



Challenges for Macroprudential Policy in the Euro Area : Cross-Border Spillovers and Governance Issues

Marcos Carias Flores

► To cite this version:

Marcos Carias Flores. Challenges for Macroprudential Policy in the Euro Area : Cross-Border Spillovers and Governance Issues. Economics and Finance. Université de Bordeaux, 2019. English. NNT : 2019BORD0067 . tel-02724821

HAL Id: tel-02724821

<https://theses.hal.science/tel-02724821>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

THÈSE PRÉSENTÉE
POUR OBTENIR LE GRADE DE
**DOCTEUR DE
L'UNIVERSITÉ DE BORDEAUX**

ÉCOLE DOCTORALE ENTREPRISE, ÉCONOMIE ET SOCIÉTÉ (ED 42)
SPÉCIALITÉ SCIENCES ÉCONOMIQUES

Par **Marcos CARIAS FLORES**

**CHALLENGES FOR MACROPRUDENTIAL POLICY IN
THE EURO AREA**
Cross-Border Spillovers and Governance Issues

Sous la direction de Jean-Marc FIGUET, Professeur des Universités
et de Cristina BADARAU, Maître de Conférences HDR

Soutenue le 23 Mai 2019

Membres du jury:

Mme Anne-Gaël VAUBOURG

Professeur des Universités, Université de Poitiers, CRIEF, *président du jury*

Mme Camélia TURCU

Professeur des Universités, Université d'Orléans, LEO, *rapporteur*

M. Jean-Christophe POUTINEAU

Professeur des Universités, Université de Rennes 1, CREM, *rapporteur*

M. Jean-Marc FIGUET

Professeur des Universités, Université de Bordeaux, LAREFI, *directeur de thèse*

Mme Cristina BADARAU

Maître de Conférences HDR, Université de Bordeaux, LAREFI, *directeur de thèse*

Challenges for Macroprudential Policy in the Euro Area: Cross-Border Spillovers and Governance Issues

Abstract

Given the fragilities of a heterogeneous monetary union and the inability of the single monetary policy to lean against the wind of national financial cycles, new policies to defend financial stability in the European Monetary Union (EMU) are of the utmost importance. In response to the global financial crisis, advanced economies have supplemented their policy arsenal with a macroprudential approach to financial regulation, the practice of using prudential regulation to protect the health of the financial system and the economy as a whole, rather than just the health of individual institutions. Policymakers have unambiguously placed the task of containing systemic financial risk on the shoulders of macroprudential policy, but the national heterogeneities that characterize the Euro area pose significant challenges. The purpose of this thesis dissertation is to enrich the debate surrounding Euro area macroprudential policy by exploring how macro-financial and institutional heterogeneity can condition its proper conduct. Macroprudential policy is a popular subject in post-crisis macroeconomics, but analysis is often built on premises that fail to acknowledge the complexities inherent to its most basic concepts, such as financial stability itself. Rather than building ever-more complex models that aim to incorporate all the dimensions of the phenomenon, the problem can be addressed by conducting a critical reflection on the field's conceptual bases before formulating a model's assumptions. In the first chapter, we conduct a critical review of the literature and identify several points of tension, interpreting their implications for the Euro area case. Based on the insights of chapter 1, chapter 2 revisits the question of whether it is ideal for regulators to keep a narrow focus on national financial stabilization in the presence of cross-border spillovers, as is currently done. To do so, we build a static two-country New-Keynesian model where countercyclical capital regulation in the core affects financial stability in the periphery through the interbank market. By comparing national stabilization rules to a regime where the core regulator internalizes the spillover, we identify scenarios where the status quo is suboptimal. Finally, chapter 3 examines the significant institutional differences that exist among EMU national regulators. By reviewing official information, as well as assessment reports from the IMF and the FSB; we map the qualitative differences of national governance frameworks across six dimensions: presence of coordination mechanisms, completeness of instruments, independence, decision-making expeditiousness, strength of the legal mandate, use of communication and transparency. Given that institutional characteristics influence reactivity, we aim to quantify how this institutional heterogeneity affects the vulnerability to inaction bias through a comparative synthetic index. We find that countries are unequally protected against inaction bias, but there are several possible approaches to building robust governance frameworks.

Keywords: Macroprudential Policy, Financial Stability, Euro Area, Systemic Risk, Political Economy

Les Défis pour la Politique Macroprudentielle dans la Zone Euro: Effets de Report Transfrontaliers et Problèmes de Gouvernance

Résumé

Considérant les fragilités d'une union monétaire hétérogène, ainsi que l'incapacité de la politique monétaire unique pour stabiliser les cycles financiers nationaux, des nouveaux outils pour sauvegarder la stabilité financière sont de rigueur dans l'Union Economique et Monétaire (UEM). En réponse à la crise financière, les économies avancées ont fortifié la boîte à outils avec l'approche macroprudentielle à la réglementation prudentielle ; à savoir la pratique de se servir des instruments prudents dans le but de protéger la santé du système financier dans sa globalité et l'économie réelle, et plus seulement la santé des banques individuellement. La politique macroprudentielle porte sur ses épaules la responsabilité de maîtriser le risque systémique dans l'Union, mais les hétérogénéités nationales qui la caractérisent entraînent des redoutables défis. Cette thèse a comme but d'enrichir le débat en examinant comment les hétérogénéités macrofinancières et institutionnelles peuvent conditionner la conduite des politiques macroprudentielles. Il s'agit d'un sujet souvent abordé dans la littérature macroéconomique d'après-crise, mais la réflexion est souvent fondée sur des prémisses ne prenant pas compte des complexités inhérentes aux concepts fondamentaux, tels que la stabilité financière elle-même. Plutôt que construire des modèles davantage sophistiqués visant à incorporer toutes les dimensions du phénomène, il est possible d'améliorer l'exercice de modélisation en réévaluant les bases conceptuelles. Pour cette raison, le premier chapitre est dédié à un survol critique de la littérature dans lequel on identifie plusieurs points de tension souvent ignorés, puis on les interprète dans le contexte de l'UEM. Sur la base des enseignements du chapitre 1, le chapitre 2 aborde la question de s'il est souhaitable que les régulateurs se soucient de stabiliser le cycle financier national en présence d'effets de report transfrontaliers, tel que dans le régime en vigueur. Dans ce but, on se sert d'un modèle statique Néo-Keynésien à deux pays où l'utilisation du coussin de fonds propres contracyclique dans le cœur peut nuire à la stabilité financière de la périphérie via le marché interbancaire. En comparant une règle de stabilisation nationale à un régime où le régulateur du cœur internalise les effets de report, on cible des scénarios où le statu quo se révèle sous-optimal. Finalement, le chapitre 3 s'intéresse aux importantes divergences institutionnelles qui existent entre les régulateurs nationaux. En examinant l'information officielle, ainsi que les évaluations du FMI et du FSB, on documente les différences qualitatives dans le cadre de gouvernance à travers six axes : mécanismes de coordination, complétude des instruments, indépendance, fluidité du processus de décision, force du mandat légal, degré de transparence et recours à la communication. Sachant que les caractéristiques institutionnelles affectent la vitesse de réaction, on propose un index synthétique comparatif pour capturer quantitativement comment ces divergences institutionnelles sont susceptibles d'influencer le biais à l'inaction. On trouve que les pays sont inégalement protégés contre le biais d'inaction, mais qu'il existe différentes approches possibles pour créer des cadres de gouvernance résilients.

Mots clés: Politique Macroprudentielle, Stabilité Financière, Zone Euro, Risque Systémique, Économie Politique

Remerciements

Je commence en adressant mes sincères remerciements à mes directeurs de thèse, Jean-Marc Figuet et Cristina Badarau, pour m'avoir guidé et soutenu dans l'aboutissement de ce projet. Votre conseil, compréhension et implication ont sans doute été précieux.

Je souhaite également exprimer ma gratitude envers Camélia Turcu et Jean-Cristophe Poutineau, qui me rendent l'honneur de rapporter cette thèse ; ainsi qu'à Anne-Gaël Vaubourg pour accepter de présider le jury de soutenance. Je ne peux qu'espérer que la qualité de mon travail soit à la hauteur.

Par ailleurs, je me dois de remercier Stéphane Déès, Stebastian Gechert et Dominic Quint, nos échanges ont contribué à raffiner mes travaux et ma pensée plus généralement.

A tous les intégrants du LAREFI, merci de votre accueil et convivialité tout le long de cette expérience, c'était vraiment sympathique.

Mis reconocimientos más profundos se los reservo a mis padres, Carolina y Marcos; por haberme brindado incondicionalmente y en todo momento el carácter, el apoyo y el amor que este reto y la vida me han exigido. No es exageración decir que estos escritos son los frutos del combate más aguerido que me ha tocado llevar, no tengo palabras para agradecer como me ayudaron a renacer de las cenizas. En este viaje no pude haber tenido mejores compañeros, este triunfo les pertenece tanto a ustedes como a mí. Gracias por enseñarme el amor más puro del que es capaz el ser humano.

Dedicatoria

Para mi querido abuelo, **Marcos Carías Zapata**. Gracias por el nombre y la herencia intelectual que me dejas. Seguramente este documento no existiría de no ser por tu amor y devoción al saber y a la educación, y a los valores que le has transmitido a mi padre, y que él me transmitió a mí. Espero portar tu nombre, tu apellido, y el título de *doctor philosophiæ* de manera a hacerle honor a tu memoria. Descanza en paz sabiendo que has vivido una vida llena de propósito.

Contents

General Introduction	1
1 Financial Stability, Macroprudential Policy and the Euro Crisis	17
1.1 Conceptualizing Financial Stability	17
1.2 The emergence of macroprudential policy as the missing pillar of macroeconomic management	23
1.3 Identifying cyclical systemic risk: credit is the key	30
1.3.1 Excess credit as the common denominator of systemic crises: a look at the evidence	30
1.3.2 Credit as a driver of the economy: a course correction in the history of economic thought	35
1.4 How to fight financial instability: the macroprudential toolkit	38
1.4.1 The Basel III countercyclical capital buffer	38
1.4.2 Countercyclical lending standards	41
1.4.3 The observed effects of macroprudential policy	42
1.5 Financial Instability during the Euro Crisis	44
1.5.1 A sudden stop crisis with irrevocably fixed exchange rates	44
1.5.2 Policy responses	52
1.5.3 Financial stability issues in a fragile recovery	59
1.6 Conclusion	64
2 Cross-Border Spillovers of Macroprudential Policy in the Euro area	65
2.1 Introduction	65
2.2 Literature survey	67
2.3 The model	70
2.3.1 Real economy	71
2.3.2 Core credit market	71
2.3.3 Interbank market	72
2.3.4 Periphery credit market	74
2.4 National macroprudential rules and the interbank spillover	75
2.5 The case for internalization under synchronized booms	78
2.6 Conclusion	84
3 Governance Frameworks of Macroprudential Policy in the Euro Area: how well do they guard against inaction bias?	85
3.1 Introduction	85
3.2 What defines a macroprudential governance framework's ex-ante vulnerability to inaction bias?	88
3.2.1 Power to act	89
3.2.1.1 Coordination mechanisms	89
3.2.1.2 Completeness of instruments	91

3.2.1.3	Independence	92
3.2.2	Willingness to act	95
3.2.2.1	Expeditiousness of the policymaking process	95
3.2.2.2	Strength and coherence of the legal mandate	96
3.2.2.3	Transparency and Communication	100
3.3	Results	101
3.3.1	Preamble: The European superstructure of financial regulation	101
3.3.2	Summary scoring grid	102
3.3.3	Country scores	105
3.3.3.1	Austria	106
3.3.3.2	Belgium	110
3.3.3.3	Finland	113
3.3.3.4	France	117
3.3.3.5	Germany	120
3.3.3.6	Ireland	125
3.3.3.7	Netherlands	128
3.3.3.8	Spain	132
3.4	Conclusion	136
General Conclusion		139
Synthèse en Français		143
References		178
A Model details		179
B Microfoundation for the spillover effect		183
List of figures		186
List of tables		187
Acronyms		191

General Introduction

“Financial and business cycles can potentially be de-synchronized, meaning financial imbalances can grow in an environment characterized by relatively muted inflation. And in such an environment, the use of monetary policy to counteract financial imbalances may not be optimal, since it may result in substantial deviations of aggregate output and inflation from their desirable levels. In this situation, macroprudential policy, addressing financial imbalances, can complement the long-run objective of monetary policy.”

