and the analysis of the organizational field above indicate that indeed not all central banks are equally scientized. The Federal Reserves are much more aligned with the knowledge produced in the dominant outlets of academic economics, whereas every other central bank (with the exception of Mexico) are either not willing or able to contribute to the mainstream of academic economic thinking. One possible explanation relates to market economies as a reference category developed in the

historical and institutional context of the United States economics profession. The US economics profession is not faced with the same policy problems as economists outside the US, due to its position in the international political economy. Policy areas such as exchange rate regimes, capital flight during financial crisis, trade imbalances or exchange rate volatility play almost no role for the US, which controls the global reserve currency and is the biggest economy in the world (Pape, 2022; Schwartz, 2019). Put differently, policy problems faced by central banks outside the US that deviate from the ideal of a US market economy are seen as pathologies of their political economies, rather than legitimate ways of organizing the economy from the point of view of US economic thinking.

This result suggests, that these central banks do not contribute to what is perceived as being a universal stock of knowledge by the economics profession i.e. the most abstract and considered to be the most objective form of knowledge. This lack of perceived objectivity then prohibits these central banks to use their stock of knowledge to fortify their policy making against epistemic contestations or political attacks. More importantly, however, is that the increased modularity in the semantic network indicates not only that variation in economic thinking remains, but intensifies over time. A crucial question remains from the analysis above: if variation in economic thinking persist or even increases, what are possible explanations for the differences observed on the organizational level? The next section provides insights into how these differences come about by zooming into the semantic relationships created by the working papers of the two most distant clusters: the ECB and the FED cluster.

2.5.2 Spotting the difference: the meaning-structure within clusters

The above analysis has shown that the meaning-structure of an organizational field such as central banking does not become more homogeneous over time, but rather splits into mostly regionalized clusters. However, the analysis itself is rather abstract, since it is not clear where the difference in the meaning-structure lies. Is it for example differences in the large topics covered or the way similar policy areas are viewed differently in various parts of the organizational field? To gain insights into these questions I have constructed word co-occurrence networks for the two clusters furthest apart in the last period of analysis: The FED cluster and the ECB cluster⁸.

Figure 8 shows the resulting ECB cluster network, while figure 9 shows the same network for the Federal Reserve cluster. Differences appear in almost all meaningful properties of the semantic network. The structure of the networks themselves differs. While the FED cluster has a number of

⁸ The analysis below uses the methodology of Rule et al (2015)

tightly connected topics surrounding monetary policy (the light green topic), the ECB cluster is significantly more modular (topics are more distinct from each other). This suggests that for the ECB macroeconomic policy areas perceived to be semantically more distinct. While the topics themselves appear to be more distinct, the mere existence of a wider array of topics covered by the ECB cluster seems to indicate that more areas of macroeconomic policy making are perceived to be necessary by the ECB cluster to fulfill its role as a central bank than the FED cluster.

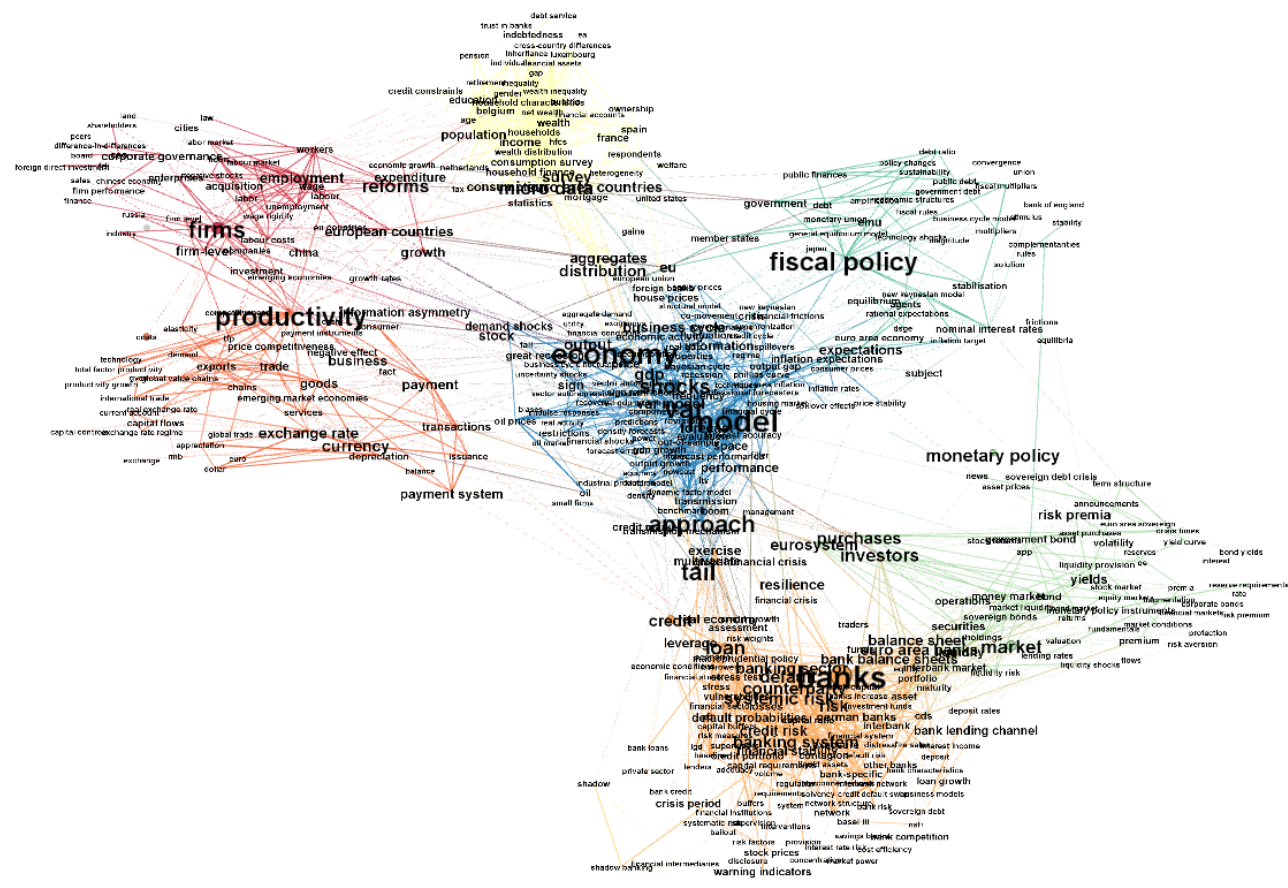


Figure 8: Co-Word network 2011-2020 ECB cluster (ECB, Germany, Luxembourg, Finland). Colors = topics, label size = inbetweenness centrality

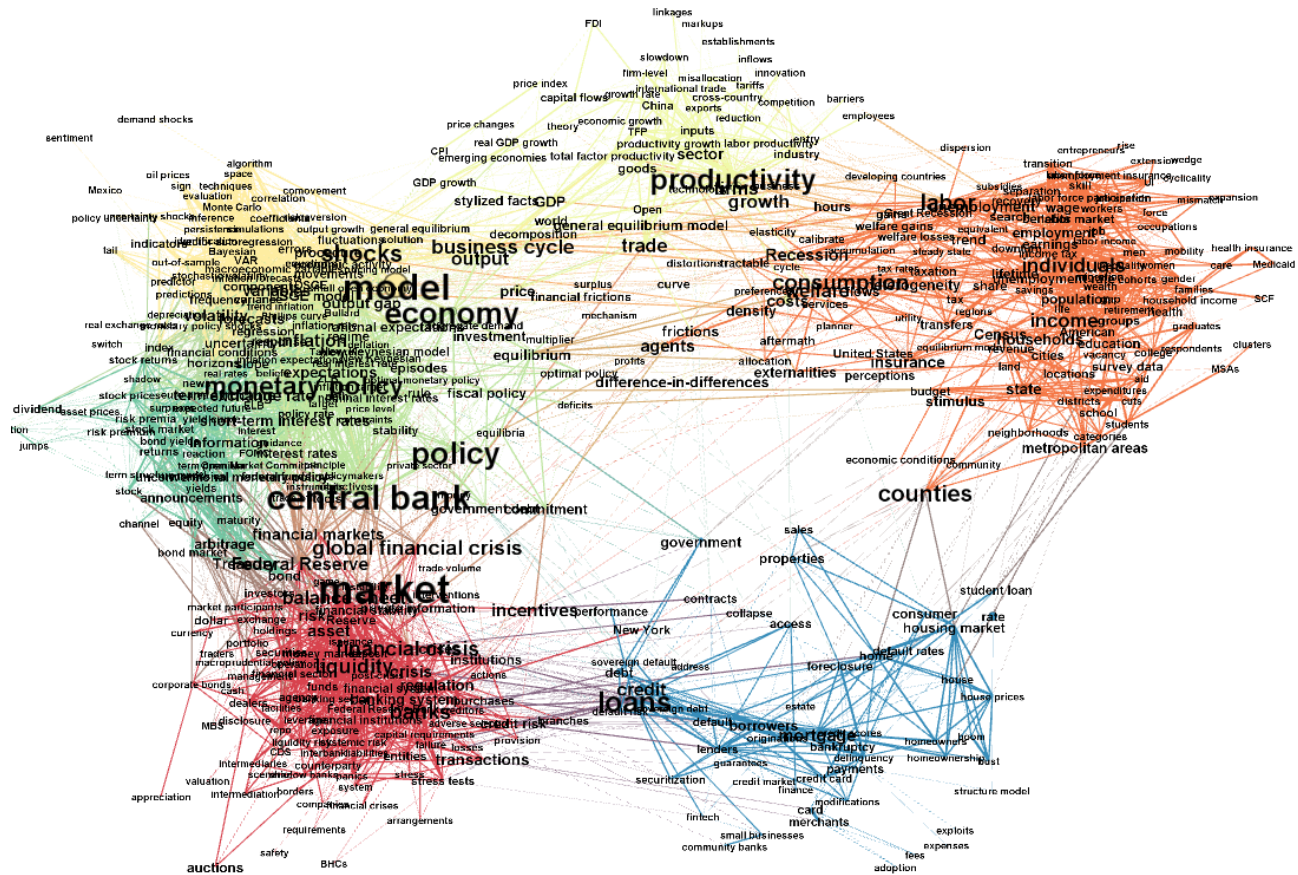


Figure 9: Co-Word network 2011-2020 FED cluster. Colors = topics, label size = inbetweenness centrality

Differences do not only persist between topics covered or their relation to each other, but also in the way policy areas are constituted on the semantic level. Take for example the topic for monetary policy, the core policy area for central banks (figure 10 and 11). Again, the FED network includes significantly more words regarding formal modeling compared to the ECB. Further, the ECB cluster includes a different mix of policy considerations within their monetary policy topic. It includes words in regards to sovereign debt crisis i.e. fiscal policy, but also financial stability and quantitative easing. This indicates that monetary policy is institutionally inter-twined with other macroeconomic policy areas in spite the more modular structure of the entire semantic network compared to the FED. Contrast this with the FED-cluster, which only includes fiscal policy as inputs for formal models, while largely ignoring financial markets and quantitative easing. The only exception to this is exchange rate regimes, however these might appear in the FED cluster due to the inclusion of Mexico into the analysis of co-word occurrences.



Figure 11: Monetary policy topic for the ECB cluster

2.6 Discussion and Conclusion

The scientization of central banks has been considered one of the latest shifts in a long line of organizational transformation within central banking. I have examined scientization as a dynamic process where organizations adopt norms to define authoritative knowledge in their field. I go beyond mere adoption to explore the semantic structure of scientization processes. My findings indicate that while central bank scientization may have spread within the central banking field as suggested by world-polity scholars, the knowledge produced within the field does not align with the same pattern. The analysis showed that central bank knowledge production becomes more modular over time i.e. scientized knowledge produced by central banks becomes increasingly distinct over time. More importantly, this clustering of central banks into distinct knowledge production clusters progresses even as other formal organizational variables point towards an increase in scientization. The semantic structure of scientized knowledge production therefore does not follow the same world-polity style adoption of what are legitimate problems to be researched by central banks. This is in spite of the wide-spread adoption of organizational norms on how and by whom scientized knowledge can be produced, the adoption of organizational norms by nation states on the institutional environment of central banks (central bank independence and inflation targeting) and the emergence of an epistemic community of central bankers supported by an infrastructure specifically built to diffuse knowledge.

However, the alternative hypothesis of knowledge being determined by localized political struggles or the position of a central bank in a variety of overlapping global and local fields does not seem to be entirely borne out either. The emerging cluster of eastern European central banks not only persists, but also becomes more distinct from other central banks even though their political economies, position in monetary hierarchies and economic conditions diverge over time. This might be due to soviet economic thinking thoroughly being discredited by the fall of the iron curtain. Scientized knowledge production of central banks in post-Soviet states was therefore not contested by a local tradition of economics, which co-evolved with the state bureaucracies. Beyond the Eastern European cluster, central banks within currency areas do not clearly align either. Members in the European Monetary Union, or for that matter European Union, do not become more similar over time, nor does the ECB become the most central actor among these central banks. Rather, a small number surrounding the ECB become more similar over time, but remain distinct from the rest of the EMU or EU central banks. Among the clusters of central banks, the Federal Reserve cluster is most distinct from the rest of the field.

The addition of the most prestigious economics journal into the semantic network has shown that the Federal Reserve System closely aligns their knowledge production with the institution scientized knowledge production mimics: academia. Taken together the analysis of the semantic networks of scientized knowledge production of central banks disprove a number of commonly assumed properties of scientization: First, central bank scientization does not lead to shared understandings of the economy within the central banking field. Second, the biggest central banks in the world (ECB, FED, Bank of England) are not the most central actors within the semantic network. Third, central banks are not homogeneous actors within the semantic network, rather localized clusters of economic thinking emerge. Lastly, not all central banks produce knowledge, which is actual comparable to knowledge produced in economic science, this is only done by the Federal Reserve System and Mexico.