-Mario Draghi, President of the European Central Bank¹

It is hard to overstate the impact that the 2009-2012 Euro crisis had on the European and Monetary Union’s (EMU) policy ecosystem. After experiencing a period of remarkable growth in the run-up to and during the early years of the union, several of the block’s economies were struck by private and public debt crises with heavy and prolonged effects on output and employment, including one of the deepest contractions in the history of modern market economies in the case of Greece. While some countries suffered more than others, the EMU as a whole struggled more than any other region to recover from the Global Financial Crisis (GFC). In fact, at the peak of the crisis when investor concerns about sovereign debt reached their zenith, the stability of the common currency itself came under threat. To keep the situation from aggravating further, it was necessary for the ECB to commit to doing *“whatever it takes to save the Euro”*²; anticipating the controversial purchases of sovereign bonds on the basis of which the ECB has been accused of violating its statutory prohibition on monetary financing (Mersch, 2016). It became clear that the EMU was not only an incomplete currency union (i.e. lacking the fiscal union and business cycle synchronization that would qualify it as such according to the theory of optimal currency areas (Mundell, 1961; McKinnon, 1963)), it was also a financially unstable currency union. It became clear that the imperative of preventing financial crises is of greater consequence for the EMU than for the average country with a sovereign currency, and that the pre-crisis policy regime was not up to this momentous task. The policy arsenal has therefore been supplemented with what the Bank for International Settlements (BIS) baptized as the macroprudential approach to financial regulation: the practice of using prudential regulatory tools to ensure the stability of the financial system and the real economy, as opposed to just the health of individual institutions. Moreover, as indicated by the above statements from the ECB’s most senior officials, macroprudential policy is seen by policymakers as more than a means to financial stability; its success is fundamental for the functioning of monetary policy and the broader economic integration project. Indeed, failure to prevent country-specific financial crises would increase business cycle heterogeneity, and with it the inadequacy of the common monetary stance. Moreover, while a typical emerging country has the option of managing foreign debt inflows through capital controls, the objective of ensuring a single market

¹Keynote speech at the First Conference on Financial Stability, organized by the Bank of Spain and the Centro de Estudios Monetarios y Financieros, Madrid, 24 May 2017.

²Speech by Mario Draghi, President of the European Central Bank, at the Global Investment Conference in London, 26 July 2012.

for financial services makes this option inconceivable in the EMU. All of this implies that the success of macroprudential policy is arguably more important in the EMU than anywhere else.

Macroprudential policy is, above all, a toolkit for crisis prevention. Recent empirical literature on credit booms and the financial cycle has shown that the seeds of crises are sown during times of prosperity (Schularick & Taylor, 2012; Dell’Ariccia et al., 2016; Borio, 2014a). Having learned this lesson, regulators in the Euro area have, in recent years, started to activate some macroprudential instruments wherever credit and real-estate prices are showing early signs of a boom. To ensure that the rebound in housing prices following the bust does not give way to a new bubble, the Central Bank of Ireland has imposed more restrictive mortgage lending standards on five occasions since 2014. The National Bank of Belgium has attempted to curb house prices and mortgage lending growth by increasing the risk weight of real-estate exposures on which capital requirements are calculated in 2013 and 2018. Countercyclical capital requirements, the spearhead innovation of the Basel III accords, have been activated in France and Ireland during the summer of 2018; and every regulator in the EMU has demanded additional capital from the largest and most interconnected banks in its jurisdiction, the systemically important financial institutions (SIFIs). Few could argue that the Euro area financial system is not significantly stronger today than it was in the eve of the crisis, yet the macroprudential regulators face significant challenges related to the particular vulnerabilities of the EMU, making this a highly consequential and relevant subject for researchers and policymakers.

While the European banking union reforms have come a long way in giving the EMU the institutions that a financially integrated currency block needs, the absence of common deposit insurance means that the stability of national banking systems can still be threatened if they cannot be backstopped by a heavily indebted sovereign. Furthermore, regulators must face the pressure of the trade-off between long-term financial stability and short-term economic performance: all other things equal, restrictive macroprudential policy should result in tighter financial conditions for non-financial agents (NFAs), and therefore more subdued growth. Knowing that each intervention likely entails an immediate growth sacrifice, decisions carry a stronger weight in a scenario of fragile recovery such as the one the EMU is currently experiencing. It is therefore of crucial importance to identify the factors that regulators must take into account to best inform macroprudential decision-making. All advanced economy regulators are faced with uncertainties related for instance to macroprudential policy’s capacity to achieve its objectives, the short-term output costs it might generate or other unintended effects; but EMU regulators have the added difficulty of operating in a sub-optimal currency area where business and financial cycles are asynchronous yet deeply interdependent due to the unparalleled level of financial integration. Crucially, the common monetary stance produces divergent financial stability externalities, and the specific structural characteristics of each national economy will demand tailored macroprudential responses. At the same time, the crisis proved the need for more coordination between member states on financial stability policies, and indeed there have been important transfers of sovereignty to the supranational level on a number of competencies with the European banking union reforms. The Euro area is therefore a complicated jurisdiction for the macroprudential regulator: its must juggle the imperatives of subsidiarity and supranational coordination, and understanding the implications of national heterogeneity both for national and area-wide systemic risks will be a crucial part of its task. The central premise of this thesis is that **any pertinent analysis of EMU macroprudential policy must integrate the implications of national heterogeneity**. More specifically, we want to answer the following question: **In what ways could national heterogeneity condition the conduct of macroprudential policy in the EMU?** After first establishing some basic definitions, we will explain why we chose to focus on heterogeneity as the guiding principle of our analysis, before presenting an overview of the work carried out in this dissertation.

Macroprudential Policy: basic concepts and EMU context

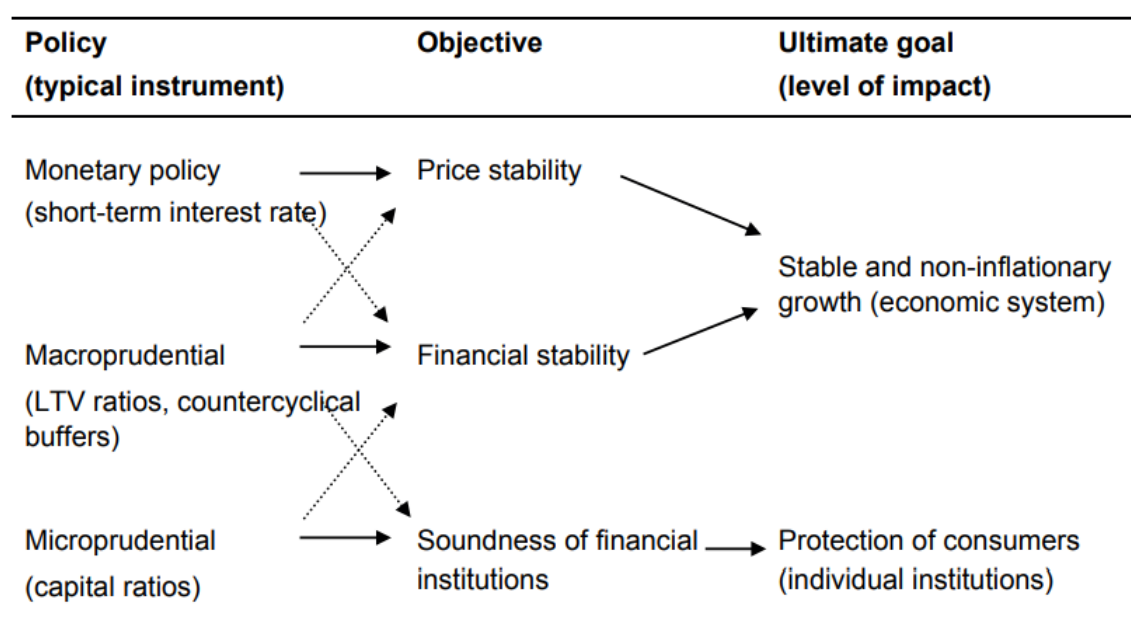
In the immediate aftermath of the GFC, a consensus quickly emerged among the global policy community on the imperative of reforming regulatory frameworks to prevent future crises (IMF-FSB-BIS, 2011). In fact, the pre-crisis policy framework was devoid of any levers with the explicit mandate of ensuring the stability of the financial system as a whole and the protection of the real economy from financial crises. It was implicitly assumed that by ensuring price stability (through inflation targeting) and protecting the health of financial institutions (through microprudential regulatory constraints), financial stability would be indirectly ensured. The closest thing to financial stability policies were public deposit insurance schemes and central bank lender of last resort interventions, but these only protected the system in a very narrow sense (mitigation of liquidity panics), and were manifestly insufficient to prevent the GFC. Two major proposals emerged to fill this void: setting a more restrictive monetary policy stance to constrain exuberant lending and asset price bubbles (Borio & Lowe, 2002; Borio & White, 2004), and extending the scope of prudential regulation so as to target system-wide rather than institution-specific stability (Borio, 2003). The first option, using monetary policy to “lean against the wind” of financial exuberance, is the subject of an unsettled debate (see Svensson (2017) versus Adrian & Liang (2018), also Smets (2014)), but its applicability to the Euro area seems unlikely (Kockerols & Kok (2019)). The second alternative, a macroprudential (as opposed to microprudential) approach to financial regulation, widely recognized as the fundamental pillar of financial stability policy (IMF-FSB-BIS, 2016).

An important term to clarify is that of systemic risk. It is usual to see the objective macroprudential policy described as “safeguarding financial stability” or “containing (or limiting) systemic risk”. Though they might appear interchangeable on the surface, thinking in terms of systemic risk is helpful from an operational perspective, especially thanks to Borio’s separation of the **structural dimension** and **time dimension** of systemic risk (Borio, 2003). The structural dimension takes into account the risk arising from interconnectedness, common exposures, fire sales and the disproportionate risk of too-big-to fail institutions. It allows us to see the fallacy of composition underlying an exclusively microprudential approach: systemic risk cannot be directly inferred from the health of individual institutions, and so the whole may be at risk even though its components appear safe. While the structural dimension takes a cross-sectional view of the financial system at a certain point in time, the time dimension tracks the evolution of systemic risk in the medium-to-long run by observing macro-financial aggregates. In the same way that monetary and fiscal policy are implemented countercyclically to stabilize inflation and employment, limiting systemic risk in the time dimension involves dynamically adjusting prudential standards to prevent the build-up of aggregate risk during booms and mitigating the real damages of their unraveling during the bust. This dissertation will mostly focus on the time-dimension of systemic risk.