These last two points become especially clear in the comparison of semantics within the ECB and FED cluster. The analysis shows, that differences do not only emerge in the economic problems researched by central banks, but also how these economic problems relate to each other and are themselves constituted. While the ECB cluster produces knowledge on a wider array of more distinct policy problems, the FED cluster deals with fewer but fuzzier policy areas. However, while the FED cluster has less distinct topics, it does include a much higher degree of words relating to DSGE modelling and other formal models typically considered as “boundary objects” (Gieryn, 1983; Thiemann, 2022) within economic science. In contrast, the ECB cluster has more distinct topics, but these topics themselves include words relating to other macroeconomic policy areas. These macroeconomic policies are in contrast to the FED not coached in the language of formal mathematical models, but rather in real and local policy institutions within the European Union.

The presence of formal modeling, the purity of macroeconomic policy making and the position of these clusters in the larger semantic network, provide some indication of what explains the pattern we find in the semantic network of central bank scientization. Macroeconomic policy making within the European Union is institutionally more complex compared to the United States. Post Great Financial Crisis monetary policy making within the European Union has become institutionally more complex than prior to the crisis. Unconventional monetary policy in the context of the European Sovereign Debt Crisis have led to a coalescence of previously distinct areas of macroeconomic policy making, which is only further complicated by concerns over financial stability (Gabor, 2016). Conducting “standard” monetary policy within the European Union is therefore much more “contaminated” by other policy areas. Compare this to the US context, where some of these issues certainly are true as well, policy areas are much easier to be purified from each other. This is despite

the dense relationship between clusters. This purification of policy areas is also what sets the pre-conditions for the Federal Reserves to produce economic science proper, since purification of policy areas allows for much easier formalization of policy problems into economic boundary objects i.e. DSGE and other modelling techniques.

This article has made a significant methodological contribution by applying semantic network analysis to theoretical arguments prominent in organizational sociology and the diffusion of knowledge. By utilizing semantic analysis to visualize and trace diffusion processes, this study has enabled a deeper understanding of the contents of organizational behavior, surpassing the conventional focus on merely organizational forms. Moving beyond traditional approaches, this methodological innovation offers a powerful tool to unravel the complexities of knowledge dissemination, enabling future researchers to delve deeper into the interplay between ideas, organizations, and their broader contexts.

By tracing the semantic structure of scientization within the central banking field, this study has provided first insights into the structure of economic thinking within the central banking field. Future research on scientization in general should go beyond simply assuming that research produced in scientized policy making fields is apolitical, tightly aligned with knowledge produced in academia or for that matter universal within the entire field. Rather, this study has shown that localized clusters can form as the scientization process progresses even under the best possible conditions for the production of universal knowledge within a field. Future research on knowledge production of central banks should take this contention seriously and investigate the exact mechanism by which scientized knowledge production does or does not help depoliticize policy making, rather than ex ante assuming that it does. Further, future research on economic thinking should take the construction of economic ideas on the meso level serious, rather than mainly focusing on either large ideological streams like ordo-liberalism or economic ideas on the micro-level.

3.0 Epistemic Support Communities: On the National Embeddedness of the Bank of England and European Central Bank

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Abstract

This paper explores the scientization within central banks and its impact on their relationship with their organizational environment. Scientization, characterized by the increased production and utilization of scientific knowledge, is often associated with the apoliticization of central banks. However, this study challenges this notion by examining how scientization opens central banks to new epistemic environments and actors capable of asserting authoritative claims over policy-relevant knowledge. I argue that central banks, during the process of scientization, actively build epistemic support networks with external organizations, particularly other central banks and academic economics departments. These networks serve to bolster the central banks' scientific authority in policymaking and are embedded within both national and international contexts, rather than forming a homogeneous global knowledge community. By investigating the cases of the European Central Bank (ECB) and the Bank of England (BoE), I demonstrate that central banks employ diverse strategies to establish these networks. The BoE primarily enrolls elite economics departments within the United Kingdom and reproduces entrenched structures in the UK economics profession, while the ECB engages a range of European universities by establishing avatars in economics departments, creating localized epistemic networks based on expertise, incorporation of national central bank networks, or personal connections. Our empirical analysis, which examines working papers and author affiliations, offers insights into the formation and development of these epistemic support networks. This research contributes to a nuanced understanding of central banks' engagement with their organizational environment in an era of scientization, highlighting the dynamic and context-specific nature of their interactions with scientific knowledge.

3.1 Introduction

How does the scientization of central banks change the way central banks engage with their organizational environment? It is typically assumed, that scientization, the increased production and utilization of scientific knowledge, leads to an apolitization process. In the case of the scientization of central banks, the technocratic language used by central bankers becomes so complex, that political actors such as parliaments or other state agencies become incapable of contesting policy decisions by independent central banks. Following this logic, the literature assumes, that central banks become increasingly isolated from their political environment, while at the same time “built-out” towards new knowledge communities (Marcussen, 2006, 2009). Over the last 15 years, the concept of knowledge communities has been introduced, but no one has further theorized the process of their creation or even empirically proven their existence. In this paper I argue, that scientization opens up central banks towards new epistemic environments i.e. new actors who can make authoritative claims over policy relevant knowledge of central banks. Among these epistemic environments are first and foremost other organizations, which could plausibly lend support to the newfound scientific authority of central banks: other central banks and economics departments in universities. In this paper I show how central banks build epistemic networks with these new environments via their mundane research activities to support their own claims over policy making. In contrast to previously posited processes of building-out via widespread beliefs in hegemonic cultural norms on the correct science for given policy problems, these networks are embedded within national and international contexts. By leveraging insights from organizational sociology and the professions literature, this study shows, that the move towards scientization re-embeds central banks into a nationally specific context, rather than create a global knowledge community.

The notion of central bank scientization opening up central banks towards a wider epistemic community is not new. Marcussen (2009) already suggested, that central banks might “built-out” their knowledge production towards a sympathetic community of like-minded central bankers and academics or, that they might create their own research departments or working paper series. While the notion of building-out i.e. the engagement of new environments during the scientization process, has already been introduced by Marcussen, so far there has been no empirical evidence. Most studies on the scientization of central banks focus on specific policy issues (Ban et al., 2016; Mudge & Vauchez, 2018; Thiemann et al., 2018, 2020) or are mainly concerned with central banks advancements into the scientific field of economics (Claveau & Dion, 2018). Studies on the epistemic environment of central banks are still amiss, we therefore lack a better understanding on how central banks leverage their environment for epistemic claims. More recent studies have also shown, that

knowledge production by scientized central banks becomes less similar over time (see chapter 1), thereby putting the notion of a global knowledge community into question.

Beyond a lack of empirical evidence for knowledge communities a conceptual issue also arises. Central banks in Marcussens conceptualizations adopt scientization as a cultural norm from world-polity. World-polity scholars argue, that scientization is a global trend towards modernization of nation states, organizations and actors. Contestations over what is the right science for a given policy problem never arise in this scenario, because all actors adopt the same global norm (Quark, 2012; Zapp, 2018). This however, is in stark contrast with studies on the adoption of global cultural or policy norms, which argue, that adoption requires a translation process into local institutional contexts like the national economics profession or political economy environment (Ban, 2016; Ibrocevic, 2022; Maman & Rosenhek, 2009, 2011; Rosenhek, 2013).

In this paper I combine organizational sociology and the professions literature to gain insights into the creation of epistemic support networks. While scientization is the result of world-polity style adoption of central banks of scientization as a norm of knowledge production, however they are also the result of translating this cultural norm into the national economics profession and political economy environment. I argue, that by adopting scientization central banks open their policy knowledge up to a field of knowledge producing organizations. At the same time, central banks have to maintain the appearance of transparency, credibility and epistemic authority over the economy to continue their policy making. In the presence of scientization, this then requires central banks to find strategies to enroll other knowledge producing organizations into their research programs. However, they do so not by monopolizing control over policy relevant knowledge, but rather by enrolling other possible epistemic authorities into their localized epistemic network.

Taking the cases of the European Central Bank and the Bank of England, this paper shows how both central banks create different epistemic support networks. Both central banks have scientized over the past 20 years, but have done so in different ways. The Bank of England has traditionally based its authority on its embeddedness in bureaucratic and financial elite networks, rather than academic economics. Similar to the British state in general it has mainly recruited its staff from elite UK institutions such as Oxbridge or London universities (Acosta et al., 2023; Fourcade, 2009 chapter 3). It has only instituted a working paper series in the early 1990s, has held academic conferences going back to the 70ies and has only created a research department in 2014. The BoE therefore provides insights into a central bank, which builds-out its epistemic network into a pre-existing national economics profession characterized by membership in elite circles of governance and academia. The

European Central Bank on the other hand has since its inception relied on its research department and its epistemic authority to not only stabilize its position within the larger central banking community and the European Union, but also used it to constitute the European economy as an object of study within European economics. It therefore not only had to be institutionalized as a macroeconomic policy maker over the entire Eurozone, but also had to coordinate with and required the support of national central banks to govern the newly constituted European economy. In contrast to national central banks, the European Central Bank could not fall back onto a pre-existing economics profession for its epistemic support. Analyzing the ECB, which used its research department to stabilize its new position in the European Union (Mudge & Vauchez, 2016, 2018), provides insights into the emergence of epistemic networks outside of an institutionalized economics profession.

Empirically, I trace the existence and development of epistemic support networks by focusing on the research outputs of both central banks: their working paper series. I collected over 3000 working paper by the ECB and 1200 by the BoE. I utilize the affiliation of authors of such working papers to empirically show organizations, which are enrolled into the research program of each central bank. I show, that the BoE mainly enrolls elite economics departments within the United Kingdom into their research department, while other central banks or international universities play only a secondary role. This pattern emerges independent of policy issues indicating an enrollment strategy based on prestige rather than technical expertise. The ECB on the other hand, enrolls two organizational environments: National Central Banks within the Eurozone and top universities within Europe. While some top European Universities are among the most common author affiliations in the epistemic support network of the ECB one crucial difference emerges: The nine out of ten top affiliations are not top economics departments. The ECB seemingly enrolls multiple European universities for various policy areas as their local academic avatar. Academic avatars differ depending on policy area indicating the enrollment of epistemic support networks based on either expertise, incorporation of epistemic support networks of national central banks or personal connections.

The next section of this paper introduces the literature on the scientization of central banks and problematizes the relationship of central banks to the economics profession. The third section of this paper introduces the data collection process and methodology, while the fourth section present the results. The last section discusses the results and points towards further research.

3.2 Scientization of central banks: organizations, professions and epistemic networks

The literature on the scientization of central banks has surprisingly neglected the organizational consequences of scientization processes. Scholars often assume, that scientization simply isolates central banks from their organizational environment. However, by adopting science as an authoritative form of knowledge, central banks open themselves up towards new environments, which also produce knowledge on policy issues of central banks. This insight is not new, since Marcussen himself has already suggested the possibility for, what he called knowledge communities. So far, no study has conceptualized how such knowledge communities might form around central banks, much less shown them empirically.

Previous research has mainly focused on the spread of scientization itself (Marcussen, 2006, 2009), the close relationship between academia and central banks in creating new policy instruments (Acosta & Cherrier, 2019; Ban et al., 2016; Thiemann, 2022; Thiemann et al., 2020) or have tracked the impact central bankers have on the economics as an academic field (Claveau & Dion, 2018). Only two studies so far have taken a closer look at how scientization has transformed individual central banks. Acosta et al (2023) analyze the early history of research at the Bank of England since the 1960ies until the creation of their research department in 2014. They show, how scientization as a process changed the role of economics within the BoE. While focusing on the interplay between changing policy needs and modelling techniques, they demonstrate how the BoE moved towards the One Bank Research Agenda after 2013, which established a dedicated research department. While Acosta et als study shows how shifting policy demands change the way academic knowledge is perceived, utilized and used for career advancement within the Bank, they do not show how the Bank relates to its new epistemic environment beyond internal changes.

Mudges and Vauchez (2016, 2018) contributions on the evolution of the ECBs research departments come closest to this study. They have analyzed the ECBs research department as a field effect, concluding that the research activity of the ECB is itself contingent on the interstitial field position of the ECB between the European bureaucratic field, the field of transnational economics and the field of finance and other central banks. While Mudge and Vauchez already show, that research departments can only be understood in the context of its organizational environment, they mainly focus on the role prominent macroeconomic models play in fixing the ECBs position in its field. However, most research conducted at the ECB does not relate to such models, especially not after the financial crisis. Furthermore, their work is highly focused on knowledge produced within the ECB.

Scientization as described above, however, extends the production of knowledge into the environment of organizations and hence poses new problems of policy control to central banks.

The extension of knowledge production into a wider knowledge community, requires central banks to partially take control or enroll their environment. The extended environment for scientized knowledge production includes other members of the economics profession in the form of economists in other central banks and universities, which help to legitimize policy relevant knowledge and thus back up central banks knowledge claims (Abbott, 2005; Broome & Seabrooke, 2020; Fourcade, 2009; Henriksen & Seabrooke, 2016). The economics profession is particularly important in situations of open knowledge production, because control over policy issues in scientized organizational fields is achieved by taking control over policy knowledge itself. Control over policy knowledge then allows to control the framing of policy issues and their solutions. Professionals in organizations establish control, by cooperating with professionals in other organizations to produce policy relevant knowledge. In this literature policy making can be done by multiple organizations such as government agencies, international organizations, non-government organization or universities, which vie for control over policy issues.

Explaining how central banks and their environment gain control together over typical central banking issues such as monetary policy or financial stability, requires an understanding of how professional incentives between different parts of the profession come together. Academic economists have traditionally produced the abstract knowledge underlying jurisdictional struggles of more applied economists. By linking the production of their economic ideas to policy makers in central banks, academic economists can bolster the perceived policy-relevance of their economic ideas (Abbott, 1988; de Souza Leão & Eyal, 2019). Central bankers on the other hand can gain legitimacy from couching their policy issues in the language of economics, because economics as a scientific discourse is often viewed as objective or norm-free (Abbott, 1988, p. 54; de Souza Leão & Eyal, 2019; Hirschman & Berman, 2014; Thiemann, 2022; Thiemann et al., 2020). Building a more permanent stable relationship to the academic economists therefore provides ample opportunity to implant policy issues into academic debates, while at the same time enable the exclusion of other actors such as heterodox economist or trade unions. Crucially, for this type of co-produced knowledge to produce legitimacy gains it does not necessarily have to factor into actual policy making. Rather, the mutual recognition of knowledge on policy issues by different parts of the economics profession itself is enough to legitimize policy issues (Broome & Seabrooke, 2020; Drori & Meyer, 2006; Meyer & Rowan, 1977). In the context of scientization i.e. the opening up of central banks to new professional environments, issue control then relies on stable and continuous

relationships between central banks and other knowledge producing organizations. One way in which central banks could establish these relationships is via the creation of central bank avatars in the academic system i.e. institutionalized actors in the academic system, that can develop central banking policy issues into academic puzzles. Solving such puzzles would then produce legitimacy gains for both, academics and central bankers, at the same, albeit for different reasons⁹ (Abbott, 2005).

How do central banks then build these new relationships with their environment to safeguard their policy knowledge from possible contestations or even to exclude contesting actors from the production of legitimate knowledge? I suggest, central banks use their research departments to build epistemic support networks i.e. professional networks of economists, who are enrolled into the research program of central banks by mundane research activities. This type of epistemic support network becomes necessary, because “issues must be continuously managed through attempts at control, including stratagems to obtain knowledge and resources that enhance the capacity for control.” (Henriksen & Seabrooke, 2016, p. 7) Therefore, by exploring how professionals in organizations cooperate with their professional environment to retain issue control, this literature provides a framework to understand how central banks deal with their exposure to their professional environment.

3.3 Data and Method

Typical analysis of scientization processes are usually conducted on international organizations, because scientization as a concept has its roots in world-polity scholarship. These studies rely on simply counting up citations or increases in publication rates (Christensen, 2018; Zapp, 2018, 2022), they however never empirically show the epistemic support network of international organizations due to scientization itself. To analyze how mundane research activities, enroll the epistemic environment of central banks, I collected the output of day-to-day research activities of central banks: working papers. I used the RePEc database to collect all working paper and occasional papers from the Bank of England and the European Central Bank. In total I collected 4405 publications (1281 from the BoE and 3124 from the ECB). In addition to collecting the publications themselves, I also collected the full text pdf and meta data such as publication date and author names.

⁹ Abbott (2005) refers to issues, that are able to produce legitimacy in two separate professional ecologies as hinges.

To analyze who actually participates in the research activities of central banks, I extracted the affiliation of authors as stated on the working paper¹⁰. In total the authors of the Bank of England working papers had 139 affiliations and the European Central Bank had 689. I also disambiguated all author names to only include unique authors. Author affiliations were coded into seven distinct categories: academia, central banks, international organization, think tanks, private industry, government agencies and other. Lastly, I used author affiliations to code documents into the most common combinations of authors within the dataset.

Methodologically, this study uses descriptive statistics as well as social network analysis. To study the organizational environment of central bank research, I construct affiliation networks. Two affiliations within these networks have a tie, if two authors co-author a working paper within the sample (for example an author from the ECB and BoE author one working paper together) or if a single author has more than one affiliation in the same working paper (for example an author could be affiliated to CEPR and a university at the same time). Additionally, I provide descriptive statistics for changes in the affiliation composition of working papers over time.

In addition to the authorship and affiliation analysis above, I also use the full texts of working papers to test if differences between more policy relevant topics or academic topics emerge. I use the “stm” package in R to run structural topic model on the text corpus. Topic models are unsupervised quantitative text analysis tool, which infer commonly appearing topics within texts. Topic modelling represents each document as a distribution over all topics within the text corpus, while each topic itself is represented by a distribution over the entire vocabulary.

¹⁰ If no affiliation was given, I searched for authors CV and added the affiliation the held at the time of publication of the working paper.

3.4 The epistemic environment of central banks

How do central bankers built epistemic support networks, which allow them to make credible claims about policy issues? To map out the change of authors working in and collaborating with central banks research departments, I first analyze the rate at which affiliations appear in each working paper series over time. Figure 12 shows the ratio of affiliation codes per year for the ECB and BoE authors respectively and allows us to draw some first conclusions on the increasing enrollment of organizations outside the central bank. For the ECB the ratios for affiliations remain relatively stable over time, with a slight decrease of about half prior to the Great Financial Crisis to about 30-40% after it. The decrease in academic authors is mainly compensated by an increase in authors from other central banks. In contrast to the ECB, the BoE has always had a high degree of academic authors, however after the one bank initiative in 2013, the relative number of academics increases slightly on average per year. Given that the number of working papers after the one bank initiative significantly increases, the stability of the ratios indicates a much higher engagement with academia. One noticeable difference between the two the ECB and BoE is its relationship to other central banks. While the ECB working paper have consistently high number of authors from other central banks (about 50% of author affiliations are from other central banks), only about 30% of Bank of England working paper feature an author from another central bank.

The ratios of author affiliations for both central banks already provide an indication on the type of epistemic environment both central banks engage with. However, a remaining question is what academic environment do both central banks focus on? Table 1 lists the top economics departments in the United Kingdom and in Europe. Additionally, it lists the most common academic affiliations in each working paper series. As can be seen by the bold affiliation in the lists, the Bank of England heavily relies on the top economics departments in the United Kingdom for its epistemic environment. Interestingly enough, the RePEc ranking lists, the BoE itself as a top economics department in the UK. The ECB on the other hand, only has one top economics department among its top academic affiliations. The Goethe university for example stands out as it becomes an academic outpost or avatar for the ECB, where ECB researchers regularly present their work and find possible co-authors for their work. Other universities are on the list can be accounted for by personal avatars. Take for example the Technical University of Lisbon. Its inclusion in the list is mainly due to Antonio Afonso, an author with affiliations both in the ECB and the university. Other universities are of course excellent economics departments in their own right, but are mainly included due to their close relationship to a national central bank (Bocconi University in the case of Italy, University of Ghent for the National Bank of Belgium, University of Amsterdam for the Dutch National Bank). It therefore

seems that the ECB epistemic network is built-out not based on elite universities, but rather on a combination of avatars in the university system or built via the existing epistemic network of national central banks.

One possible interpretation for the affiliation pattern is rather straight forward: During the scientization process the Bank of England encounters an entrenched economics profession located at elite economics departments. When the BoE then builds out its knowledge production and establishes its epistemic support network, it simply reproduces the professional environment. Contrast this with the ECB. The ECB does not encounter a European economics profession, but rather a number of national central banks and a variety of national economics profession. For the ECB building out its epistemic support network, therefore relies on the creation of avatars i.e. institutionalized actors in the academic system, which bring ECB policy issues into university system. These avatars are able to generate legitimacy for academics working on central banking issue, which recursively legitimize ECB policy making (Broome & Seabrooke, 2020).

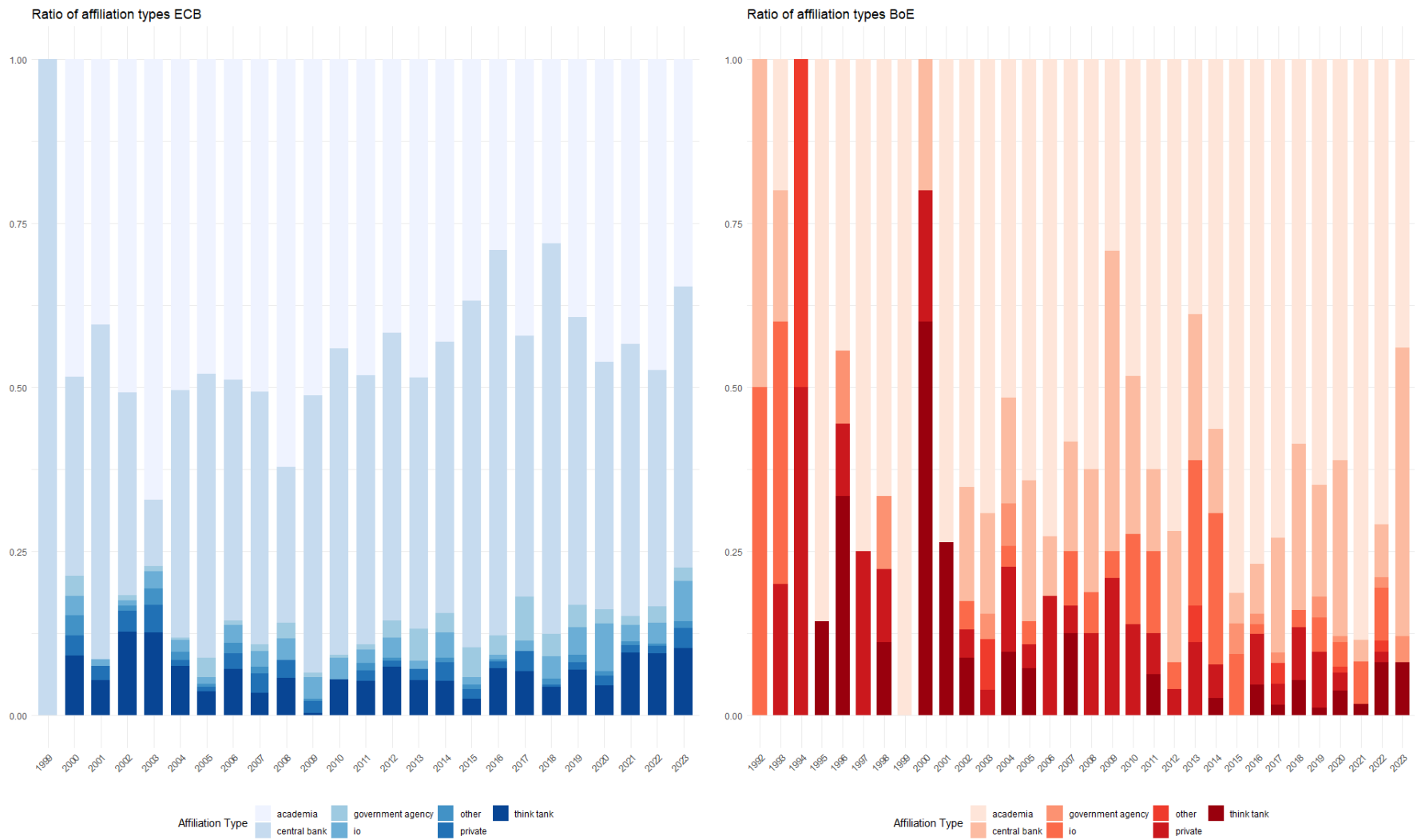


Figure 12: Ratio of author affiliation types for all Bank of England and European Central Bank Working Paper over time

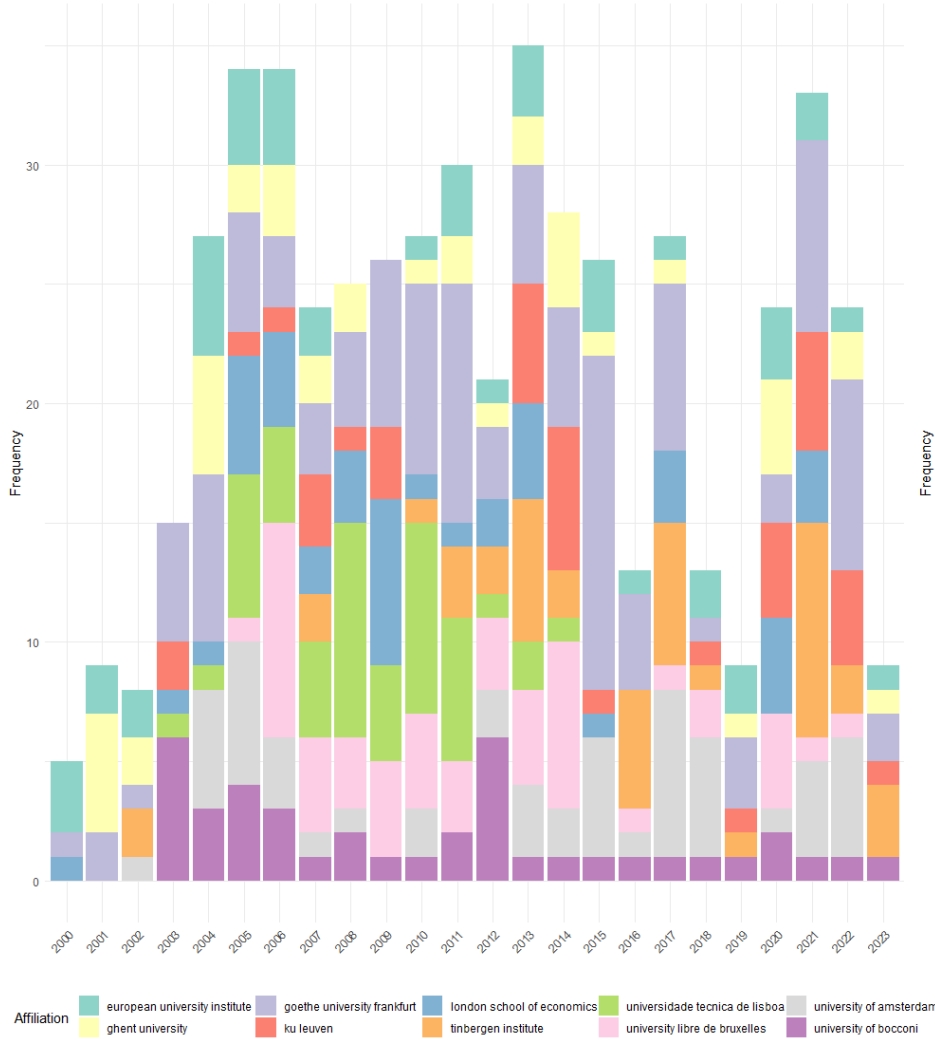
Top United Kingdom Economics Department	Top Affiliations of Bank of England Working Paper Authors	Top European Economics Departments	Top Affiliations of European Central Bank Working Paper Authors
London School of Economics	London School of Economics	Paris School of Economics Toulouse School of Economics Barcelona	Goethe University Frankfurt University of Amsterdam
Oxford University	Oxford University	School of Economics Oxford University	University Libre de Bruxelles Technical University of Lisbon
University College London	Queen Mary University of London	London School of Economics University of London	European University Institute
University of Warwick	University of Cambridge	college London	Tinbergen Institute
University of Nottingham	University of Nottingham	University of Tilburg	London School of Economics
<i>(Bank of England)</i> University of Cambridge	University of Warwick London Business School University College London	University of Zurich University of Warwick	Ghent University
University of York London Business school	King's College London	Sciences Po University of Nottingham	University of Bocconi KU Leuven
Imperial College University of Sussex	Stanford University University of Bristol		University of Pompeu Fabra

Table 1: Top 10 Economics Departments in the United Kingdom and Europe according to RePEc. Top 10 academic affiliations of ECB and BoE working Paper. Bold Departments are within the Top10 economics departments in the respective area

Until now we have seen, that both central banks built-out their epistemic support networks in different ways. The European Central Bank builds academic avatars in a number of non-elite European economics departments. The Bank of England in contrast puts significantly more focus on elite economics departments. Differences between the two central banks, however, do not only emerge in the enrolled epistemic environment, but also over time. Figure 13 shows the number authors with academic affiliations mentioned in table 1 for each year for both central banks respectively. The academic affiliations of the ECB change with time. While the Goethe University is consistently spread over time, the Technical University of Lisbon vanishes entirely after Antonio Afonso leaves the ECB. As we will see later, Dutch universities like the Tinbergen Institute or the University of Amsterdam are only top departments for specific topics (fiscal policy and financial stability). In contrast to this is the Bank of England. Over the entire period elite economics

departments are the most frequent academic affiliations in BoE working papers. However, the strategic attempts of the one bank initiative to enlarge the epistemic support network seemed to work out, because a higher number of elite departments begin to write with the BoE.