Furthermore, macroprudential policy also has a complex relationship with monetary policy. Both policies try to achieve their respective objectives by influencing the behavior of financial variables. To affect the prices of goods and services, the central bank can influence aggregate demand through the policy rate by affecting the cost of liquidity and therefore inciting or discouraging bank lending, or through wealth effects by affecting the prices of financial assets; among other channels. Macroprudential policy, on the other hand, seeks to use regulatory instruments to curb the growth of credit and asset prices whenever these are deemed to pose a threat to financial stability; and to make balance sheets more resilient by building up loss-absorption capacity. Moreover, the recent literature on the risk-taking channel of monetary policy has shown that a

persistently low interest rate environment can increase agent's preference for risky investments (Borio & Zhu, 2012; Adrian & Shin, 2010; Rajan, 2005; Dell'Ariccia, 2010). Therefore, easy monetary policy can produce negative systemic risk externalities, which is especially relevant in a low-inflation/low-interest rate environment where central banks need extraordinarily accommodative policies to achieve their inflation targets. Given these complexities, it can be difficult to tell whether monetary and macroprudential policies are in complement or in conflict with each other, and how policy regimes should deal with these tensions. Some argue that monetary policy should support macroprudential policy by leaning against the wind with a more restrictive policy stance in the presence of systemic risk (Borio & Lowe, 2002; Borio & White, 2004; Stein, 2012; Lambertini et al., 2013; Woodford, 2012; Gambacorta & Signoretti, 2014). Others support a strict separation between the two, arguing that one of the benefits of macroprudential policy is that it should allow monetary policy to focus on price stability by containing any systemic risk it may produce (Svensson, 2017, 2018; Assenmacher-Wesche & Gerlach, 2010; Collard et al., 2017). The debate seems unsettled in the general case, but it is difficult to see how the single monetary policy could be used to target credit and asset prices when these evolve asynchronously in member states. Therefore, it is relatively uncontroversial that the EMU financial stability mandate should fall squarely on the shoulders of macroprudential policy³ (Kockerols & Kok, 2019; Dehmej & Gambacorta, 2017).

Figure 1: The relationships between macroprudential, microprudential and monetary policies



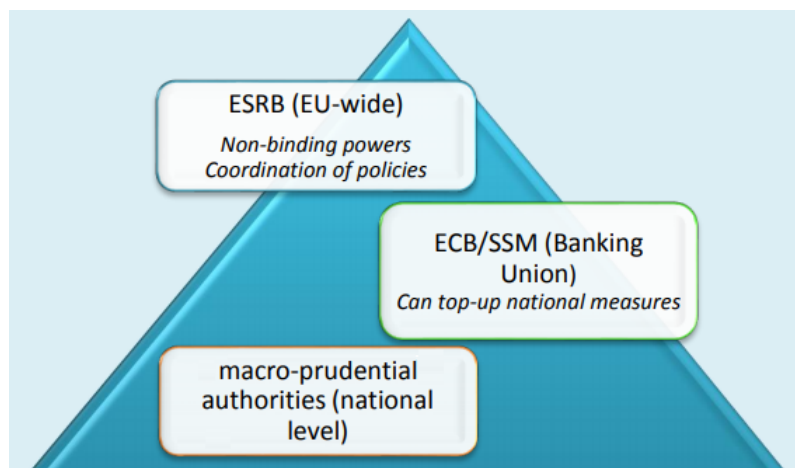
Source: Schoenmaker & Wiertz (2011)

Figure 1 provides a panorama of the interdependencies between monetary policy and the two kinds of prudential policy. *In fine*, both macroprudential and monetary policy are guarantors of macroeconomic stability, while microprudential policy protects the interests of consumers of financial services (shareholders and depositors). Macroprudential policy has consequences for microprudential and macroprudential policy: failure to prevent a systemic crisis will be detrimental to the health of individual institutions and create a deflationary scenario. Conversely, persistently loose monetary policy and too many unstable institutions make the task harder

³This seems to be the official stance of the ECB, as evidenced by the Mario Draghi quote at the beginning of the chapter.

for the macroprudential regulator. Finally, there is overlap in the transmission channels: both monetary and macroprudential policy seek to influence aggregate credit and asset prices, both micro and macroprudential regulation impose restrictions on bank balance sheets. In the EMU context, we should take care to position macroprudential policy within the wider set of post-crisis reforms in financial regulation that constitute the European banking union. First, macroprudential policy, which is essentially focused on crisis prevention, should be distinguished from resolution policy, whose purpose is managing imperiled banks. Resolution is concerned with how to best manage the orderly restructuring of insolvent institutions with the aim of protecting the taxpayers and avoiding the disruption of financial services; and it has been partly transferred to the supranational level through the creation of a Single Resolution Mechanism (SRM) and a Single Resolution Fund (SRF). The other pillar of the banking union is the Single Supervisory Mechanism, a microprudential authority that combines national prudential regulators and the ECB and gives the latter an enhanced role by entrusting it with the direct oversight of the area's most important banks. The banking union has also given the ECB macroprudential powers, but here the balance of competencies remains tilted in the direction of national regulators. At the national scale, domestic regulators are responsible for implementing macroprudential instruments so as to ensure financial stability within their borders. At the EU level, the European Systemic Risk Board (ESRB) was created to ensure coordination and information sharing between national regulators. In addition, the ECB has been attributed the power of imposing tighter regulatory standards over some of the instruments at the national regulator's disposal. Figure 2 below summarizes the competent authorities in the EMU macroprudential framework.

Figure 2: Euro area macroprudential authorities



Source: Margerit et al. (2017)

Finally, we should clarify what constitutes, in practice, macroprudential instruments. The best known type of prudential instrument are minimal capital requirements. To constrain risk-taking behavior, banks are required to hold a minimum amount of own funds as a proportion of their holdings of risky assets. The more capital they hold, the higher their loss-absorption capacity, and the more the bank's shareholders internalize risk. To mitigate structural systemic risks, large and interconnected banks can be asked to hold additional capital that reflects the additional risk they pose to the system. On the time dimension, capital requirements can be adjusted to be more restrictive in boom periods where systemic risk is building up. This is the logic behind the Countercyclical Capital Buffer (CCyB), the instrument at the center of the modeling exercise in chapter 2. Capital regulation is distinctive for its international dimension. To limit

arbitrage, countries across the globe (but especially in Europe) have agreed to the harmonized standards set by the Basel Committee on Banking Supervision (BCBS). The macroprudential dimension was introduced in 2010 by the Basel III accords, which were then transposed into E.U. law by the CRD IV package in 2013⁴. Another important class of macroprudential tools are dynamic restrictions on lending standards. It is typical for banks to face minimal restrictions on the risk profile of borrowers. By allowing these standards to become more restrictive during booms, they can reduce the amount of risky lending that takes place. In contrast with capital regulation, there is much less international harmonization with these instruments, and they are not covered by the ECB's top-up power. Capital regulation and lending standards are some of the most important and discussed macroprudential instruments, but the total possible range of instruments is wide and open to expansion. Our discussion should be understood within the context of the banking sector; meaning that it does not concern the shadow banking sector, a promising avenue for future research given recent trends.

Why does national heterogeneity matter?

As evidenced by the seminal work of Smets & Wouters (2003), it used to be standard for macroeconomic models to study the Euro area as a homogeneous whole, probably due to their overwhelming preoccupation for inflation outcomes. This approach can even be found in more recent models concerned with macrofinancial outcomes, such as Gerali et al. (2010) and Beau et al. (2012). Though policymakers and academics were not ignorant of the real-economy challenges posed by the macroeconomic, institutional, industrial and cultural divergences between the member states; few suspected that persistent differentials in growth, inflation and current account balances were signs of impending systemic risk Lane & Milesi-Ferretti (2007). In fact, the prevailing narrative interpreted internal current account imbalances and accelerated business cycles in the periphery as a benign manifestation that capital in the core (mature economies like France, Germany and the Netherlands) was financing the convergence process in the periphery (countries like Ireland, Spain, Greece, Portugal and Italy who suffered during the crisis), thereby contributing to reducing structural heterogeneity over the long run. Indeed, it was recognized that the Euro area was not an optimal currency area: despite high trade integration and capital mobility, business cycles are desynchronized between a high-income core and an emerging periphery (Bayoumi & Eichengreen, 1992; Dickerson et al., 1998; Belke et al., 2017), labor mobility is insufficiently high (Blanchard & Katz, 1992; Decressin & Fatas, 1995; Smets & Beyer, 2015) and fiscal adjustment is constrained by the Maastricht fiscal rules and the absence of a significant common budget. The hope was that, according to the hypothesis of endogenous optimal currency areas (Frankel & Rose, 1998), unification itself would engender the favorable conditions for the EMU to converge towards an optimal currency area ex-post (De Grauwe & Mongelli, 2005). Intra-area current account imbalances and the booms they allowed in the Periphery were seen as an integral part of this process.

The problem with this rationale is that, in line with pre-crisis mainstream macroeconomics, it was almost exclusively focused on the real economy dimension and neglected macrofinancial considerations. Since then, the literature has uncovered three stylized facts that discredit this benign view of heterogeneity and intra-area imbalances. First, it has now been firmly established that booms in private credit and, to a lesser extent, real estate prices and public debt are the main identifiable drivers of financial crises (Borio & Drehmann, 2009a; Drehmann et al., 2011; Schularick & Taylor, 2012; Reinhart & Rogoff, 2011; Dell'Ariccia et al., 2016) and prolonged

⁴Regulation No 575/2013 on prudential requirements for credit institutions and investment firms (CRR) and Directive 2013/36/EU on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms.

balance-sheet recessions (Mian et al., 2013; Dell’Ariccia et al., 2016; Jordà et al., 2013). This casts the exceptional pre-crisis economic performance of the periphery in a different light: at least part of the convergence achieved during the early years was illusory, as it was underpinned by unsustainable debt accumulation that would eventually be corrected. Second, the leading interpretations of both the GFC and the Euro crisis ascribe a crucial role to cross-border financial flows (Bernanke, 2005; Borio & Disyatat, 2011; Lane, 2013). Unification fostered the precipitous liberalization of historically repressive peripheral banking systems, eliminated currency risk and led to a near absolute convergence in risk-free nominal interest rates. The ensuing bonanza of capital inflows from the Euro area core was essential to the formation of private and public debt imbalances, mirroring emerging market crises in the 80’s and 90’s. Third, we are now conscious of the negative financial stability externalities of loose monetary policy, both through effects on the risky behavior of individual financial agents (Borio & Zhu, 2012; Adrian & Shin, 2010; Dell’Ariccia, 2010) and effects on credit and asset prices. In this sense, the one-size fits all policy of the ECB not only has heterogeneous effects on business cycles, it has heterogeneous national systemic risk externalities. For countries with higher inflation rates, a common monetary stance means lower real interest rates and thus looser financial conditions. Given the unprecedented monetary easing of the last few years and the difficulties of normalization, this element will be of great relevance during the ongoing recovery.