Frequency of Academia Affiliation in ECB Working Paper



Frequency of Academia Affiliation in BoE Working Paper

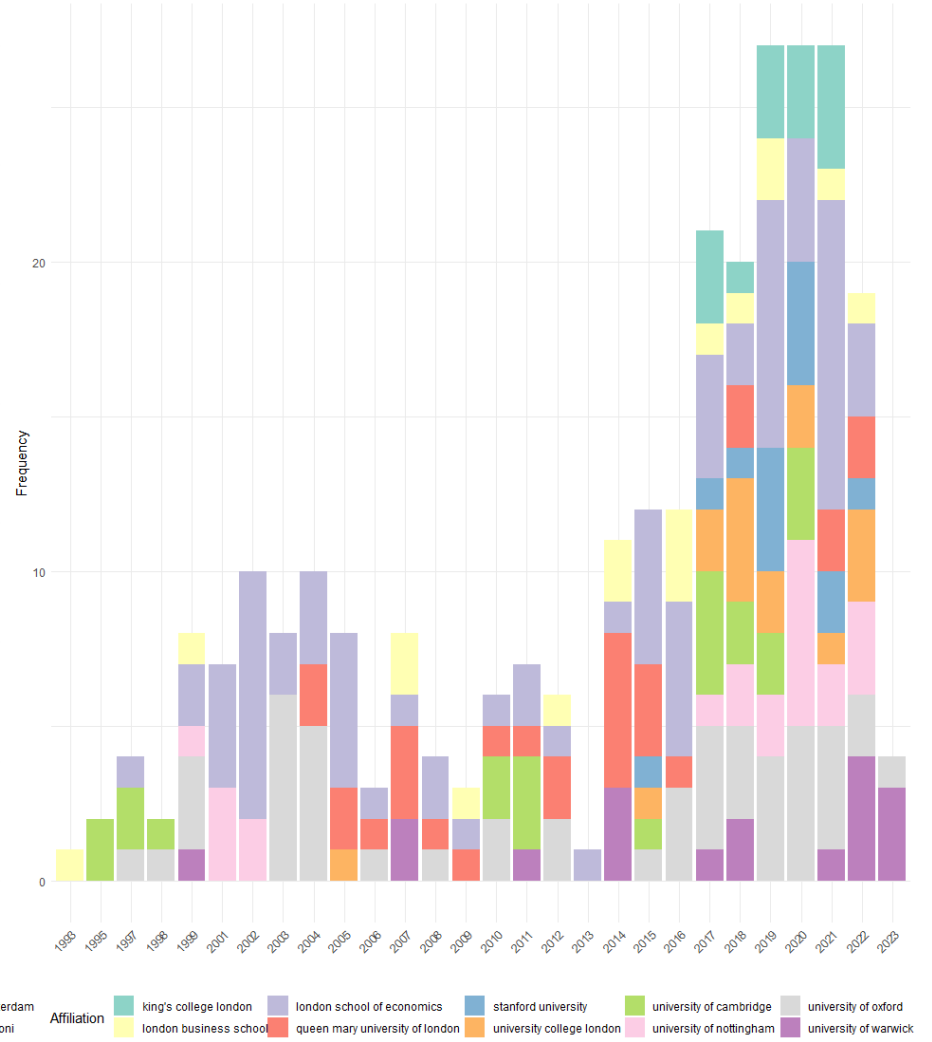


Figure 13: Number of the 10 most common Academic Affiliations of Authors in Bank of England and European Central Bank Working Paper over time

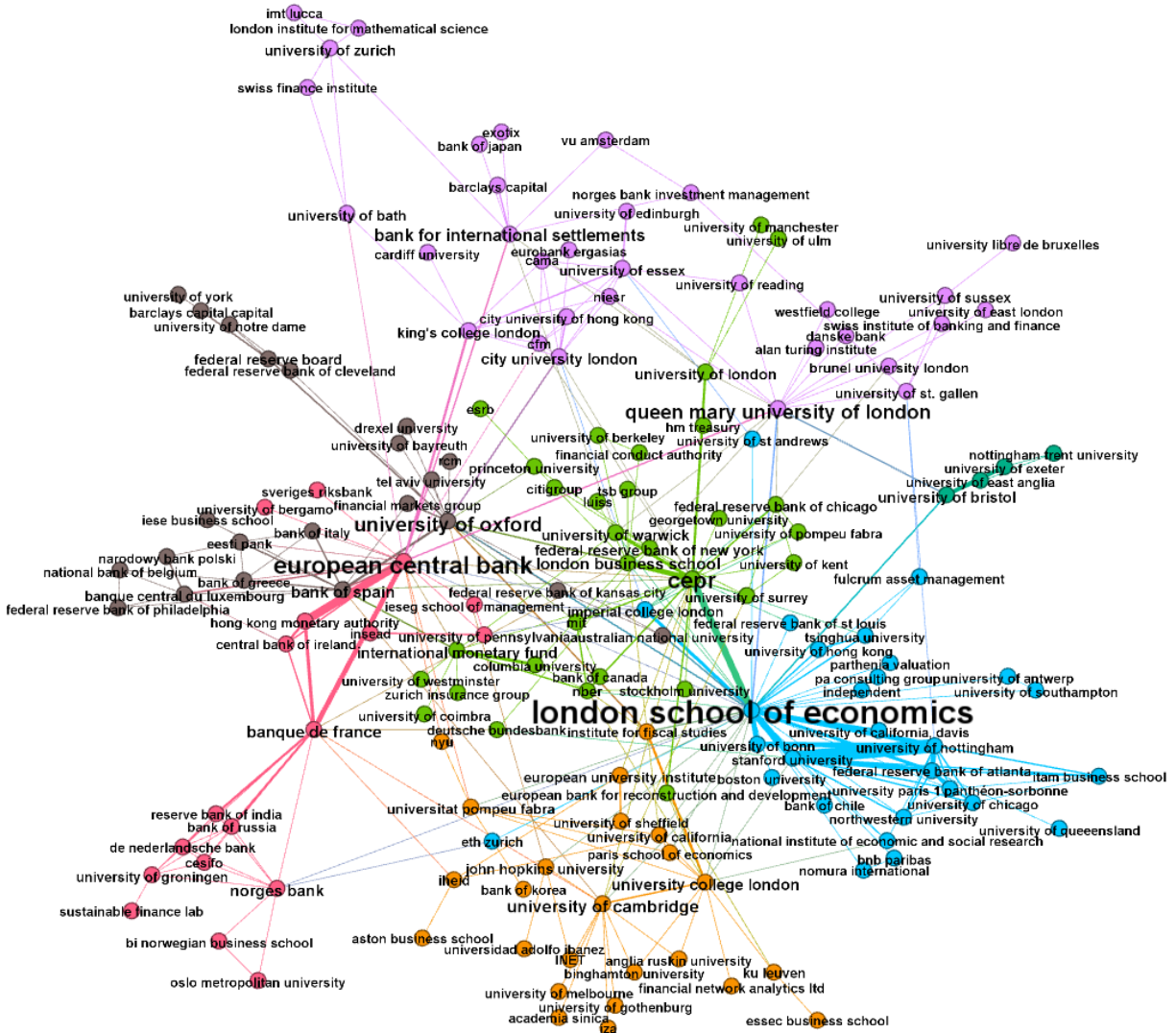


Figure 14: Affiliation Network of all Bank of England Working Paper from 1992-2023

The previous analytical steps have shown, that strategies of building-out differ between the Bank of England and the European Central Bank. This becomes even clearer, if we take a closer look at the affiliation networks for both central banks. Figure 14 and Figure 15 depict the affiliation networks for the BoE and the ECB respectively. Two affiliations within these networks are connected either if two authors from different affiliations co-author an article together or if one author has multiple affiliations at the time of writing the working paper. Label size in both networks indicates in-

betweenness centrality, measurement of how important organizations are for bringing the network together. The color of nodes indicates their cluster, calculated by the Louvain clustering algorithm.

The Bank of England network shows, that there is no clear clustering of either elite academic institutions or central banks. Neither, is it the case that only elite economics departments work more often with certain central banks or only among each other. Rather, central banks, universities and elite economics departments are dispersed within throughout the network. The only stand out university is the London School of Economics with a high degree in-betweenness score.

The ECB on the other hand is relatively split into two parts. One part includes almost all European National Central Banks in a cluster of affiliations. Given the reliance of the ECB on the expertise of national central banks, this is unsurprising. However, this enrollment also provides an opportunity to use the scientized knowledge production to enroll the expertise of national central bank in its own analysis of the European economy. Comparatively to the tightly knit central bank cluster are the wide range of non-central bank affiliations. While the top universities of the affiliation network are central nodes, such as the Goethe University or the Technical University of Lisbon, the most central affiliation within the network is the Center for European Policy Research (CEPR). CEPR as a non-profit organization aims to bring researchers within Europe together to provide independent economic research for policy makers. Considering, that the CEPR (and its American cousin NBER) are among the most central affiliations in the ECB network, one can conclude, that the ECB built-out their epistemic network by co-opting already existing policy research infrastructures within Europe.

shows the top 5 words for each selected topic, while the rest shows how each topic develops over time.

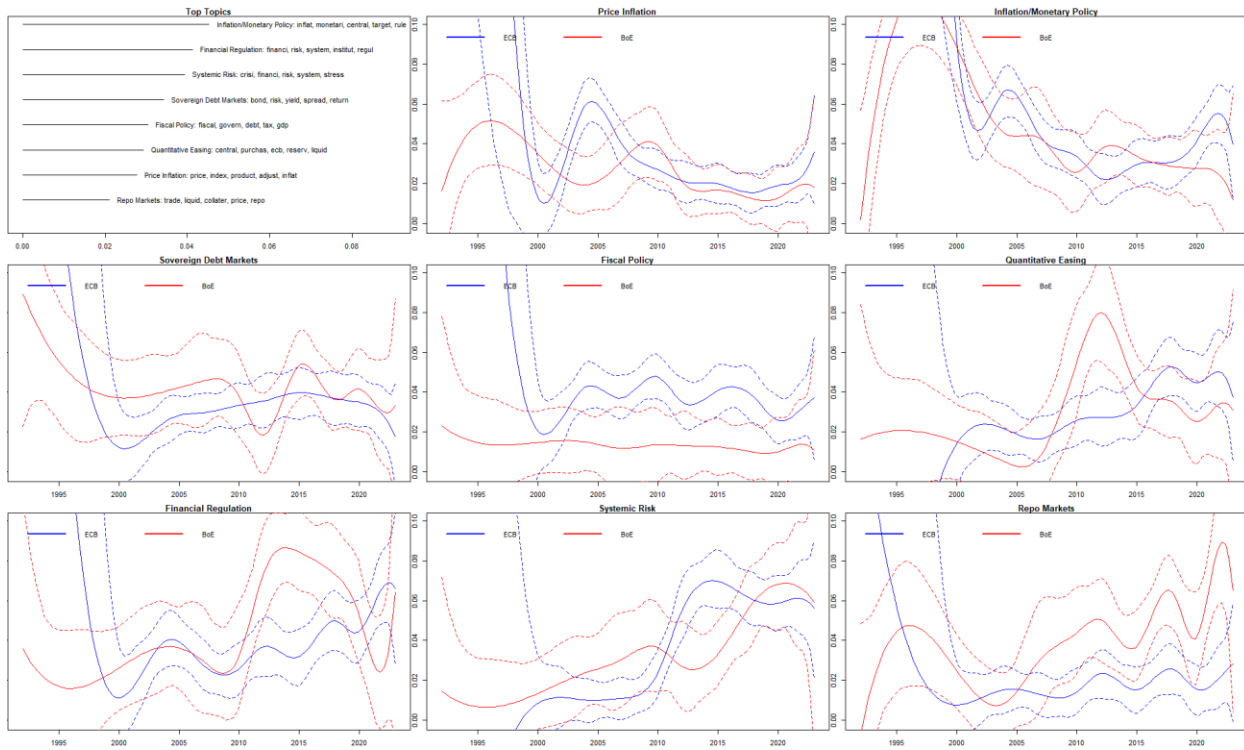


Figure 16: Results of Topic Modelling

Table 2 shows the top three academic affiliation for each topic for the Bank of England and European Central Bank respectively. The table shows, that the Bank of England almost exclusively relies on top economics departments for its epistemic support network independent of the research topic. The London School of Economics is among the top 3 in all topics, while the other spots are almost exclusively taken up by other top economics departments. This is in contrast to the ECB. Certainly, the most common academic affiliations also appear in a number of topics. However, there are differences depending on topic. Dutch universities like the Tinberg Institute or UVA appear more often in topics regarding Systemic Risk, fiscal policy and sovereign debt markets. Whereas more traditional topics of inflation/monetary policy and price indexing is also populated by economics departments from the University of Mannheim. In general, there is more variance of economics departments among ECB working papers, which indicates an epistemic support network based on expertise, rather than prestige.

Table 2: Top 3 Author Affiliations for each Topic for the Bank of England and European Central Bank

Topic							
Financial Regulation		Inflation /Monetary Policy		Repo Markets		Systemic Risk	
BoE	ECB	BoE	ECB	BoE	ECB	BoE	ECB
							VU
London				London			Universit
School of		Universit		School of	Universi	Universit	y
Economic	Goethe	y College	Goethe	Economic	ty of	y college	Amsterda
s	University	London	University	s	Zurich	London	m
	University	London			Universi		
	of	School of		Universit	ty of	Universit	Tinberge
University	Mannhei	Economic	University	y of	Amsterd	y of	n
of Oxford	m	s	of Oxford	Oxford	am	Oxford	Institute
		Universit	University	Universit		London	
Australian		y of	of	y of		School of	Goethe
National	University	Nottingha	Mannhei	Cambridg	HEC	Economic	Universit
University	of Zurich	m	m	e	Paris	s	y
Topic							
Fiscal Policy		Price Index		Sovereign Debt Markets		Quantitative Easing	
BoE	ECB	BoE	ECB	BoE	ECB	BoE	ECB
		London		London	Universi		
	Technical	School of	Technical	School of	ty of	Universit	Goethe
	University	Economic	University	Economic	Amsterd	y of	Universit
	of Lisbon	s	of Lisbon	s	am	Warwick	y
	University	Universit					
	of	y of	Lusiada	Universit	Tinberge		Universit
	Amsterda	Nottingha	University	y of	n	Queen	y of
	m	m	of Lisbon	Exeter	Institute	Mary	Zurich
					VU		
			University		Universi	London	
			of	Universit	ty	School of	Universit
	Goethe	Universit	Mannhei	y of	Amsterd	Economic	y Libre De
	University	y of Bonn	m	Bristol	am	s	Bruxelles

3.5 Discussion and conclusion

The aim of this article was to empirically track how central banks engage their epistemic environment after scientization as a global norm has set in. Existing literature has so far mainly focused on specific policy issues (Ban et al., 2016; Mudge & Vauchez, 2018; Thiemann et al., 2018, 2020) or are mainly concerned with central banks advancements into the scientific field of economics (Claveau & Dion, 2018), but have neglected how central banks manage their new epistemic environment. To fill this gap, this article has leveraged the sociology of professions literature to theorize how scientized organizations enroll possible allies in their new environment. Drawing on the analysis of over 4000 working papers by the ECB and Bank of England, their author affiliations and on network analysis, the article shows that central banks differ in the way they engage with their environment. While the Bank of England shows an increase in academic authors in its working paper series after the One Bank Research Agenda was initiated in 2014, the ECB engages with academics and other central banks at constant rates. Differences between the ECB and BoE also emerge in the type of academic organizations they enroll. The BoE highly focuses on elite university departments within the UK i.e. they collaborate mostly with economists from highly prestigious universities within their national economics profession.

The ECB on the other hand does not face a unified European economics profession, which would have co-evolved with the bureaucracy of the European Union. The analysis shows, that the ECB builds-out their epistemic network by creating avatars at different European Universities. In contrast to the BoE, these are not the most prestigious economics departments within Europe, rather they are either local off-shots of the ECB in the case of the Goethe University, dependent on specific ECB researchers shifting into academic roles in the case of the Technical University of Lisbon or close ties between national central banks and their national professional environment in the case of top Belgian and Dutch Universities. Furthermore, national central banks play a key role in the epistemic network of the ECB. This is most likely due to two reasons: First, the ECB relies on the technical expertise of national central banks for its policy making. Producing knowledge collectively therefore becomes more likely. Second, working with authors from national central banks provides a gateway for the ECB into national economics professions as they are likely enrolled into the research activities of national central banks themselves.

This article shows, that scientized central banks use their research departments to create epistemic support networks. Epistemic support networks become necessary once central banks open themselves up towards a new epistemic network. These networks allow central banks to retain

control over policy issues even after the production of policy relevant knowledge has been extended into the professional environment. As such, they help central banks enroll their professional environment to retain authority over epistemic claims over policy issues. However, they do not necessarily do so by creating super star macroeconomic models as suggested by Mudge and Vauchez or by pushing into economics journals as suggested by Claveau and Fontan, but rather by engaging their environment in mundane research activities. Again, differences between the Bank of England and the European Central Bank emerge. The BoE in accordance with its professional economics tradition mainly engages elite economics departments in the UK independent of the research topic. This type of epistemic support network is in line with Fourcades description of the UK economics profession as a group of elite policy makers and academics trained in elite economics departments in the London area and Oxbridge. Lacking a corresponding European economics profession, the ECB on the other hand, relies on a more heterogeneous group of universities depending on the research topic. This pattern indicates, that the BoE mainly enrolls its environment based on prestige, while the ECB tends to work with its academic avatars. The creation of an epistemic support network based on avatars rather than elite university departments aligns with Mudge and Vauchez's description of the ECB as an interstitial field between national central banks and academia.

Lastly, a simple comparison between the affiliation networks of the two central banks shows, that there is no "global" knowledge community as envisioned by Marcussen. Certainly, scientization leads to central banks "building-out" their organization horizontally into new institutional domains like academia. However, this building-out processes remains embedded within a national profession in spite of the transnationality of the economics profession (Fourcade, 2006). This result combined with the results of chapter 2, which indicates increasing differences between the actual knowledge produced in central bank knowledge communities, suggest, that the scientization of central banks do not produce a global knowledge community, but rather remain at best regionally clustered.

While this study has already provided first insights into how central banks build-out their knowledge communities, some limitations remain. First, comparing only two central banks might not be enough to conclusively dismiss the formation of a global knowledge community as the knowledge community might be a small-world-network. Adding more central banks to the analysis and computing bi-modal affiliation networks might therefore reveal organizations, which function as bridges between disconnected knowledge communities. Second, this study was only able to establish the existence of a network of affiliations enrolled by the research activities of central banks. However, it does not show how such activities interact with the knowledge produced in the larger university system or related to possible epistemic contestations, which might emerge in the newly engaged environment

of central banks. Future research on this topic could for example trace, how economics departments enrolled in central bank research activities evolves in comparison with traditionally more heterodox departments in a country. Another research avenue lies in a qualitative analysis of contested episodes of macroeconomic policy making and the role knowledge communities play in supporting the epistemic authority of central banks during epistemic contestations.

4.0 Independence without purpose? Macroprudential regulation at the Bundesbank

Abstract

It is commonly assumed that state agencies legitimize themselves via outputs. This paper shows that in situations of organizational crisis, state agencies may adopt new policy areas symbolically to compensate for lost legitimacy. Drawing on an ethnography within the Bundesbank, internal documents, and insider interviews, I trace how the German Bundesbank adopted financial stability as a policy area to compensate for the loss of monetary policy and banking supervision in the early 2000s. By focusing on the relationship between internal organizational struggles over the Bundesbank's identity and the boundary work it has to conduct to establish its new role, I show that the Bundesbank failed to shift the state-economy boundary post-crisis in its effort to regain its position as autonomous purveyor of macroeconomic governance.

Keywords: macroprudential regulation; Bundesbank; sociology of translation; legitimacy; boundary work; central bank.

4.1 Introduction

Prior to the financial crisis, central banks managed to produce legitimacy towards their audiences by orienting themselves towards a relatively simple measure of performance, namely low and stable inflation (Singleton, 2010). Their public image as guardians of monetary stability, and the mono-functional integration of policy decisions, market interventions, and their rationalization necessitated the exclusion of other policy issues from central banks' purview, such as financial stability, inequality or rampant financialization (Walter, 2019; Walter & Wansleben, 2020). After the global financial crisis, this macroeconomic governance regime, focusing solely on the inflation rate came into question. Central banks engaged in ever more extensive unconventional monetary policy in an attempt to stabilize financial markets and to retain their legitimacy as the purveyor of macroeconomic governance. Meanwhile, post-crisis reforms institutionalized new roles for monetary authorities as financial regulators, as observed in the United Kingdom. As a result of this increasing range of policy areas in which central banks are involved, and the sheer size of their asset purchases, these authorities' image as technocratic guardians of monetary order is facing increasing challenges. Consequent calls for democratization of central banking, monetary financing and more direct intervention in the refinancing conditions of climate-neutral industries via 'green central banking' highlight the shifting position of central banks in their polity and raise profound questions about the organizational forms and institutional arrangements on which contemporary central banking is predicated.

The German Bundesbank is one such case of a central bank that has experienced a radical challenge to its cherished institutional role. Known for its stringent anti-inflationary stance, the Bundesbank was regarded as the central bank of Europe during the 1990s (Marsh, 1992) and served as an international role model for credible, independent monetary policy (Johnson, 2016). By the early 2000s, however, the Bundesbank found itself in a precarious position. First, the establishment of the European Central Bank (ECB) took from the Bundesbank its main task: control over interest rates and inflation. Second, the Bundesbank lost the political struggle to be the single banking supervisor in Germany to the newly created BaFin in 2002. These two developments left the Bundesbank in the awkward position of being a historically powerful, independent central bank without monetary policy authority, and a banking supervisor without administrative power. In its new institutional environment the Bundesbank was left without the ability to legitimize itself via policy outcomes, which has thrown German central bankers into an organizational crisis (Dyson, 2009).

In this paper, I investigate the Bundesbank case to gain insights into how organizational dynamics internal to central banks, their search for legitimacy, and changes in the broader political and institutional contexts interact in such situations of organizational crisis. I argue that the disempowered Bundesbank engaged symbolically in the production of expertise on the topic of financial stability and macroprudential regulation to produce legitimacy in relation to its environment precisely to compensate for its limited ability to legitimize itself via actual policymaking. In contrast to microprudential regulation, which assumes that the stability of each market actor is sufficient for financial stability, macroprudential regulation assumes that financial markets are unstable on a systemic level; in other words, systemic risks emerge endogenously within financial markets over financial cycles. Prior to the global financial crisis, however, my argument is that symbolic engagement with macroprudential regulation led to ‘decoupling’ (Meyer et al., 1997; Meyer & Rowan, 1977), a state in which the Bundesbank adopted formal structures and discursive expertise to signal its belonging to an organizational field of macroprudential regulators without changing its core decision-making procedures. However, this symbolic engagement became unexpectedly relevant because of the financial crisis, which raised a demand for actors who could implement macroprudential policies that had been lacking before 2008. A recoupling of the Bundesbank’s mandate and its practices was thus provoked by external events. However, the Bundesbank remained in an ambiguous position precisely because macroprudential policy works differently from monetary policy both institutionally and as an instrument. Macroprudential regulation involves visible distributional consequences that do not sit well with the idea of an apolitical, independent policymaker. As a result, the Bundesbank came to share responsibility over macroprudential regulation with the BaFin and the Ministry of Finance. The institutional reforms after 2008 thus have not brought back the widely feared Bundesbank of the 1990s.

The situation after 2008 and the discussion about how to institute macroprudential regulation as a policy programme required finding ways of creating a new boundary between the state as an administrator of macroeconomic intervention and financial markets as an object governable by such intervention. To gain insights into such boundary work, I draw on the sociology of translation (Callon, 1984). More specifically, I argue that creating a new state-economy boundary based on instruments adopted from such transnational arenas as the Basel III bank capital requirement standards requires central banks to disentangle initially unclear causal relationships between the means (policy instruments) and the ends (an increase in financial stability). For central banks wishing to legitimize themselves via policy outputs (Scharpf, 1970), unclear means-ends relationships are problematic. In the process of central banks’ efforts to create the discursive space they need to justify their

macroprudential interventions and internal organizational technologies to facilitate these interventions, lacking material entanglements within financial markets and banks might render these policy interventions inoperable. Banks for example could lack the accounting infrastructure to provide the data necessary for calibrating central banks' policy interventions or market actors themselves are not using the policy rate set by the intervention for their business practices, thereby voiding the effect of the intervention. One possible solution to this is straightforward: if organizations can reconfigure and disentangle their environment to fit their policy instrument – that is, translate their newly developed problematization of the economy – uncertainty could be reduced. If successful, the central bank can then use outcomes produced by an entire network of actors as the effect of its policy intervention, thereby generating output legitimacy. As the introduction of new housing instruments in 2015 and 2020 shows, the Bundesbank has been at least partially successful in this translation of its new policy programme and has therefore been able to make significant strides in producing output legitimacy given its limits within its new institutional environment.

In sum, this paper's analysis adds to this special issue by providing insights into how the new state-economy boundary for macroprudential regulation is formed, institutionalized, and made operational. It points towards the crucial role of the central bank as an actor whose concerns for legitimacy in relation to various fields are key drivers in the adoption of macroprudential regulations at the national level (Baker, 2013b, 2015; Goodhart, 2015; McPhilemy, 2016; Mero & Piroska, 2017; Piroska, Gorelkina, & Johnson, 2021; Stellinga, 2020; Yağcı, 2017). As such this study uses the Bundesbank adoption of macroprudential regulations to provide insights into how new policy programmes for central banks can be used to move from symbolic legitimacy towards legitimization via outputs – an area of study so far neglected by organizational sociology (Bromley & Powell, 2012; de Bree & Stoopendaal, 2020) – while tracking how divergent early problematizations within the central bank can become consequential in the course of institutional reform. Lastly, it points to the importance of discursive and boundary work by central banks in the production of the state effect presented in the introduction of this special issue.