In light of all this, it is worth wondering *“not only whether the euro area is an optimal currency area but also whether it is an optimal macroprudential area”* (Rubio, 2017, p.7). After a thorough examination of the role played by national heterogeneity in the gestation and unwinding of the Euro crisis in chapter 1, we approach the link between national heterogeneity and macroprudential policy from two perspectives. It is standard practice for models that tackle EMU macroprudential policy to account for core-periphery heterogeneity, but the way in which they do this can vary. Brzoza-Brzezina et al. (2015) and Dehmej & Gambacorta (2017) consider the consequences of business cycle desynchronization by subjecting their models to asymmetric shocks, Quint & Rabanal (2014) estimate a model where the core and the periphery are structurally identical but differently parameterized, and Rubio (2018a) examines structural differences in national mortgage markets. An important lacuna of these models is that they fail to integrate cross-border financial flows. We take interest in the relationship of financial dependence that exists between the periphery and the core. As documented by Tola & Wälti (2015), the Euro area real economy is ultimately dependent on core banking systems, since periphery banking systems depend on the liquidity they purvey through the interbank market. The key heterogeneity between the core and the periphery is therefore their structural asymmetric roles on the Euro area interbank market. Our model is close in spirit to Poutineau & Vermandel (2017), in that they also accord a central role to cross-border financial flows and consider heterogeneity of national banking systems. But due to different hypotheses regarding the effects of the CCyB on foreign interbank lending and a different approach to cross-country coordination, our results do not unequivocally favor the status quo of narrowly national implementation of macroprudential policy. In chapter 3, we take interest in a dimension of heterogeneity that has received much less attention: institutional differences between national macroprudential authorities. The above macroeconomic models treat national regulators as though they are identical, but in the spirit of subsidiarity, much freedom was left to the countries in designing their governance apparatus. Most obviously, some have opted for concentrating powers in the central bank (Ireland) or the prudential regulator (Finland), while others have built ad-hoc multi-agency councils (France). However, this only begins to scratch the surface of institutional heterogeneity. By delving deeper into the details, we observe that governance frameworks differ across many important dimensions: the decision-making process can be more or less convoluted, the instrument toolkit can be more or less complete and diluted among the relevant actors, the role of elected officials can be more or less prominent, the degree of transparency and use of

communication can vary substantially. In a study with data from 49 countries, Lim et al. (2013) find that in countries where the central bank is the regulator tend to intervene more quickly and vigorously, so we try to build a qualitative assessment of how all this institutional heterogeneity could translate into different levels of protection against the inherent pressure to intervene too little, too late.

How does national heterogeneity condition the conduct of macroprudential policy in the EMU?

It is important that we clearly delimit the contours of our investigation. As is the case for the bulk of the macroprudential policy literature, our analysis concerns the financial regulation of banks defined as deposit-taking institutions that grant credit, meaning that it need not be applicable to non-bank entities that engage in maturity transformation and credit creation through financial engineering, i.e. shadow banks. Unless specified otherwise, any claims concerning monetary policy refer to standard monetary policy using the interest rate on main refinancing operations, meaning that they need not apply to monetary policy through unconventional instruments. As specified before, we decide to focus on macroprudential policies that address the time dimension of systemic risk, as this is the area of financial stability policy that fits best with macroeconomics; the structural dimension being more the remit of microeconomic banking theory⁵. Methodologically, this dissertation is best situated within the tradition of general equilibrium macroeconomics through simple modeling of aggregate relationships (in the vein of classic elementary models such as the IS-LM model or the Mundell-Flemming model) and political economy/institutional economics, insofar as it considers that the legal and organizational properties of the entities that implement policy as critical to its success.

A general running theme of the dissertation is that, with a subject as novel and broad as macroprudential policy, it is important to go back to basics. Therefore, we devote a substantial effort to scrutinizing and clarifying the elementary concepts that frame the discussions of the field. Far from a mere reflection on semantics, this is key to formulating the intuitions on which we build our model. We believe that the meaning behind the terms used to frame an economic question has a strong influence on how that question is treated, and *à fortiori* on the conclusions reached. The modeling framework typically used to conduct macroprudential policy analysis (DSGE models) was constructed mainly with monetary policy in mind, at a time where economists had been discussing monetary policy for decades if not centuries, and so with little conceptual ambiguity around its objectives and mechanisms. While this does not in any way disqualify the findings achieved by the field so far; it is worth wondering if the profession's reflex to immediately treat the subject with the most state-of-the-art tools available does not at times come at the expense of nuance in the underlying economic intuitions. We must remember that a model is a tool for addressing an economic question in a way that is analytically rigorous and consistent with the scientific method, but even the most sophisticated model can provide misleading answers if the terms of the question fail to acknowledge key complexities of the modeled phenomena. Similarly, our interest in institutional matters is motivated by the recognition that there are many ways in which macroprudential authorities differ from one another, and that these divergences can be consequential for how policy ends up playing out.

This thesis dissertation is structured into three chapters. In the first chapter, we go over some fundamental but often neglected ambiguities regarding financial stability, provide an overview of the literature on macroprudential policy, and expose the past and present vulnerabilities of

⁵This is a very general statement, it is also possible (and necessary) to explore the structural dimension in macroeconomic models but the properties of structural systemic risk make it more amenable to microeconomic models.

the Euro area through graphical analysis; with the aim of building sound conceptual foundations to guide the rest of our analysis. Chapter 2 focuses on the macrofinancial heterogeneity between the core and the periphery of the Euro area, and in particular the consequences of the relationship of financial dependence that exists between the banking systems through their different roles on the interbank market. We use a simple, static two-country framework based on the 3-equation New Keynesian (NK) model to examine whether cross-border spillover effects of the CCyB through the interbank channel can justify a policy regime in which the core regulator internalizes the effects of its policies on the periphery's credit cycle. Chapter 3 tackles two important but so far relatively untreated subjects: institutional heterogeneity and inaction bias. Using a synthetic numerical index that measures a set of qualitative characteristics, we map the institutional heterogeneity of 8 Euro area national regulators and propose a framework for assessing what their idiosyncrasies mean for the vulnerability to inaction bias.

Chapter 1: Financial stability, macroprudential policy and the Euro crisis.

How does the complex concept of financial stability apply to the particular case of the Euro area, and what lessons does the Euro crisis have for macroprudential policy? In contrast to classical macroeconomic policy objectives like price stability and full employment, financial stability is a complex and multidimensional phenomenon that is difficult to define or reduce to a single statistic. Furthermore, a Euro area financial stability objective must be defined by taking into account the particular vulnerabilities of the EMU. But what are these vulnerabilities? How did they manifest during the recent Euro crisis and what are the implications for macroprudential policy and its relationship to other policies? These are all questions that need to be addressed in order to identify the relevant problems that macroprudential policymaking is likely to encounter.

To build a solid conceptual foundation on which to base our analysis of macroprudential policy in a heterogeneous monetary union, we feel that it is necessary to go over the basics of the field and approach the subject from the bird's-eye view. We therefore start with a critical survey of the fundamental literature on financial stability and macroprudential policy, as well as providing a diagnostic of the relevant aspects of the recent Euro crisis through graphical analysis. First, we review the diverse and sometimes contradictory set of definitions that have been proposed for financial stability. Far from a purely semantic exercise, this overview allows us to identify certain ambiguities and points of tension that have consequence on how macroprudential policy is modeled in macroeconomic models. We then survey the state of the literature on macroprudential policy, with a particular focus on its relationship to monetary and microprudential policies, the role of credit as the quintessential systemic risk indicator and target variable, and the modeling of the countercyclical capital buffer. To justify the aspects of the macroprudential policy debate on which we will focus in the rest of the dissertation, we dissect the Euro crisis with a graphical analysis of macrofinancial statistics, emphasizing the core-periphery heterogeneities, the institutional evolutions and the elements of vulnerability that remain to this day.

The preliminary work carried out in this chapter provides guidance for the rest of the dissertation. We formulate definitions for financial stability in the general case and in the special case of the Euro area, by identifying elements from other author's definition that are consistent with our best current understanding of systemic risk and discarding those that seem unadapted. We formally define financial stability as a situation in which when (a) the entities, markets and infrastructures that make up its financial system are not in a state of crisis that induces its widespread dysfunction, (b) the non-financial agents that depend on the financial system for funding present expenditure are not significantly affected by said dysfunction such that the broader economy does not suffer noticeable costs and (c) the financial system is not propiti-

ating the accumulation of financial imbalances that could in the future result in (a), (b) and negatively distort the economy’s long-term production capacities. We subsequently define **Euro area financial stability as a situation where no subset of member states is in a state of instability grave enough to threaten the stability of other member states or, in the worst scenario, the integrity of the EMU.** The material and often ignored element in the previous definition is the interdependence between the stability of member states. Crucially, the practice of measuring EMU systemic risk as the weighted average sum of national systemic risks (as is implicitly done in macroeconomic models) may underestimate the benefits of macroprudential rules that target area-wide (as opposed to national) stability. We also identify **a tension between a vision of macroprudential policy as a way of ensuring system resilience and another one that sees it as a tool for credit stabilization.** In fact, it is this tension that could make the CCyB vulnerable generate cross-border spillover effects of the kind we model in chapter 2. Finally, our diagnosis of the causes and mechanisms of the Euro crisis justifies our focus on macrofinancial heterogeneity between the core and the periphery; and show that though the EMU has become more resilient, it remains vulnerable to the bank-sovereign doom loop due to its institutional lacunae.

Chapter 2: Cross-border spillovers of macroprudential policy in the Euro area

How should macroprudential regulators set the CCyB in the presence of cross-border spillovers? Core and periphery banks play a heterogeneous role on the Euro interbank market: core banks have privileged access to ECB funds, periphery banks cover their refinancing needs by borrowing liquidity from core banks. This creates a situation of financial dependency that makes financial conditions and the credit cycle in the periphery dependent on the lending decisions of core banks. Because the activation of the CCyB will influence the conditions on which core banks lend to their counterparts in the periphery, it follows that macroprudential policy in the core can generate a cross-border spillover effect through the interbank market and accelerate the credit cycle of its neighbor. **On account of this spillover and the interdependence of financial stability between EMU member states, should regulators always focus exclusively on regulating the national credit cycle? Or can a better result be achieved if the core regulator internalizes the spillover effect?**

To address these questions, we compare the performance of a national macroprudential rule based on the status quo and an alternative rule with internalization in a **simple, static, core-periphery general equilibrium model based on the 3-equation New Keynesian model.** To assess the relative merits of different policy regimes, the standard approach in macroeconomics is to compare their performance in a general equilibrium model simulation. The theoretical literature on macroprudential policy in the EMU has predominantly used Dynamic Stochastic General Equilibrium (DSGE) models with a two-country core-periphery structure for this task (Quint & Rabanal, 2014; Brzoza-Brzezina et al., 2015; Poutineau & Vermandel, 2017; Rubio, 2018b). Fully-fledged DSGE models are powerful tools that bridge the macro and micro dimensions of the economy by deriving the relationships of aggregate variables from microfoundedations, can simulate the impact of shocks across several successive time periods and can fit the data in a way that rivals macroeconometric models. However, as argued by Korinek (2018), the complexity of DSGE modeling demands very strict methodological restrictions that can limit the scope of ideas the researcher can explore: the approach is biased towards models with a well-behaved ergodic steady state, not every important stylized fact can be reproduced from microeconomic optimization problems of representative agents, among others. Reproducing the behavior of capital flows in DSGE models is particularly challenging⁶, so it is not uncommon

⁶Of the models cited above, only Poutineau & Vermandel (2017) incorporate financial integration in a way

for authors to resort to simpler models when studying questions of international coordination and cross-border financial spillovers of macroprudential policy (Jeanne, 2014; Korinek & Sandri, 2016). While such models may lack the theoretical purity of a fully-fledged DSGE, they offer an intuitive and tractable framework to get an initial understanding of macroeconomic phenomena based on stylized aggregate relationships. According to Blanchard (2016), highly stylized models like the Mundell-Flemming model or variations of the classic IS-LM can play a complimentary role to DSGE models, providing a less restrictive and transparent environment to get a first idea of the effects of a mechanism or policy; and whose results can later be tested in a more sophisticated model.

One model in this category is the 3-equation New Keynesian (NK) model, as described in Poutineau et al. (2015). This model is a reduced-form representation of the canonical New Keynesian model that serves as the reference for most DSGE analysis⁷, meaning that it consists of the basic relationships between the fundamental macroeconomic variables without explicitly including the microfoundations that underpin them. Of course, the elementary microfoundations are implicit: the IS curve, linking output to the interest rate, is derived from the intertemporal utility maximization program of a representative consumer; while the New Keynesian Phillips Curve, linking inflation to output, is derived from a profit maximization problem where supply does not adjust perfectly to demand in the short run because a fraction of firms with market power are price-makers. We use this framework as the basis for the real economy block of our model. To introduce a banking sector, we take inspiration from the IS-LM-CC model by Bernanke & Blinder (1988), augmenting the NK model with a financial frictions equation that results from the equilibrium between supply and demand of bank loans. Using this as an identical template for our two countries, we add national heterogeneity and financial integration through a cross-border interbank market where periphery banks provide the demand and core banks the supply. Finally, we add a countercyclical capital buffer that, for each country, influences the credit supply by adjusting the capital requirements ratio, and therefore the amount of capital necessary to extend a marginal unit of credit. Because a tightening of the capital buffer encourages the core bank to substitute domestic lending with foreign interbank lending, there is a spillover effect. We then test the performance of two rules: a national stabilization rule where each regulator stabilizes credit growth within its jurisdiction, and an internalizing rule where the core regulator partially internalizes the spillover effect. We calibrate the model's parameters to Euro area data and run a static simulation of different combinations of demand shocks⁸.

Key features of the model include:

- Asset-side substitution causes the spillover effect: Usually, the CCyB is modeled to reduce all types of lending in bank portfolios. However, it is possible for banks to respond to higher capital requirements by increasing the share of low-risk assets, including interbank claims (Jacques, 2008; Jokipii & Monnin, 2013; Francis & Osborne, 2012; Heid et al., 2004). If this is the case, then a higher CCyB in the core will increase the supply of interbank loans to the periphery. In our model, a tighter CCyB will result in a reduced domestic credit supply but an increased interbank loan supply.
- A different approach to the alternative macroprudential policy rule: So far, the EMU macroprudential literature has only evaluated national stabilization rules by comparing them to “federal” or “supranational” rules that stabilize the aggregate credit of the Euro area (Brzoza-Brzezina et al., 2015; Poutineau & Vermandel, 2017). Consistent with the

that captures the patterns in cross-border flows that were behind the crisis.

⁷See, for example, Woodford (2003) or Gali (2008).

⁸As shown in Poutineau et al. (2015), analysis of the static equilibrium can give an indication of the behavior of the variables in a dynamic framework.

definition of Euro area financial stability we specify in chapter 1, we propose a different type of rule in which the core regulator internalizes the spillover by including the periphery's credit cycle in its loss function.

- Evaluation criterion: Consistent with the Basel III implementation framework for the CCyB, we consider that each regulator wants to stabilize credit growth around a target value that it considers sustainable. Each regulator's loss is computed as the difference between growth of credit at equilibrium and its target value, and the union-wide loss is the sum of the two regulator's losses. We use the union-wide loss as the criterion to choose between the rules.

The key finding of the exercise is that, **in certain circumstances, it is in the interest of union-wide stability that the core regulator internalizes the spillover.** We subject the model to different combinations of demand shocks to simulate different growth scenarios. In the case of asymmetric shocks, the national stabilization rule offers the better performance. When shocks are symmetric, the preferable rule will depend on the intensity of the shocks. If the combined effect of the shocks is strong enough, the periphery's CCyB reaches its upper bound and at this point the regulator is no longer able to stabilize domestic credit. It is at this point that the internalization rule starts delivering better area-wide results, but at the expense of a weaker performance in the core. The core regulator effectively tolerates a stronger than ideal credit boom at home to reduce the credit boom in the periphery, and this has a positive net effect at the union level. If this is indeed the case, then it is worth wondering if the top-up power of the ECB should be expanded to set looser policy stances as well as tighter, as it is the only institution with an ostensibly legitimate mandate to privilege area-wide stability.

Chapter 3: Governance frameworks of macroprudential policy in the Euro area: How well do they guard against inaction bias?

In what respects do the national governance frameworks differ from one another, and what does this heterogeneity mean for the vulnerability to inaction bias? In the realm of monetary policy, it is agreed that operational independence of the central bank is a key institutional quality necessary for achieving the price stability mandate (Rogoff, 1985; Grilli et al., 1992; Dincer & Eichengreen, 2014). Likewise, it is likely that the quality of macroprudential policymaking will be affected by the institutional characteristics of the authorities in charge of implementing it. In particular, governance frameworks should aim to protect against the inaction bias inherent to macroprudential policy, i.e. the tendency of regulators to intervene less often and less vigorously than needed (ESRB, 2014). To the extent that national governance frameworks differ considerably between EMU member states, it follows that this institutional heterogeneity could mean that not all countries are equally vulnerable to inaction bias. **But how do institutional characteristics affect inaction bias? How do these characteristics vary across member states? By observing this variability, is it possible to measure a country's *a priori* vulnerability to inaction bias?**

This is relatively uncharted territory, as there is nothing in the way of an indicator to account for institutional heterogeneity of macroprudential regulators and its relationship to inaction bias. **The purpose of chapter 3, therefore, is to fill such a gap by constructing an inaction bias vulnerability index.** To measure a qualitative property like central bank independence, the standard approach has been to create synthetic indicators that attempt to include a maximum amount of factors susceptible of affecting independence and whose variability can be observed by the researcher. For example, Crowe & Meade (2008) identify the stability and independence of the chairman's appointment, the degree of government involvement, the priority accorded to the price stability objective in the legal mandate and the degree

of restrictions on public debt monetization as the essential criteria by which independence is measured. They then assess the performance of a central bank in each of this criteria according to observable characteristics. For example, the conditions of the chair’s appointment process is evaluated by observing who appoints the chair (the board or the government), the length of his/her mandate and whether the appointment is subject to dismissal. Following a similar logic, Lombardi & Siklos (2016) construct an index for measuring the “macroprudential deployment capacity” of central banks in 46 countries, which is to our knowledge the only indicator of this kind pertaining to macroprudential policy. Their index is highly rich in information as it covers a large amount of characteristics, but this very richness could make it hard to interpret. It is claimed that the index describes how macroprudential frameworks are organized, but it covers a very wide range of dimensions without clarifying how these map into the broader concept of “deployment capacity”; it is not entirely clear what it means for a country to be better ranked than another. In trying to make it too broad, the readability of the indicator suffers.

Based on a similar approach to Lombardi & Siklos (2016), we have decided to build a smaller index (in terms of dimensions and characteristics considered) that responds to a clear question: all other things equal, how does the governance framework protect against the bias to inaction? Inaction bias, the temptation to disproportionately err on the side of inaction when making policy decisions in an uncertain environment, has been identified as a major political economy risk (ESRB, 2014). Therefore, making this the object of our index makes it useful and easy to interpret. As to the criteria that will factor into the index, we identify them based on the seminal work by Nier et al. (2011) on the diversity of governance frameworks, where the two fundamental criteria are the regulator’s power and willingness to act. An important challenge in this exercise is controlling for the author’s subjective appreciation. For this reason, we systematically base our observations on the assessments made by the International Monetary Fund (IMF) and the Financial Stability Board (FSB), two institutions that have had great involvement in the construction of governance frameworks across the globe, thereby deferring to their expert judgment whenever possible. The index, measured on a scale of 0 to 100, should be interpreted as being ordinal and not cardinal; meaning that a country with a score of 50 should be considered as more vulnerable than one that scores 100, but not twice as vulnerable. It follows from this that the index is comparative in nature: a low score means that, all other things equal, publicly available information indicates that this country is *à priori* more vulnerable than its Euro area peers. It does not provide an absolute measure of vulnerability; as even the countries with the lowest scores (50) received mostly favorable reviews in the IMF/FSB reports. Finally, it should be noted that the case of Spain was notoriously difficult to evaluate, as their macroprudential framework is currently in the middle of its reform process.

We narrow down the determinants of the vulnerability to inaction bias to six elements that will work as the subcriteria for the index. To determine the power to act, we evaluate the coordination mechanisms that ensure information sharing and consistency of action across institutions, the degree of completeness and control of the regulator over the macroprudential instrument toolkit, and the level of independence of the decision-making process. As for the willingness to act, we consider the number of decision-making instances at which a measure can be blocked (decision-making expediency), whether the formulation of the legal mandate encourages proactive policymaking, and the level of transparency and use of communication. After computing the index for 8 Euro area countries, we notice that **the protection against inaction bias *à priori* seems variable across different national governance frameworks.** Importantly, we find that **the choice of institutional arrangement** (that is, the decision to concentrate macroprudential policy in a single institution or spread it across several) **is not necessarily indicative of the quality of the overall governance framework.** In fact, the two countries that get a full score, France and Ireland, feature very different governance frame-

works. The Irish framework presents the most radical case of concentration within the central bank; it outperforms other arrangements of its type (Belgium, Spain and the Netherlands) by placing little limitations on its power and reach, all the while establishing strong checks on accountability. The French framework, on the other hand, succeeds in making a strong multi-agency body by treating it like a full macroprudential authority on its own right and giving the central bank a strong role; as opposed to the frameworks in Germany and Austria where the authority of the multi-agency body seems more diffuse. Overall, this shows that **there is no “one-size-fits-all” way of designing a governance framework; robust frameworks may be built following different models as long as they conform to sound design principles.**

Chapter 1

Financial Stability, Macroprudential Policy and the Euro Crisis

1.1 Conceptualizing Financial Stability

If one sees in the macroeconomic policymaker a parallel to a physician seeking to treat a diseased organism, then it is fundamental to properly characterize healthy and unhealthy states of nature. In this respect, decades (if not centuries) of experience and theory have given fiscal and monetary authorities a solid foundation to build upon. There are reasonable debates to be had on how well GDP captures value creation and its relationship to human welfare, but the fiscal policymaker need only look at the evolution of output and employment to decide a stance¹. For central bankers following inflation targeting regimes, the concept of price stability has been so formally defined that the level of the indicator associated to it, a target value for the annual growth in general prices, is often inscribed into the legal statutes (as is the case for the ECB). In contrast, the macroprudential regulator faces a proverbial challenge: it must articulate policy around a vague, complex and intractable objective upon which there is no universally agreed definition. Financial crises have always been a feature of market economies (Taylor, 2015; Reinhart & Rogoff, 2011; Minsky, 1986; Kindleberger, 1978), occurring on average every 15-20 years for the typical industrialized country between 1870 and present day (Taylor, 2015). Nonetheless, formally conceptualizing financial stability appears to have become an item of the research agenda only after the Asian crisis of the late 1990's. We will go over some of the definitions that the literature has proposed in order to craft a working definition that can guide this dissertation. Most of this literature predates the crisis, so we will also see how they stand in the context of our now-enriched understanding of financially complex economies. The authors stem from broadly shared notions but can be quite divergent when it comes to the details. These divergences, which can be traced to differences in world views of the financial system, will be key in achieving an operational definition that can be of use to the regulator.

First, a proper definition must tell the regulator where in the economy his jurisdiction starts and where it ends. In this sense, it is imperative to recognize that gauging financial stability should go beyond assessing the health of the financial sector and the agents that compose it. However, broadening the scope too much poses the risk that the regulator's reaction function will become overdetermined by phenomena that have a link to financial stability but are not among their irreducible elements. As such, one definition that may suffer from this was proposed by Foot (2003):

“... we have financial stability where there is: (a) monetary stability; (b) employment levels close to the economy's natural rate; (c) confidence in the operation of the generality of key

¹That is, strictly from a perspective of macroeconomic stabilization.

financial institutions and markets in the economy; and (d) where there are no relative price movements of either real or financial assets within the economy that will undermine (a) or (b)”

Stated as such, this definition basically includes full employment and price stability as pre-requisites to financial stability, not accounting for the many occurrences across the business cycle where they are violated but are not commonly thought of as financially unstable (for example, the stagflation of the 1970’s). On the other end of the spectrum, a definition may succeed in describing a set of situations that correspond to instability but be too narrow to encompass all the relevant elements. Such is the case of that put forth by then general manager of the BIS, Andrew Crockett (Crockett, 1996, p.532):

“I will define financial instability as a situation in which economic performance is potentially impaired by fluctuations in the price of financial assets, or in the ability of financial intermediaries to meet their contractual obligations.”