Studying the Bundesbank's organizational response to the initial shock to its organizational legitimacy and subsequent boundary work post-financial crisis requires an understanding of internal processes and practices. To study these processes and practices, I conducted ethnographic research within the Bundesbank for six months via an internship in 2018. I worked in the coordination department of the financial stability directorate, whose primary task is to prepare upcoming meetings in the financial policy committee, coordinate requests from inside the Bundesbank from other directorates, in addition to facilitating requests from parliament. Furthermore, the department

is tasked with preparing Bundesbank representatives for international and national committee meetings and transmit new developments in the political sphere to the more analytical departments, and *vice versa*. It is therefore the ideal position to observe the organizational processes and boundary work the Bundesbank undertakes post-crisis. Based on my access to the Bundesbank, I use various data sources to track its internal and discursive changes from 2000 until 2020. The first data source relies on internal department plans, which are available to employees for contact information on specific issues. These plans include all employees of the directorates of banking supervision, financial stability and its predecessor the international directorate. Beyond the employees themselves, the plans also include the task descriptions of departments and working groups. I use this data in three ways: first, I track where specific expertise on financial stability has accumulated over time. Second, I establish the degree of decoupling between the expertise and the invested resources measured in terms of the number of employees working in specific working groups over time. Third, I identified and interviewed nine key insiders. Lastly, I analyzed financial stability reports (FSR), parliamentary debates and legal texts to capture the translation process the Bundesbank underwent. A special role among these documents is taken up by FSRs, because they are the prime publication used by the Bundesbank to advocate for its problematization of financial markets. In later periods, FSRs became key components of the Bundesbank's new financial stability mandate, due to their foundational role in decision-making within the post-crisis regulatory framework.

The next section introduces the theoretical framework in more detail, while pointing towards how organizations' legitimacy concerns might interrelate with their boundary work in the creation of a new policy area. At the same time the section will point to the importance of translation processes inside and outside the Bundesbank. In the first analytical step I will show how the early engagement with financial stability emerged from an organizational need for legitimacy, with an emphasis on the internal organizational struggles over resources between the directorate for banking supervision and the international directorate. The second section focuses on the post-crisis period in which a new macroprudential regulatory framework is adopted in the wider environment of the Bundesbank. Crucially, it is here that incongruent problematizations in the early adoption of expertise on financial stability at the organizational level prevented the Bundesbank from taking full control over financial stability. During this period the Bundesbank overcame decoupling by creating a new directorate for financial stability and creating internal organizational technologies to facilitate its new role in the macroprudential regulatory regime. However, the Bundesbank still has to enroll other actors to create the material conditions for its policy interventions. The final analytical section uses a

recommendation on new housing instruments to analyze the boundary work the Bundesbank underwent to translate its new policy programme. The last section concludes.

4.2 Central bank legitimacy, boundary work and translation

The neo-institutional literature on organizational legitimacy takes organizational survival within a heterogenous environment as its starting point. Organizations rely on their environment for resources, be they material or social. Thus, organizations find themselves subject to an increasingly institutionalized environment making heterogenous demands on them. To cope with these inconsistent demands, organizations might choose to adopt rationalized myths from their institutional environment ceremonially to signal their belonging within an organizational field, in addition to protecting internal processes necessary to fulfill their core tasks. This type of buffering between symbolically adopted formal structures and core organizational tasks is referred to as 'decoupling' (Bromley & Powell, 2012; Meyer & Rowan, 1977). In the neo-institutional literature, organizations therefore produce legitimacy in two ways: by symbolically adopting formal structures and discursive expertise to conform to their institutionalized environment or by producing outcomes via management of relational networks (Meyer & Rowan, 1977, p. 354). The degree to which an organization uses a particular method of legitimization is not static, however, but rather depends on the institutional environment. Organizations might deploy both ways at the same time or predominately use one rather than the other.

While the ceremonial adoption of expertise and norms might be a temporary, albeit risky substitute for output legitimacy, this does not mean that adoption itself has no effect. Rather, once adopted, these myths can be the starting point for the development of new policy programmes, which may allow the organization to legitimize itself via outputs. Establishing a new policy programme is not as straightforward as it might seem, however, as the organization might not be able to overcome its initial decoupling (Bartley & Egels-Zandén, 2016; Lim, 2017; Tilcsik, 2010). A key role in reducing decoupling is played by early adopters within organizations, especially if they manage to gain control over key positions as department heads (Carpenter, 2020; Tilcsik, 2010). Department heads are high enough in the organizational hierarchy to implement their ideal of what the organization ought to be by taking control over the future production of expertise and by solidifying their ideas through hiring decisions and the establishment of new practices. However, even if a department head manages to overcome the initial decoupling within the organization it does not mean that it will be able to produce legitimacy via outputs, because the material entanglements with its environment necessary to make the new policy programme operational might not yet exist.

While the institutional literature has found conditions and processes in which symbolically adopted instruments can become tightly coupled with organizational practices (Bartley & Egels-Zandén, 2016; Glaese, 2020; Hallett, 2010; Lim, 2017; Michelson, 2019; Sandholtz, 2012; Tilcsik, 2010), it has so far failed to come up with a convincing answer to the question of how organizations can overcome mismatches between the conditions outside the organization and their new toolbox (Bromley & Powell, 2012; de Bree & Stoopendaal, 2020). The literature therefore lacks the conceptual framework needed to fully describe how organizations move from producing symbolic legitimacy via the decoupled adoption of new policy programmes to producing output legitimacy via the implementation of said policy programmes. A similar gap can be found in the literature on the adoption of macroprudential regulation as it has focused mainly on policy learning (Yağcı, 2017), idiosyncrasies of macroprudential regulation itself (Goodhart, 2015; Stellinga, 2020), the lack of scientific backing (Thiemann et al., 2018, 2020) or national politics (Mero & Piroška, 2017; Piroška *et al.*, 2021). They have often neglected the work central banks must undertake to reconfigure the environment to make their policy instruments operational. It is exactly these material conditions outside organizations, however, which allow for the outcomes suggested by the economic models accompanying new regulatory interventions to materialize, produce output legitimacy and thereby stabilize the organization's position within its polity.

To fill the gap in our knowledge of how organizations can deal with the lack of material relationships with their environment to make policy outcomes materialize, I make use of the conceptualization of the state-economy boundary introduced by Coombs and Thiemann (2022) in the introduction to this special issue. Coombs and Thiemann, (following (Mitchell, 1991, 2018), argue that central banks produce the boundary between state and economy. They have a pivotal role in defining and, if successful, creating the governable object of the economy, upon which they can administer macroeconomic policy. This process has two important aspects: First, a rationalized space has to be created, which clearly delineates state from market actions. This delineation must clearly identify means-ends relationships between policy interventions and the macroeconomic outcomes utilizing measures legitimized via quantification, narrative scripts, or appropriateness within the organizational field (Coombs, 2022; Meyer *et al.*, 1997; Sauder & Espeland, 2009; Thiemann, 2022). The rationalized space created by central bank expertise for policy intervention by itself is not sufficient to produce macroeconomic outcomes; concrete entanglements with private actors, which constitute the infrastructure for governing techniques (Braun, 2015; Rose & Miller, 1992; Walter & Wansleben, 2020) are equally important in constituting the state-economy boundary (Eyal, 2013b). It is these entanglements which construct the state 'effect' – in other words, the attribution of a

macroeconomic outcome to policies of the state rather than to the collective of private and public actors – to emerge (Eyal, 2013b; Mitchell, 2018).

In this paper I argue that the Bundesbank has to engage in boundary work to establish both the discursive expertise and the material entanglements constituting the state-economy boundary of the post-crisis macroprudential regime (Best, 2022; Gieryn, 1983). The success of this boundary work is a necessary condition for the Bundesbank to produce output legitimacy once again. To better understand how the Bundesbank might disentangle the macroprudential means-ends relationships, I rely on the sociology of translation (Callon, 1984; Callon & Latour, 1981)¹¹. Viewed from this perspective, becoming an autonomous policy agency in a new policy area means becoming the obligatory passage point in which it can claim the outcome produced by the network of actors within the state-economy boundary for itself. To do so the organization has to reconfigure, enroll and stabilize its surrounding actor-network and its position within the network. That is to say that the organization has to translate its understanding of the economy in an effort to reconfigure the actors within the state-economy boundary to create the conditions under which the means-ends relationships established by their discursive expertise can survive the intrusion of other problematizations (Beunza & Ferraro, 2019; Callon & Latour, 1981).

Following from these considerations I show that there are four conditions for a central bank to regain its ability to legitimize itself via outcomes. First, it must recouple its internal practices with its policy instruments, because without this recoupling policy instruments would remain unused. Second, it must be able to create the discursive space for its intervention. This includes creating the relationships between the means (policy instruments) and a clearly defined and measurable policy outcome (financial stability). Third, the central bank must translate its expertise, that is, to reconfigure the entanglements in the state-economy boundary to produce outcomes. Fourth, within the institutional arrangements between itself and other state agencies, the central bank must become the obligatory passage point to claim the policy outcome for itself. As the case of the Bundesbank will show, until all four conditions are met an organization will have only limited abilities to use policy outcomes in its search for legitimacy. Table 3 summarizes these four conditions for each time period of analysis for the Bundesbank.

¹¹ The same process could be described in Foucauldian terms as reducing differences between problematizations and technologies of government. The state effect in this literature, however, emerges from governing techniques, rather than from intentional efforts by state-actors to create legitimacy (Rose & Miller, 1992, p. 203f). The sociology of translation is therefore a more parsimonious conceptualization of the process the Bundesbank undertakes.

	Monetary policy in the 1990s	Financial stability 2000–2008	Financial stability after 2013
Institutional arrangements	Strong central bank independence with high autonomy Sole purveyor of low inflation rates Full control over policy instruments	Strong central bank independence Contestation of the role of the Bundesbank	Strong central bank independence with medium autonomy Shared responsibility for financial stability with BaFin and the Ministry of Finance
Policy instruments	Single policy instrument administered in a single market	No policy instruments	Multiple policy instruments working in different markets and regulating different market actors
Decoupling	Tight coupling	Decoupling	Tight coupling
Means-ends relationship	Causal relationships well-established between interest rates and inflation target Entanglements with financial markets exist to make policy instruments operational Policy outcome has a well-established measure	Discursive expertise on endogenous and exogenous emergence of systemic risks Without policy instruments no clear relationship between possible intervention and financial stability is possible	Causal relationship for some instruments unclear Entanglements with financial markets exist only for some policy instruments Policy outcome has no well-established measure
Output legitimacy	High	Low	Medium

Table 3: The Bundesbank in three different periods

4.3 The Bundesbank before the euro

Understanding how the Bundesbank managed to assert itself as the expert on financial stability requires a short historical overview of the Bundesbank’s fate after the introduction of the euro and the creation of BaFin, the single financial supervisor, in 2002. The following provides a short historical overview of the Bundesbank’s initial starting point as Europe’s central bank in the 1990s and the subsequent structural changes which started its transition into the Bundesbank of today.

The Bundesbank of the 1990s is a prime example of an organization built on output legitimacy. Following struggles over whether fiscal or monetary policy should take primacy in macroeconomic management after the breakdown of the Bretton Woods system (Rademacher, 2022), the Bundesbank emerged as the main purveyor of macroeconomic governance via monetary policy in Germany. Backed up by its historically strong independence, the Bundesbank in the 1990s found itself in full control of the interest rate. At the same time the goal of low inflation rates became the norm as the goal of monetary policy, due to the worldwide spread of inflation targeting (Wasserfallen, 2019), its scientific backing in mainstream economics (Goodfriend, 2007; Walter, 2019) and its disentangled means-ends relationship between the state and the economy (Walter, 2019; Walter & Wansleben, 2020).

This organizational environment of the Bundesbank was also reflected in a tight coupling between internal structures and practices with the outputs produced. Because of the multiple veto-players in the decision-making process, the Bundesbank was consensus-based, focusing on the core task of controlling the inflation rate. The ideological focus on monetary policy also demoted banking supervision internally to a secondary goal (Dyson, 2009; Marsh, 1992). As a result, the Bundesbank 'was content to formally delegate key activities to an independent agency attached to the Federal Finance Ministry, the Berlin-based Federal Banking supervision office' (Dyson, 2009, p. 141). Crucially, the Bundesbank was also extraordinarily autonomous as it was able to pursue its policy programme even against the preferences of its principal. It therefore fulfilled all four conditions for producing output legitimacy. However, two structural changes within the Bundesbank's environment coincided in the early 2000s, which started the transition from an organization legitimizing itself via output to an organization that symbolically adopts rationalized myths in the form of formal structures and expertise.

The first structural change was the establishment of the ECB in 1998 in advance of the introduction of the euro in 2002 and the Bundesbank's resulting loss of control over monetary policy. This change in the conduct of monetary policy downgraded the Bundesbank from the premier central bank in Europe (Marsh, 1992) to only one contributing national central bank, albeit an important one. The introduction of the euro led to questions about the Bundesbank's redundancy in Germany as tensions emerged between banking supervision, monetary policy and central bank, independence. Faced with the question of whether the Bundesbank had become redundant Bundesbank presidents Welteke and Weber attempted to promote a variety of topics – such as banking supervision and financial

stability – to justify the Bundesbank’s size.¹² This self-promotion by the Bundesbank as the new banking supervisor coincided with federal government worries about the competitiveness of the German financial sector and reforms applied to a more financialized pension system, which initiated financial regulation reform debates.

These factors resulted in the second external structural change. In May 2002 BaFin was founded, consolidating the three smaller regulatory agencies. According to Handke and Zimmerman (2012), the federal government decided against establishing the independent Bundesbank as the single supervisor, as recent reforms financializing the German pension system made the abdication of financial regulation politically costly. The Bundesbank was therefore not successful in becoming the single supervisor, but its heavy lobbying did enable it to retain shared responsibilities over banking supervision with BaFin. Importantly though, the Bundesbank is not formally allowed to conduct administrative acts, even today. Hence, it would have to rely on BaFin for all policy interventions.

In the next section I examine the Bundesbank’s organizational reaction to the changes in its environment. The first change was to the structure of the Bundesbank itself, which enabled a higher degree of freedom for directorates to adjust to their specific environments. The second internal change is directly related to internal restructuring as it allowed for new problematizations of the economy and financial systems to take hold in two different directorates within the Bundesbank. It is precisely these early problematizations which would become consequential in the Bundesbank’s struggles to establish itself as the new financial regulator within the German polity post-crisis.

4.4 Internal restructuring towards symbolic legitimacy

The two structural changes in the Bundesbank’s environment led to an organizational crisis, which required the bank to seek meaning in a new world where output legitimacy via monetary policy or banking supervision became impossible. In its search for meaning the Bundesbank shifted towards producing legitimacy symbolically. The Bundesbank changed its internal structure to accommodate this new type of legitimacy. An internal structural reform passed in 2002 had two effects. First, it centralized policy decisions in a downsized board of the Bundesbank, rather than a number of state-level boards. Second, it provided individual board members with more control over their respective directorates, thereby loosening the tightly coupled organizational structure geared towards monetary policy. This reform and the subsequent higher degree of freedom coincided with a massive reduction in staff during this time. This scenario led to board members laying claim to as many topics

¹² Neither was able to prevent internal reforms and stop the downsizing from 16,500 employees in 1991 to around 10,000 in 2018, and from 202 to 47 branches.

as possible while defending the expertise held in their own directorates in an effort to obtain as many resources as possible. The struggle over resources in a declining Bundesbank therefore took the shape of jurisdictional struggles over policy areas between directorates.

The Bundesbank's directorates, now equipped with more agency, reacted to shifts in its environment by accumulating expertise to lay claim to jurisdiction over upcoming topics within the larger organizational field. One such topic was financial stability, which originally emerged in the IMF and BIS as well as in the central banking community in the early 1990s (Baker, 2013b; Čihák, Sharifuddin, Tintchev, & Muñoz, 2012; Thiemann et al., 2018, 2020). The IMF was confronted with financial stability concerns because of its experience with the Asian financial crisis, while the BIS began developing macroprudential ideas at the end of the 1990s. Both institutions focus heavily on financial markets, which led them to be forerunners in thinking on financial stability (Interview with Bundesbank official 7). Two directorates began to accumulate expertise on the topic of financial stability within the Bundesbank as a result of this emerging norm of central banks as purveyors of financial stability: the banking supervision directorate and the international affairs directorate. Both directorates were restructured and received responsibilities for financial stability during the structural reforms in 2002. Both directorates reacted to different environments, while accumulating their new expertise, leading to different problematizations of financial regulation, the financial system and the Bundesbank's role in it.

The banking supervision directorate changed more drastically during the structural reform (Interview with Bundesbank official 9). A new department for 'micro- and macroprudential analysis' was created in 2002 to perform analyses on systemically important banks and later on performed stress tests and designed early-warning indicators. The department focused on determining the systemic relevance of banks, systemic risk within the banking sector and the stability of the banking sector on the 'macro' side, while the 'micro' side focused mainly on estimating the effects of new capital regulation based on each bank's respective balance-sheet. The directorate itself was further charged with implementing the Basel II reform package. The key components of problematizing the financial system in the banking supervision department were based on the perception of banks as atomized actors whose balance-sheets are independent of each other. Here systemic risks stem from exogenous shocks to the financial system or the bankruptcy of a big bank, while the regulator's task consists of guaranteeing the resilience of each individual bank. The role of the Bundesbank in this problematization comes down to that of a rather apolitical banking supervisor, whose main responsibility consists of monitoring the compliance of banks with regulatory standards rather than proactive interventions in financial markets. This problematization led to specific analytical tools for

the supervision of systemic risks in the form of stress tests, which allowed for an estimation of effects of macroeconomic and idiosyncratic shocks to the entire banking sector or single banks. Changes within the banking supervision directorate can be traced to two causes: Welteke's strategy of establishing the Bundesbank as the key provider of expertise on financial stability and the creation of BaFin as an institutional competitor to the Bundesbank's authority. The heavy focus on systemic risk can also be interpreted as a strategy to carve out a distinct field of banking supervision, in contrast to the focus of BaFin.

The international directorate, by contrast, focused on the topic of financial stability with only a few changes to the structure of the directorate. The international directorate was tasked with representing the Bundesbank in international working groups and committees such as BIS, IMF and ECB working groups, and with analyzing the impact of international financial and currency systems on Germany. Financial stability concerns entered mainly through the prominent figure of Vice President Jürgen Stark (Interview with Bundesbank officials 6 and 7), who represented the Bundesbank on the international stage and became the head of the international directorate during the structural reform in 2002. Stark, as Vice President, emerged as the representative of a strong Bundesbank as and an expert in international financial systems, especially considering the weak standing of then Bundesbank President Welteke. It was therefore the emergence of financial stability topics in the IMF and BIS that prompted the adoption of financial stability topics in the international directorate (Interview with Bundesbank officials 6 and 7)¹³.

As the IMF and BIS both focused heavily on endogenous risks emerging from financial markets, rather than risks stemming from single market participants, the expertise accumulated in the international directorate differed starkly from that of the banking supervision directorate. From a market perspective the inclusion of systemic risk allowed for the perception of risks as endogenous to financial markets, conceptualized as a chain of interdependent balance-sheets. Exemplary for the endogenous risk perspective are over-the-counter derivatives markets, in which even slight price adjustments can cause feedback effects within derivatives markets due to counterparty risks, subsequent withdrawals of market liquidity and margin calls (Deutsche Bundesbank, 2005, pp. 28–31). This problematization of systemic risks as endogenous to financial markets requires a different type of intervention by financial regulators. The regulator's role in this problematization is anti-cyclical; in other words, regulators have to intervene in financial markets *before* feedback effects in

¹³ The international directorate cooperated closely with the IMF in its financial sector assessment program (Deutsche Bundesbank, 2003, p. 166).

financial markets escalate into a full blown financial crisis. Post-crisis this type of intervention would often involve policy tools such as credit constraints in housing markets, counter-cyclical capital buffers or extra capital requirements for systemically important banks. As such, the prospect of endogenous risk emerging from financial markets stemmed largely from the transnational epistemic community of central banks and was not built up for policymaking as the instruments for its prevention would be introduced only after the crisis. Consequently, the expertise built up in this perspective served mainly as a way to legitimize the Bundesbank in the international community of central banks, rather than actual policymaking intentions.

Even though the accumulated expertise described above would suggest a form of policy learning for future policy action, one has to keep in mind that the Bundesbank did not have any administrative power over policy instruments. Only the banking supervision directorate conducts onsite visits to banks and could, at least in principle, demand a more detailed look into the accounts of banks. Table 4 provides evidence for decoupling on the topic of financial stability by the Bundesbank in the pre-crisis era. As the table shows, the number of non-administrative staff working on systemic risks in the banking supervision directorate rose more quickly than in the international directorate because it was tasked with implementation of Basel II. In the period between 2000 and 2007 the total number of employees in the banking directorate working on systemic risk rose from one to 37, while in the same period in the international directorate the number rose from seven to 20. The lack of expanded resources on macroprudential regulation are in line with the argument that financial stability expertise in the international directorate was mainly for show.

	Banking Supervision	International	Financial stability
2000	1		
2001	6		
2002	9	7	
2003	21	8	
2004	28	12	
2005	35	15	
2006	35	15	
2007	37	17	
2008	44	20	
2009	32		43
2010	35		72
2011	35		75
2012	48		73
2013	45		97
2014	42		105

2015	20		101
2016	22		124
2017	24		124

Table 4: Number of non-administrative staff in each directorate

Further evidence of decoupling can be found in the adoption and institutionalization FSR in 2003. The establishment of FSRs was influenced by the promotion of financial stability as a norm for central banks by the Bank of England and the ECB (Interview with Bundesbank official 7). The strong focus of the Bank of England on financial markets precipitated their early development of financial stability concepts. The Bank of England's publication of the first FSRs was seen as especially important and helpful in convincing board members to publish FSRs (Interview with Bundesbank official 7; Čihák *et al.*, 2012, p. 6). Publication of the report by the Bundesbank thus falls into line with the adoption of formal structures for the purpose of producing symbolic legitimacy (Meyer *et al.*, 1997).

4.5 The crisis, regulatory reform and competing problematizations

The previous section has outlined how the Bundesbank reorganized itself to accommodate the production of symbolic legitimacy rather than output legitimacy. Its organizational changes, invested resources, adoption of the FSR and expertise itself indicate decoupling between the purported expertise on financial stability and actual practice. The initial ceremonial adoption would soon come to bear fruit as the rise of macroprudential regulation with the emergence of a new regulatory paradigm after the financial crisis (Baker, 2013b; Coombs, 2020) and the subsequent passing of the financial regulatory reform the *Finanzstabilitätsgesetz* (FinStabG) in 2012. The following section outlines how the Bundesbank reacted to the great financial crisis on an organizational level. It also shows how the initial competing problematizations of financial markets and the role of the Bundesbank in them prevented the Bundesbank from taking full control of the post financial regulatory framework.

The Bundesbank reflected on its organizational shortcomings after the immediate crisis was resolved. This resulted in the eventual transformation of the international directorate into the financial stability directorate in 2009. The crisis therefore served as an external shock to the organizational structure of the Bundesbank, in which decoupling itself became problematized. As already described, the banking supervision department focused on the stability and systemic contribution of individual institutions, while the international department took on the perspective of risks emanating from financial markets. Crucially, these two perspectives were not brought together, leading to a perceived institutional blind spot, in which the banking supervisors failed to judge the risk stemming from international derivatives markets, while the international department was not

sufficiently able to estimate the internal weakness of banks (Interview with Bundesbank officials 6, 7 and 1). As a result, the Bundesbank worked towards bringing their practices closer in line with its perceived future tasks of taking full control of macroprudential instruments.

The recoupling process, however, progressed only slowly, as jurisdictional struggles between directorates persisted. The banking supervision and international directorates remained largely the same, prior to the transformation of the international directorate into the new financial stability directorate in 2009. The new directorate was now solely responsible for financial stability within the Bundesbank, but was still largely structured like its predecessor, with the addition of a department for macroprudential analysis and a secretariat focused on handling upcoming topics in international committees. The macroprudential analysis department was staffed mainly with members of the banking supervisory department for macroprudential analysis, even though the old macroprudential analysis department within the banking supervisory directorate still existed. The structure of the financial stability directorate largely stayed the same until 2012 as the banking supervisory directorate continued to be in charge of systemically relevant banks, stress tests and early warning indicators.

These changes, although incomplete, already point to a recoupling of expertise and the newly established tasks the financial stability directorate took on during the crisis (data collection, full responsibility for the increasingly important FSR and coordination of the German rescue fund). Only after the financial stability reform passed in 2012, however, did the new directorate integrate the remaining tasks of the banking supervision directorate. Furthermore, it created new formal and informal organizational structures to facilitate full use of policy instruments and thereby recouple their internal practices with their newly received policy instruments.

The lack of organizational recoupling previous to reform, however, led to persistent jurisdictional struggles between directorates and thus to competing problematizations of financial markets, the nature of systemic risk and the role of the Bundesbank in the future regulatory framework. The financial stability directorate had a clear idea of the new identity of the Bundesbank as intervening in financial markets in an effort to curtail systemic risks, while other directorates of the Bundesbank differed in their problematizations. These directorates raised concerns over the political consequences for the Bundesbank's cherished independence because of the more salient distributional effects of macroprudential regulation (Engelen, 2011), especially in the realm of credit allocations and banking supervision. Furthermore, they argued that direct control over macroprudential instruments would conflict with the Bundesbank's role in the European System of

Central Banks and largely retained pre-crisis problematizations of financial distress stemming from exogenous shocks, rather than endogenous pathologies of the financial system.

Post-crisis, a multitude of proposals for regulatory reform were considered by a variety of industry representatives and political parties, ranging from a UK-type system (Engelen, 2011), in which the Bundesbank would have full control over macroprudential instruments, to more mixed forms of shared responsibility between the Bundesbank and BaFin. Even though the financial stability directorate pushed for the Bundesbank to become the single supervisor in Germany in its FSRs during this time, its problematizations failed in trials of strength with other problematizations within the Bundesbank and thus it was unable to enroll and mobilize actors within and outside the Bundesbank. As a consequence, when the time came to decide on a new regulatory setup the inconsistent actor-network of the Bundesbank led to an impasse, in which no clear decision on the new institutional framework for financial regulation in Germany was reached (Handke & Zimmermann, 2012).

The prolonged political struggle ended only when the ESRB published its recommendation to EU member states on the structure of national regulatory frameworks ¹⁴. This recommendation was, with minor tweaks, fully adopted by the German parliament. In parliamentary debates, the Bundesbanks' expertise was never called into question; rather it was emphasized that the Bundesbank already possesses the expertise needed to deal with the analysis of financial stability (*Deutscher Bundestag Stenografischer Bericht 188. Sitzung*, 2012, p. 22659). The eventual post-financial regulatory reform, the *Finanzstabilitätsgesetz* (FinStabG) was passed in 2012. It established the Committee for Financial Stability (*Ausschuss für Finanzstabilität – AFS*), whose main tasks include coordinating discussions between BaFin, the Bundesbank, the finance ministry and Germany's Bank Rescue Fund in an effort to make recommendations on macroprudential interventions or the creation of new policy instruments.

The resulting reform package put the Bundesbank in an ambiguous position. On one hand, it failed to become the obligatory passage point in the state-economy boundary for financial stability, due to internally conflicting problematizations. Thus, its ability to claim financial stability as an outcome solely of its policy actions is limited. On the other hand, it was directly tasked with providing problematizations of financial markets in the future in the form of expert opinions communicated via

¹⁴ Unsurprisingly, the recommendation heavily suggested the involvement of national central banks in new financial stability regulatory regimes, as these banks played a major role in the transnational policymaking process (McPhilemy, 2016).

FSRs. It could therefore still have the ability to produce output legitimacy, albeit in a limited fashion, if it manages to recouple its internal practices with its new environment, provide a discursive space for future interventions, and enroll its environment in its policy programme. The next section turns to the Bundesbank's attempts to fulfill the remaining conditions for output legitimacy.

4.6 The creation and occupation of the new state-economy boundary by the macroprudential Bundesbank

The post-regulatory institutional settlement established by the Financial Stability Act (FinStabG) reorganized Germany's financial regulation system. In this new settlement the Bundesbank has been given a mandate to carry out economic analysis for the work of the AFS, thereby giving them the authority to provide the main problematizations of the economy. What actions did the Bundesbank take to reorganize itself based on its new environment? More importantly, to what degree were they successful in enrolling other actors in their new policy programmes? Lastly, given their institutional framework, were they successful in legitimizing themselves via outcomes once again?