Here, the author may be underestimating the complexity of the phenomenon, as the two potential causes he lists, volatility of asset prices and bank solvency risk, are only some of the most important. Notably, the subprime mortgage crisis has alerted us of the dangers of funding liquidity risk, financial innovation and shadow banking; while the Euro crisis shone a light on the up-to-then neglected sovereign risk in advanced economies. In this respect, we believe that the formulation of Allen and Wood strikes the proper balance, as it keeps the phenomenon general enough while anchoring in the financial sphere (Allen & Wood, 2006, p.159):

“We define episodes of financial instability as episodes in which a large number of parties, whether they are households, companies, or (individual) governments, experience financial crises which are not warranted by their previous behaviour, and where these crises collectively have seriously adverse macro-economic effects”

There are several interesting elements to unpack. First, the criterion, shared by most authors, of severe negative spillovers to the real macroeconomy is made here explicit. Second, it understands that many financial crises do not typically start in the financial sector, because for the financial sector to lend excessively, non-financial agents must borrow in excess. Third, it specifies that the stress undergone by the agents in question is “unwarranted by its behavior”. Here, the authors wish to underscore a phenomenon that is characteristic of many systemic crises: pure contagion, or the fact that entities with sound fundamentals are affected by the crisis. At the same time, it is included in part to address a very challenging implicit tension: financial stability must allow room for market discipline, meaning situations in which excessive risk-taking is sanctioned by markets, for example through a default. Put otherwise, what distinguishes a state of instability is the presence of “innocent bystanders” that feel the aftershocks of the unraveling of risk. While this is indeed a hallmark of financial instability, a systemic crisis happens whenever a critical mass of agents (in terms of size but also interconnectedness) is affected by a large enough shock, irrespective of whether or not it is “warranted”. When the bursting of the real-estate bubble took down the Spanish savings banks in 2010-2011, few can argue that they were not responsible of their bad investments; but this did not make the crisis less systemic. To go back to our question, a proper definition of financial stability must have the financial sector at its epicenter and main field of action for the macroprudential regulator. But, since a distinguishing feature of financial instability is the presence of significant macroeconomic consequences, it will also incorporate the transmission channels between the financial and real sphere of the economy.

Another commonly used criterion is the degree to which the financial system is inhibited

from its functions. If one defines financial instability as a state where the financial sector cannot perform its elementary function with sufficient success, then a lot hinges on what that function is perceived to be. For example, Mishkin highlights the informational role of the financial system (Mishkin, 1999, p.6):

“Financial instability occurs when shocks to the financial system interfere with information flows so that the financial system can no longer do its job of channeling funds to those with productive investment opportunities.”

Underlying this definition is an assumption that a natural “good” state of the financial system is one in which information flows freely and fluidly, which is sufficient for yielding an optimal allocation of capital. Informational issues play an important role in episodes of instability: the collapse of wholesale funding markets that followed the Lehman shock was motivated in large part by market participants fleeing uncertainty regarding bank’s exposures to the mortgage market. However, this is only one of the dimensions of financial instability. As shown by the seminal work of Diamond & Dybvig (1983), it is enough for creditors to be unable to coordinate to precipitate a bank run even if they have access to the same information. What’s more, and this is a critique addressable to most of the definitions we list, there is a focus here on the immediate symptoms of financial instability (entropy-inducing volatility) and not enough on its ultimate causes: the shocks that Mishkin mentions seem to appear exogenously. More interesting is what is said at the end regarding the channeling of funds to investment. To assess functionality, it is important to take into account the macroeconomic role of finance: to facilitate the realization of value-creating investments by managing the allocation of funds. Following this train of thought, Haldane et al. propose the following (Haldane et al., 2005, p.2):

“Conceptually, financial stability can be thought to be, on the one hand, about having a financial system which enables individuals to smooth consumption over time in the face of shocks; and, on the other, about the efficient financing of investment projects with saved resources. At root, it is about the saving-investment nexus. On this broad definition, financial instability is any deviation from the optimal saving-investment plan of an economy which derives from the malfunctioning of its financial system.”

So far, the definitions reviewed have sought to describe the possible range of situations that we would commonly associate with financial crises and their common factors, but here Haldane tries to push the concept of instability a bit further. Crucially, the notion that financial instability includes situations where the financial sector guides the allocation of credit and savings in a macroeconomically suboptimal direction extends the time horizon over which instability may be observed and has the virtue of including the processes that lead to crises and not just the symptoms of crises themselves. Indeed, a concept of instability that is too focused on crisis episodes is of limited use as a normative guide for preventive policy. The recent empirical literature on financial crises and the financial cycle (Borio, 2014a; Borio et al., 2012; Schularick & Taylor, 2012) has shown that financial crises are outcomes determined over a time horizon that is years or even decades longer than the crisis episode itself. Notably, financial crises are typically preceded by unusually prolonged and pronounced booms in credit and asset prices, often in the less productive sectors of the economy. These macrofinancial imbalances are accumulated during periods of growth and apparent calm, yet their formation is the driving force of crisis outcomes. The financial sector appears to be performing its growth-enhancing function, but liabilities are accumulating based on unreasonable assumptions and it is their inevitable correction that triggers the crisis. Therefore, the concept of financial instability must describe not only the properties of the crisis (the collapse of asset values, breakdown of trust in markets, widespread defaults etc...) but also the long-term macrofinancial processes that sow its seeds

(the accumulation of unsustainable imbalances)². Fergusson also introduces a definition of financial instability in a similar vein (Fergusson, 2002, p.209):

*“... a situation characterized by [...] three basic criteria: i) some important set of financial asset prices seem to have **diverged sharply from fundamentals**; and/or ii) market functioning and credit availability, domestically and perhaps internationally, have been significantly distorted; with the result that, iii) aggregate spending deviates (or is likely to deviate) significantly, **either above or below** , from the economy’s ability to produce.”*

Regarding criteria i and iii, we would like to emphasize how the author includes distortions of the kind that typically precede crises, and that financial instability is as much about the boom as it is about the bust. This describes well the dynamics that were present in Ireland and Spain in the run-up to the Euro crisis: a credit-fueled boom in real-estate prices propped up demand for several years without increasing the economy’s productive capacity, resulting in persistent current account deficits. We see that in this strand of definitions, the notion that financial instability is a gradual, dynamic process is key. In fact, Schinasi (2004), in a deliberate effort to offer as general a definition as possible, criticizes most approaches for painting a binary picture: authors imagine two states of nature, stability and instability. Instead, he posits that the system fluctuates continuously along a spectrum defined over many dimensions that can be captured, albeit imperfectly, by observable variables. For example, one can imagine a simple case where only two elements determine system stability: the capitalization of banks and the liquidity of investment funds. In such a case, a range of stability may be defined by all the combinations of capital and liquidity ratios that ensure that the system continues to accomplish its functions satisfactorily. Generalizing this principle, he writes (Schinasi, 2004, p.8):

“Broadly, financial stability can be thought of in terms of the financial system’s ability: (a) to facilitate both an efficient allocation of economic resources—both spatially and especially intertemporally—and the effectiveness of other economic processes (such as wealth accumulation, economic growth, and ultimately social prosperity); (b) to assess, price, allocate, and manage financial risks; and (c) to maintain its ability to perform these key functions—even when affected by external shocks or by a build up of imbalances—primarily through self-corrective mechanisms. A definition consistent with this broad view is as follows: A financial system is in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and of dissipating financial imbalances that arise endogenously or as a result of significant adverse and unanticipated events.”

Schinasi’s concept of spectrum puts the finger on an important question: if a system can fluctuate between states of relative stability, then what is the level of stability that society should expect that the policymaker delivers? The previous line of argumentation, for which a healthy relationship between the financial sector and the economy at large is central to financial stability, has received some push-back from authors that see it as overreaching and recommend that the notion of stability be re-centered around system resilience. Tucker (2016) stresses that, because finance is an inherently uncertain and risky practice, failure to prevent crisis is unavoidable; and that if the regulator defines its benchmark of financial stability too ambitiously and outside of its means, it risks harming its own credibility. As such, he posits the following (Tucker, 2011, p.4):

“financial stability prevails where the financial system is sufficiently resilient that worries

²Schinasi is explicitly supportive of this view, declaring that *“the concept of financial stability relates not only to the absence of actual financial crises but also to the ability of the financial system to limit, contain, and deal with the emergence of imbalances before they constitute a threat to itself or economic processes”* (Schinasi, 2004, p.6).

about bad states of the world do not affect confidence in the ability of the system to deliver its core services to the rest of the economy”

Padoa-Schioppa (2002) (p.25) is supportive of this rationale, defining financial stability as “*a condition where the financial system is able to withstand shocks without giving way to cumulative processes, which impair the allocation of savings to investment opportunities and the processing of payments in the economy*”.

There is therefore a tension between, on the one hand, a relatively minimalist vision of financial stability that stops at demanding that the system is resilient enough to withstand shocks (Tucker, 2011; Padoa-Schioppa, 2002) and, on the other, a more ambitious one that demands that the financial sector is not playing a destabilizing role for the economy at large (Haldane et al., 2005; Fergusson, 2002; Schinasi, 2004). This tension, often not sufficiently accounted for by the macroeconomic literature, nonetheless has consequences for policy design. An example of this is the countercyclical capital buffer, an instrument that will be examined in length in chapter 2. Conceived by the Basel Committee mainly as a tool to strengthen resilience, both the macroeconomic literature³, and certain central banks⁴ treat it as a tool to stabilize aggregate credit. It is difficult to say which of these two approaches is the more appropriate one in the general case, but can something be said in the case of the Euro area?

The factors that ended up producing the Euro crisis are many and complex, and we will explore them in depth in section 1.5 and chapter 2; but to craft a working definition of financial stability that can be used to guide macroprudential policies, two EMU-specific facts are of relevance. The first is that the heterogeneous macrofinancial environments of member states, captured among other things by marked differentials in real interest rates and the elasticity of national financial cycles, had a capital role in the gestation of the crisis. The second is that, due to the singular level of interdependence created by the single currency, the financial stability of a member state is heavily contingent on that of its peers. A national banking system may be considered stable under the resilience criterion, but at the same time be creating dangerous imbalances in another country through its cross-border activity. This may not create a sufficient level of exposure to threaten the bank’s resilience, but it could destabilize the host country that receives the capital flows. If this were to lead to a crisis of the scale that was seen in 2011-2012 that involves an existential threat to the common currency; any national banking system may be threatened regardless its initial resilience. For these reasons, we believe that a resilience-centric definition would not be suited, and that financial stability in the EMU should be defined along the lines of the holistic view. We therefore posit the following:

Definition: National Financial Stability

Financial stability prevails within a national jurisdiction when (a) the entities, markets and infrastructures that make up its financial system are not in a state of crisis that induces its widespread dysfunction, (b) the non-financial agents that depend on the financial system for funding present expenditure are not significantly affected by said dysfunction such that the broader economy does not suffer noticeable costs and (c) the financial system is not propitiating the accumulation of financial imbalances that could in the future result in (a), (b) and negatively distort the economy’s long-term production capacities.

Several phrases warrant comment. In criterion (a), we opt to remain deliberately agnostic on the specific situations that define a crisis scenario. There is, as we saw, seemingly arbitrary variability on behalf of the authors regarding which elements to include and to exclude, even if

³This refers to virtually the entire general equilibrium literature on this instrument.

⁴For example, the Central Bank of Ireland.

certain ingredients like asset price volatility tend to reappear more than others. Following Schinasi (2004), a recognition that instability is a multidimensional phenomenon whose components are in continuous evolution discourages us from attempting an exhaustive list, leaving it to the regulator's judgment to adjust to the context at hand. This dissertation will have a strong focus on the macro variable whose influence in financial stability is most undisputed: credit. Criterion (b) captures the property, specified by most authors, that financial instability sets itself apart due to its negative spillovers to the real economy. In this sense, the stock market crash of 1987 or the bursting of the dot-com bubble, despite causing acute stress within the financial sector, are not considered episodes of financial instability given their modest macroeconomic consequences. Finally, following Haldane et al. (2005), criterion (c) introduces the long-term dimension and explicitly acknowledges the role of the financial sector in shaping the composition of the economy. A more succinct reformulation may simply state that financial stability denotes a condition in which the financial system is neither in a state of crisis with macroeconomic consequences, nor is it generating the conditions for one such crisis in the future. Having defined national stability, we use this notion to derive a definition for EMU-wide financial stability that is sensitive to the interdependence between members:

Definition: EMU-specific Financial Stability

Financial stability prevails at the area level when no subset of member states is in a state of instability grave enough to threaten the stability of other member states or, in the worst scenario, the integrity of the EMU.

The main point of this definition is to emphasize that a group of member states (or even a single one if it is systemic enough) has the potential to destabilize the entire EMU. This is a reality that was revealed during the recent Euro crisis (see sections 1.5 and 2.5). During its first phase, the crisis affected countries that had accumulated deep public and private external debt imbalances and as such failed to meet the criteria for national financial stability. But their individual circumstances did not degenerate in isolation, contagion played a determinant role. While all the peripheral countries had their frailties, their sovereigns were punished above and beyond what was justified by market fundamentals whenever the conditions of their peers deteriorated (Tola & Wälti, 2015; Martin & Zhang, 2017; De Santis & Stein, 2016; Beirne & Fratzscher, 2013). In the most acute moments of the crisis, contagion on the sovereign bond market was starting to affect some core countries. Instability did not reverse its trajectory until Mario Draghi's "*whatever it takes*" speech, confirming that the panics of investors were partially motivated by a loss of trust in the EMU itself. Had this dynamic been allowed to continue, the sovereign-bank doom loop would have threatened the stability of national banking systems that were otherwise healthy. As we will see in our modeling exercise in Chapter 2, one of the important implications of this definition is that, supposing that one decides on a single measure of instability, the area's level of instability cannot be equated to the weighed average instability of its members. In fact, once a certain critical economic mass becomes concerned by the crisis⁵, the whole area might be in danger.

In summary, while it would be intuitive to assume that academics and policymakers working in the field of financial stability do so with a shared understanding of the term, a survey of the efforts to rigorously define it reveals conceptual diversity. We believe that, to be consistent with our current knowledge of the phenomenon, financial instability must include both the immediate symptoms and long-term causes of financial crises, evaluate not only the financial system's self-contained resilience but how well it performs its role in the economy and, for the case of the

⁵Of course, this critical value is not a constant of the system and can hardly be observed ex-ante, and it is not just a question of mass but also its distribution the severity of the crisis. Likewise, it is affected by structural change: breakthroughs like Draghi's speech or the creation of the banking union make the union more resilient and push this threshold up.

Euro area, be especially mindful of international interdependence. As we will see in Chapter 2, the choices made in defining financial stability are not trivial; in fact they may affect what macroprudential policy stance seems most appropriate in a given scenario.

1.2 The emergence of macroprudential policy as the missing pillar of macroeconomic management

The extent to which the GFC instigated a major shift in the direction of the macroeconomic agenda, both in academia and policy, cannot be understated. Dia & VanHoose (2017) review the recent history of how banking has been apprehended in macroeconomic models. Starting in the 1990's, the growing predominance of Real Business Cycle (RBC) and New-Keynesian models relegated the banking sector to a marginal role of a quasi-neutral intermediary between savings and investment whose internal mechanics mattered little for the determination of business cycles. As the borders between intermediated and market finance became increasingly blurred by innovations such as securitization; the hypothesis that banks could be considered as analogous to direct finance was not called into question. Alongside this relative disinterest on the side of theory, a sense of complacency settled among central bankers and regulators as to what policies were necessary to secure financial stability. On the one hand, the widespread success of inflation targeting regimes in taming inflation popularized the idea that monetary stability had been instituted. In the monetarist tradition that was still influential among central bankers at the time⁶, this also implied financial stability was ensured. On the regulation front, balance sheet requirements were set exclusively according to a microprudential logic whose ultimate objective is to ensure the soundness of individual institutions and the protection of investors. Implicitly, this view is based on the hypothesis that ensuring the soundness of individual banks is sufficient to ensure the soundness of the banking system as a whole; a principle that would later be exposed as a fallacy of composition by the GFC. It was under this intellectual environment that Robert Lucas (Lucas, 2003, p.1), in his capacity as president of the American Economics Association, contended that the “*central problem of depression prevention has been solved, for all practical purposes, and has in fact been solved for many decades*”.

In parallel to this, a more skeptical view of money, finance and the policies that influence them had been gradually taking shape in international organizations; notably at the Bank of International Settlements (BIS) and, to a lesser extent, the IMF⁷. At the BIS the idea that banking regulation should take interest in macrofinancial developments was emerging as early as the 1970's. Clement (2010) traces the lineage of the term “macroprudential” to a 1979 meeting of the Cooke Committee (an earlier form of the Basel committee). In this instance, it is used to designate concerns about the accelerating pace of foreign lending to developing countries. The term reappears in a Bank of England internal document commissioned by BIS adviser and future general manager Alexandre Lamfalussy⁸. Here, the idea of using prudential-type instruments to constrain the pace of cross-border credit is floated for the first time. The term subsequently faded into obscurity, before being resurrected in the wake of the 1997 Asian crisis. It was at this point that interest for financial stability matters came to the forefront of the BIS research agenda, one of whose objectives was the development of a macroprudential approach to financial supervision and regulation.

Of particular relevance is the seminal essay by Borio (2003), in which he formalizes and elab-

⁶The ECB's policy strategy initially included a “monetary pillar” based on an annual growth target for M3.

⁷For some of the earliest contributions in this view see Borio et al. (2001), Timmermans (2001), Bordo et al. (2001), Demirguc-Kunt & Detragiache (1998).

⁸See also Maes (2010) for an account on the role of Lamfalussy and the BIS in the birthing and early promotion of the macroprudential approach.

orates on the distinction between the macroprudential and microprudential views. While the microprudential regulator seeks to protect investors and depositors from the risks undertaken by the individual banks that manage their assets, the macroprudential policymaker protects the economy from the large-scale risks that the financial sector periodically generates. An important point of distinction is the nature of the aforementioned risks. The microprudential view sees risk as exogenous, a parameter of the state of nature given by processes independent of the bank's behavior. In contrast, the macroprudential view recognizes that the decisions of banks impact the environment that determines their individual risk exposure, especially when they are large and interconnected. In other words, risk is endogenous, and so overall risk is determined not only by the aggregation of individual exposures but the degree to which they might be correlated, and by sudden reversals in market-wide conditions. Table 1.1 below summarizes the key differences between the two approaches in his view.

Table 1.1: The macroprudential and microprudential views

	Macroprudential	Microprudential
Proximate objective	limit financial system-wide distress	limit distress of individual institutions
Ultimate objective	avoid output costs	consumer (investor / depositor) protection
Model of risk	(in part) endogenous	exogenous
Correlations and common exposures	important	irrelevant
Calibration of prudential standards	in terms of system-wide distress, top-down	in terms of risks of individual institutions, bottom-up

reproduced from Borio (2003)

Borio (2003) also elaborates on the notion of systemic risk by decomposing it along two dimensions that regulators can target: the structural and time dimensions. The structural or cross-sectional dimension focuses on assessing the distribution of vulnerabilities across the financial system accounting for the aforementioned endogeneity of risk. Here, the policymaker will be focused on mapping the channels through which a shock to an individual entity can spread across markets and entities, assessing which entities may have a disproportionate influence on systemic stability, identifying concentrations of exposures to particular assets or funding sources. This is perhaps the most well-known of the two dimensions of systemic risk as it is easier to bridge it to microprudential policy in that it can be defined predominantly in terms of the internal mechanics of the financial sector. The time dimension, on the other hand, fits better within the macroeconomic policy tradition (Borio, 2011), as the long-term dynamics between the financial sector and the real economy take center stage. The policymaker examines how macrofinancial imbalances build up and unwind, following cyclical patterns over long time horizons. The relevant phenomena to monitor are persistent misalignments in asset prices (in particular those of real estate or the national currency), irregular expansions in aggregate lending, leveraged overinvestment unjustified by fundamentals and excessive maturity and currency mismatches. Prudential standards are tightened to slow down the growth of these imbalances during booms to prevent them from attaining untenable dimensions (a.k.a. leaning against the wind), and subsequently released to soften the painful adjustments caused by their sudden unwinding (such as credit crunches); thus reducing procyclicality. Recalling our definition for national financial stability, we could say that the structural dimension addresses the financial sector's near-term vulnerability to a crisis, while the time dimension addresses the long-term macrofinancial processes that give rise to that vulnerability. Resilience-based definitions of fi-

1.2. THE EMERGENCE OF MACROPRUDENTIAL POLICY AS THE MISSING PILLAR OF MACROECONOMIC MANAGEMENT

nancial stability (Tucker, 2011; Padoa-Schioppa, 2002) emphasize the structural dimension but tend to minimize the role of the time dimension or are skeptical of whether prudential policy can and should respond to it. The more holistic definitions acknowledge the importance of addressing both. In our interpretation, the structural dimension extends the scale of risk from the financial institution to the financial system, while the time dimension does the same from the financial system to the broader economy. As this dissertation wishes to contribute mainly to the literature from macroeconomic and political economy points of view, we will have a stronger focus on the time dimension.

It is important to understand how macroprudential policy fits within the broader policy framework. The first thing to keep in mind is that microprudential and macroprudential policies use very similar and sometimes overlapping instruments to accomplish two distinct objectives. The rationale behind microprudential policy is that the guarantees that underpin the functioning of the banking system, deposit insurance or lender of last resort operations⁹, create moral hazard: an incentive for banks to take on excessive risk on the assumption that they will not bear the totality of the losses in bad states of the world. But some deposits may not be covered by deposit insurance, and this risk-taking may not reflect the preferences of shareholders due to principal-agent¹⁰. Therefore, the regulator forces banks to internalize risk by imposing binding constraints on balance sheets or lending policies, called prudential standards. The idea behind macroprudential policy is that these standards can be set to contain not only the idiosyncratic risk to depositors and shareholders but also the systemic risk to the financial sector and the economy at large.