To establish how the Bundesbank reorganized itself requires an understanding of the new regulatory setup. The AFS has the power to issue warnings and recommendations, but BaFin is still the only institution that can perform administrative acts. Thus, after the financial crisis in the last instance the finance ministry is still in control of financial regulation in Germany, given that BaFin remains a subordinate institution to the finance ministry. With the Financial Stability Act the Bundesbank is for the first time directly mandated with maintaining financial stability and macroprudential regulation at the national level. It is tasked with identifying possible risks to financial stability and reporting them to the AFS. It must also publish an FSR once per year, issue warnings and recommendations, and review the proper implementation of recommendations.

In accordance with its new environment the Bundesbank reorganized itself to produce the expertise needed to analyze the state of the financial system and markets, as well as to develop formal and informal organizational structures to involve BaFin and the finance ministry, in addition to political actors in their policy programme. After some trial and error in the early years of the new regulatory framework the directorate's eventual structure in 2016 would revolve around specific financial markets and actors. The current directorate includes a secretariat tasked with coordinating various political and international committees, a department tasked with tackling basic issues of financial stability and macroprudential supervision (developing methodology, data management and so on), a department for supervision of the banking sector and one for supervision of the non-banking sector, a department for systemic risk stemming from international financial markets and finally a

department for international currency markets.¹⁵ The intended effect of these changes was the merger of the political process of recommendations and warnings within the AFS with the economic analysis necessary for these recommendations. Consequently, the Bundesbank's knowledge production is now tightly coupled with its official task of recommending policy interventions.

Beyond formal changes to the financial stability directorate, changes to the procedure of macroprudential regulation were implemented to accommodate the quarterly meetings of the AFS. For example, a new committee called the Financial Stability Coordination Committee (*Koordinierungsausschuss Finanzstabilität* – KAF) was created. The KAF is headed by the financial stability directorate, but it also includes the macroeconomics and banking supervision directorates. The KAF aims to coordinate and prepare the Bundesbank directorates for meetings in the AFS. Furthermore, it is tasked with facilitating analysis in other directorates as they become necessary. Lastly, the KAF is the committee in which the different directorates discuss topics and analysis for the FSR, such as upcoming risks and evaluate when and if further actions need to be taken. In short, the KAF serves as an organizational structure designed to ensure the enrollment of the other directorates of the Bundesbank in the policy programme of the financial stability directorate.

The key role of departmental heads in the transition towards a macroprudential Bundesbank becomes apparent in the practices of preparing for KAF meetings within the financial stability directorate. KAF meetings are prepared with the help of an internal quarterly meeting of all departmental heads. These meetings utilize a new risk-matrix developed by the directorate in which potential systemic risks are mapped onto each market section under analysis by the Bundesbank. If, for example, a new risk is detected by analysts in a department, it is tested against the risk-matrix to identify how it would impact each market, what possible feedback effects could emerge and what further analysis is required. In addition, these meetings serve to discuss a possible recommendation to activate a macroprudential instrument. Within this newly created structure departmental heads play a crucial role as it is their hiring practices that help to stabilize the expertise within each department. At the same time, their position at the meso-level within the organization allows them to manage the problematizations of financial markets within the Bundesbank, while at the same time incorporate the possible enrollment of the organizational environment into their decision-making (Carpenter, 2020; Tilcsik, 2010).

¹⁵ An analysis of department heads in the period 2009–2018 reveals that all but one were early adopters of macroprudential thinking within the Bundesbank. Furthermore, only two out of seven are former banking supervisors.

With the establishment of the KAF and the risk-matrix the Bundesbank was able to overcome its initial decoupling and create the organizational technologies necessary to fulfill its role in the new regulatory setup. It is thereby able to act upon its new mandate and satisfy the first condition of producing output legitimacy, although the two conditions – creating a discursive space for its intervention and reconfiguring the material conditions in the state-economy boundary – remain.

To analyze this reconfiguration process, I now turn to the recommendation for new macroprudential tools for the regulation of housing markets in 2015. This recommendation is one example in which this enrollment process and the consequent boundary work between state and economy has had mixed results. As macroprudential instruments for housing markets adopted via Basel III were not initially developed for the German financial system, they lacked a legitimate discursive justification for their use, as well as the material conditions for their administration. In 2014 the Bundesbank therefore began to problematize the relationship between macroprudential housing instruments and financial stability for an eventual recommendation to German lawmakers on the creation of new macroprudential instruments. In 2014 it reported on results of survey data on mortgage lending in 23 cities in Germany. This analysis showed no significant risks or excessive rises in house prices at the current time, however through the use of stress tests the Bundesbank was able to argue that future downward scenarios might reveal vulnerabilities in the banking sector. The downward scenario is used to emphasize the feedback effects between increasing housing prices, general deterioration of macroeconomic conditions and possible financial stability risks to the banking sector (Deutsche Bundesbank, 2014, pp. 61–66). Crucially, the downward scenario is also used as a narrative of the future state of the economy, thereby shaping a mechanism through which the administration of macroprudential tools by the state in relation to banks could improve financial stability.

However, the analysis of the Bundesbank identified two obstacles to the use of macroprudential housing instruments. First, German banks use sustainable LTV ratios to evaluate a mortgage risk-profile, a variation of the standard instrument¹⁶ suggested by Basel III. This makes the widespread administration of LTV ratios difficult. Second, accounting and data collection standards in Germany do not include sufficiently fine-grained information on borrowers and mortgages to calibrate possible macroprudential interventions. The AFS therefore recommended the creation of new

¹⁶ Exact sustainable LTV calculations can vary between banks, as well as regionally.

accounting standards and four new macroprudential instruments (LTV ratios, debt-to-income ratios, debt-service-to-income ratios and amortization ratios).

While the enrollment of the Ministry of Finance and BaFin in the AFS was successful, the enrollment of parliament and market actors was only partially successful. In consultations on the recommendation, industry actors decried the new reform as prohibitive in relation to their lending operations and profits. They also objected to the high costs of creating the accounting infrastructure for future data requests. These lines of argument were picked up by parliamentarians, who mainly argued against the distributive effects of new housing instruments, the political salience of denying credit to low-income borrowers and lastly its effect on the provision of affordable housing within Germany. As a result of these electoral considerations the eventual law only introduced two new instruments, LTV ratios and amortization ratios, discarding the two more politically perilous borrower-related measures (debt-to-income, debt-service-to-income). They also did not create new accounting standards for German banks, which severely hinders the Bundesbank in its efforts to rigorously analyze housing markets or even apply the few new instruments it has been given. Only after the Bundesbank repeatedly criticized the federal government for its lack of action and the ESRB issued a warning on housing markets in 2020 did lawmakers react and create new data requirements for banks. This created the material conditions for the administration of housing instruments. However, German lawmakers have once again failed to create borrower-related instruments, despite the ESRB's recommendation.

As the recommendation on housing instruments shows, the Bundesbank is well able to problematize the economy in line with its envisioned policy programme and even enroll BaFin and the Ministry of Finance in its programme. However, at crucial moments it struggled to enroll several actors. In other words, problematizations of financial and political actors intruded the problematization of the Bundesbank, therefore preventing a fully successful translation process. Despite the mixed outcome of the recommendation itself, the Bundesbank was still successful in establishing itself as the key authority on financial stability in Germany as it is their analysis and problematizations of the economy that function as the foundation for the work of the AFS.

4.7 Conclusion

This paper has documented how the Bundesbank reacted to a crisis of legitimacy in the early 2000s. It showed the internal transformation the Bundesbank underwent to compensate for its loss of monetary policy and banking supervision powers by adopting financial stability as a new policy area, at least 'ceremonially'. However, this ceremonial adoption of new policy areas was not without effect

as the financial crisis created a demand for macroprudential interventions. Subsequently, the Bundesbank attempted to position itself as the new macroprudential regulator within the emerging German regulatory regime, although internal struggles over the role of the Bundesbank led to an institutional setup in which it shares responsibility for macroprudential regulation with BaFin and the Ministry of Finance. The Bundesbank's efforts to create a new state-economy boundary to legitimize itself via policy outputs was thus limited by its new institutional context. As its attempts to establish new macroprudential instruments for the housing market has shown, however, it could still be partially successful in translating its policy programme. These findings provide insights into the emergence of national macroprudential regimes, which so far have been explained mainly by policy learning (Yağcı, 2017), idiosyncrasies of macroprudential regulation itself (Goodhart, 2015; Stellinga, 2020), the lack of scientific backing (Thiemann *et al.*, 2018, 2020) or national politics (Mero & Piroska, 2017; Piroska *et al.*, 2021). While these aspects play an important role, this study has shown how path-dependencies within central banks can become consequential in the institutionalization of macroprudential regulation at the national level, if they prevent the central bank from seizing macroprudential regulation for itself. Additionally, it showcased the importance of tracing where, when and how macroprudential expertise accumulated in central banks before the crisis because this can influence how macroprudential regulation is problematized and consolidated.

At a more general level this study points to the importance of legitimacy concerns at state agencies for the creation of new policy areas. Understanding why and how central banks can legitimize themselves via outputs, rather than via symbolic adoption of discursive expertise is crucial in explaining the emergence of new policy programmes. This study has proposed four conditions for this legitimization to be successful: an institutional arrangement which allows the organization to differentiate itself from other agencies in the polity; the availability of policy instruments; a tightly coupled organization; and sufficient boundary work to disentangle the discursive and material relationship to make policy instruments operational. The Bundesbank has failed to create an institutional arrangement in which it could claim financial stability as a policy output for itself, but it has managed to establish itself as the authority on financial stability in Germany. As a result, the Bundesbank managed to stave off its organizational crisis and regain a stable position in the German polity.

Future research should pay attention to areas outside monetary policy, in which central banks do not occupy the same central position at the heart of the banking system, because organizational processes and concerns might play out in an unusual fashion. In such cases, central banks might not be able to perform the boundary work necessary to create a state-economy boundary amenable to

their policy interventions. Lastly, if they are unable to meet the abovementioned conditions central banks implicate themselves politically by engaging in these policy areas, thereby risking their organizational autonomy.

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Appendix A

While the graphical depiction of networks for each period provides descriptive insights into the structure of the organizational field of central banks and its relationship to the academic field, the depiction itself is the outcome of the sparsification algorithm or the periodization chosen. To test whether the clustering is a robust finding and not an artefact of either periodization or network sparsification, I calculate the modularity scores for networks in a 5-year moving time window for different values of the sparsification parameter alpha. As can be seen in figure 12, for reasonable values of alpha, the modularity increases over time. As expected the slope of the trend decreases with increases in alpha, because higher values of alpha lower the threshold for inclusion of a similarity tie within the network. Lastly, modularity also decreases for higher alphas, because the inclusion of more similarity ties increases the ties between clusters and therefore reduces the total modularity score.

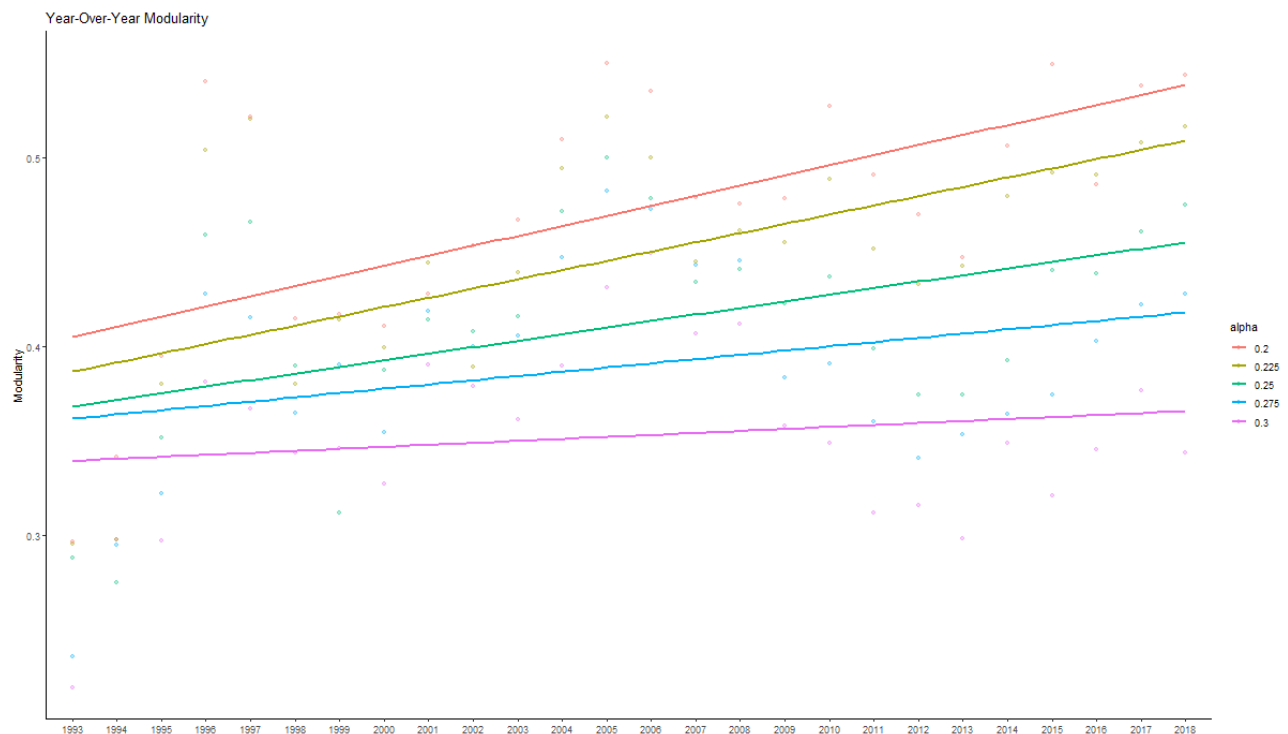


Figure 17: Modularity scores for moving 5-year time window over the entire period and linear trends for each value of alpha.

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Eidesstattliche Erklärung nach § 8 Abs. 3 der Promotionsordnung vom 17.02.2015

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