It is worth wondering if this does not create a tension with the Tinbergen rule¹¹: can tensions arise from targeting both microprudential and macroprudential stability with the same instruments? Osinski et al. (2015) examine how the potential for tension between macroprudential and microprudential capital requirements evolves along the financial cycle. They note that, at various points during a cycle, the two perspectives might reach different conclusions on what direction capital buffers should take. In the late stages of the boom phase, inflated asset prices, low volatility and compressed risk premia indicate low microprudential risk and therefore a strong capital position, while the long-term macroprudential indicators signal a late-stage boom and demand raising buffers. This is what Borio & Drehmann (2009b) call the “paradox of financial stability”: the system appears the most stable just as it is at its most vulnerable. The potential for contradiction is at its highest during the crisis and downturn. Here, a microprudential assessment demands that banks strengthen their capital position to cover recognized losses and prepare for future ones, while from a macroprudential perspective capital buffers should be released to soften the credit crunch. A tension is born, therefore, because capital is set both to ensure the strength of individual balance sheets and stabilize the provision of lending to the economy. Due to this potential for contradiction, certain precautions should be taken in policy design. From an institutional perspective, it is important that the macroprudential mandate is attributed in a way that protects against these potential conflicts, a point that we revisit in chapter 3. In the Euro area, institutional overlap between microprudential and macroprudential authorities diverges between countries and is significant for some of them, so this can be an element of heterogeneity. Concerning instruments, it is important that their macroprudential orientation is clear and unambiguous in their design, a principle that the countercyclical capital buffer might not fully respect (see section 1.4.1).

Equally fundamental is the relationship between monetary and macroprudential policies. On

⁹See the foundational model of Diamond & Dybvig (1983) on bank runs.

¹⁰See Alexander (2006) for a survey on the principal-agent problem in banking.

¹¹The policymaker should have as many instruments as objectives, and each instrument should be assigned to the objective over which it holds the most influence.

the one hand, the crisis has raised awareness on the effects of monetary policy on financial stability through a variety of channels. Some of these channels have been known for some time, such as the borrower default channel tied to the literature on the financial accelerator. Restrictive monetary policy shocks can result in widespread defaults if enough borrowers are in vulnerable positions¹². What was less recognized was the potentially harmful effect of persistently low policy rates. There is an emerging literature on what has been called the risk-taking channel of monetary policy (Borio & Zhu, 2012). The idea is that low rates, by boosting asset and collateral values, reduces the perceived riskiness of borrowers and increases the net worth of banks, thus creating incentives to engage in more and riskier lending. This affects the total volume of created credit, but also its quality in terms of higher risk (Dell’Ariccia, 2010). Rajan (2005) argues that the increase in risk taking is also encouraged by a “search for yield” effect: banks shift to riskier assets as the returns on low-risk investments are disproportionately reduced. Adrian & Shin (2010) also argue that, assuming that banks target a certain liability structure to make the most of the leverage effect, they will respond to a boost in equity valuations by expanding their balance sheet. The existence of the risk-taking channel during the great moderation has been validated by a robust empirical literature¹³.

This realization of the financial stability problems brought by persistently low policy rates has challenged the foundations of the inflation-targeting (IT) paradigm that became so successful during the great moderation. According to IT, the policy rate should be set so as to stabilize inflation around a positive but low target value. In an environment of persistently low and even declining inflation, IT mandates that the central bank lower its policy rate to stimulate aggregate demand and exert upward pressure on prices. One of the main avenues by which this is expected to work is the bank lending channel Bernanke & Gertler (1995): by lowering the refinancing cost of borrowers, credit growth is stimulated and so is the expenditure of non-financial agents. In a way, the extraordinary credit expansion seen across western economies in the run-up to the crisis was seen, at the minimum, as a harmless byproduct of accommodative policies necessary to achieve the inflation target, and at most as an intermediate target instrumental to their transmission. Similarly, the transmission of monetary policy also works through the wealth effect of rising asset prices (the asset price channel). Missing from this picture is the positive relationship between excessive credit/asset price growth and systemic risk that has since become uncontroversial (Borio & Lowe, 2002; Drehmann et al., 2011; Drehmann & Tsatsaronis, 2014; Jordà et al., 2013; Schularick & Taylor, 2012; Dell’Ariccia et al., 2016; Gourinchas & Obstfeld, 2012; Reinhart & Rogoff, 2011). Insofar as there are positive relationships between, on the one hand, money and credit and, on the other, excess credit and systemic risk; it follows that persistently accommodative monetary policy can create systemic risk. In a world where achieving inflation targets and supporting activity demands extremely loose stances and unconventional measures whose full ramifications are uncertain, central bankers face a problematic dilemma. To borrow the expression from Borio et al. (2018), they find themselves “*in the grip of a pincer movement*”: They must stimulate vigorously to fend off deflation in the short run while being mindful of the long run risks that said stimulus might engender (quadrant IV in figure 1.1).

¹²See Jiménez et al. (2014), Gertler & Gilchrist (1994) or Sengupta (2010) for some empirical literature confirming this channel.

¹³We can cite Jiménez et al. (2012, 2014), Dell’ariccia et al. (2017), Paligorova & Santos (2017), Maddaloni & Peydró (2011), Delis & Kouretas (2011), Altunbas et al. (2014), Gambacorta (2009).

1.2. THE EMERGENCE OF MACROPRUDENTIAL POLICY AS THE MISSING PILLAR OF MACROECONOMIC MANAGEMENT

Figure 1.1: The dilemmas of monetary policy



Source: Papadia (2018).

Quadrants I and IV depict dilemma situations insofar as achieving both price and financial stability objectives require the policy rate to be adjusted in opposing directions.

There is a debate on what is the proper macroprudential response to this reality. For some, the answer is to augment the monetary policy framework with a macroprudential objective, to internalize unintended effects on credit growth and/or asset price inflation. In a financial boom, this translates into setting higher policy rates than otherwise suggested by IT, a reasoning formally captured by an augmented Taylor rule that includes a term capturing asset prices or credit growth. In other words, central banks should “lean against the wind” (LAW) of financial booms and not merely content themselves with fighting post-crisis recessions, a.k.a. “cleaning up afterwards”. Prominent voices have been advocating LAW since well before the GFC (Borio & Lowe, 2002; Borio et al., 2003; Smets, 1997; Borio & White, 2004; Bordo & Jeanne, 2002), and this position has gained in popularity ever since (Kokores, 2015). Stein (2012) highlights the ability of monetary policy to simultaneously constrain risk-taking at a system-wide scale by “getting in to all the cracks”, including the shadow banking sector. Moreover, Caruana & Cohen (2014) underline that crises result in strong deflationary pressures that central banks are finding increasingly difficult to countervail, and that therefore the tensions between price and financial stability objectives dilute in the long-run. When incorporating financial frictions and endogenous risk-taking mechanisms into DSGE models, Cúrdia & Woodford (2011) Woodford (2012), Angeloni & Faia (2013), Gambacorta & Signoretti (2014), Bofinger et al. (2013), Filardo & Rungcharoenkitkul (2016), Gerdrup et al. (2017), Lambertini et al. (2013) find numerous cases where LAW policies (often with the help of macroprudential policies) are welfare enhancing.

On the opposing side of the discussion stands what Smets (2014) describes as the “modified Jackson Hole consensus”: monetary policy should keep its focus on price stability and financial stability should be fully delegated to macroprudential policy. Financial stability should only concern the central banker to the extent that it might condition the attainment of the inflation

target. This view is notably championed by Svensson (2017, 2018), who contends that proponents of LAW tend to conduct unrealistic cost-benefit analysis. For example, he argues that Adrian & Liang (2018) exaggerate the quantitative effect of the policy rate on crisis cost and probability; meaning that a LAW policy would entail certain unemployment costs with questionable financial stability benefits Svensson (2017). Assenmacher-Wesche & Gerlach (2010) provide empirical evidence suggesting that LAW would substantially suppress real growth. Collard et al. (2017) counter Stein’s “getting through the cracks” argument by suggesting that the wide scope of a LAW policy can reduce the quantity of credit while having a sterile effect on its quality. Smets (2014) cautions that LAW could be harmful to the efficacy of monetary policy, unanchoring inflation expectations by making policy less predictable and inducing reputational costs when the central bank fails to prevent a crisis. In this view, correcting the systemic risk externalities of monetary policy is part of the macroprudential regulator’s job. Though the case for LAW has definitely become stronger, the “Clean vs. Lean” debate as it is sometimes referred to is anything but settled.

Whatever the relative merits LAW may have in the general case, the prospect of applying it to a heterogeneous monetary union merits a discussion of its own. In addition to the usual dilemmas that we mentioned earlier, the ECB has to manage the challenges of applying the same policy rate to a heterogeneous set of countries. If the periphery is experiencing a financial boom but the core is flirting with deflation, should it raise rates to stabilize the periphery and risk pushing the core into recession? Several studies have shown that financial cycles in the Euro area are asynchronous (Stremmel & Hanno, 2015; Kunovac et al., 2018). Moreover, Leroy (2014) shows that the intensity of the bank lending channel was heterogeneous between core and periphery countries prior to the crisis. Avalos & Mamatzakis (2018) shows that the effect of unconventional monetary policies on risk is also heterogeneous along core-periphery lines. As long as heterogeneity persists, a “one size fits all” monetary policy instrument will remain inappropriate to deal with financial stability threats that are typically country-specific. Kockerols & Kok (2019) apply Svensson (2017) cost-benefit framework to the Euro area and confirm that a LAW policy would yield negative net marginal returns. In such a scenario, national macroprudential policies can have the further benefit of counteracting the national imbalances induced by monetary policy. In an estimated core-periphery DSGE model for the Euro area, Quint & Rabanal (2014) find that a LAW policy rule creates important distributional effects to the detriment of borrowers, and that countercyclical capital buffers implemented on a national basis can partially compensate the loss of national monetary autonomy. Though they do find that macroprudential policy can be complemented by a LAW monetary policy, this finding is qualified by the fact that they leave little room for country heterogeneity. Indeed, in a stylized static New-Keynesian model, Dehmej & Gambacorta (2017) show that LAW is incapable of countering asymmetric financial shocks to member states, something that only country-targeted macroprudential policy can achieve. A clear separation between monetary and macroprudential policies appears to be the official stance of the ECB, as stated by Mario Draghi¹⁴:

“We assess whether the markets are closer or not to develop a financial stability situation. So there are markets where valuations have been more stretched than others. Then we ask ourselves, what is the right answer to this problem? The right answer is to have in place macroprudential instruments that are effective, strong and well-targeted to cope with these risks. Certainly it’s not to change monetary policy because of a financial stability risk in a certain part or in a certain market of the eurozone.”

¹⁴ECB press conference, 14/12/2017.

1.2. THE EMERGENCE OF MACROPRUDENTIAL POLICY AS THE MISSING PILLAR OF MACROECONOMIC MANAGEMENT

Figure 1.2: The place of Macroprudential Policy



Source: IMF (2013)

In conclusion, as summarized by figure 1.2, macroprudential policy fills a void in the policy space painfully revealed by the GFC, addressing the failure of microprudential policy to prevent systemic crises and the financial stability externalities of loose monetary policies. Macroprudential policy, by being calibrated to regulate the whole rather than its individual components, is expected to resolve the fallacy of aggregation that ignores endogenous risk, herd behavior, interconnectedness risk and other emerging processes of the financial system. At the same time, it completes the macroeconomic stabilization toolkit by providing countercyclical instruments that can lean against the wind of the financial cycle and prevent the accumulation of macro-financial imbalances. In practice, however, the mapping from policy to objectives is likely to be less than perfectly tractable, as these policies operate through similar transmission channels and are therefore likely to affect each other's objectives. To ensure consistency between these policies, the institutions that implement them must be carefully designed. While supranational authorities (the ECB and the ESRB) have some role in the conduct of macroprudential policy, the main actors here are the national authorities. Therefore, institutional separation of monetary and macroprudential policy seems strong and uniform on the surface. As countries have opted for different governance frameworks at the national level, some heterogeneity could emerge in the apprehension of possible tensions between macroprudential and microprudential policies, an issue we explore in chapter 3. The expectations and challenges for macroprudential policy in the Euro area are particularly high, experience will tell how much it can contribute to building a more stable monetary union.

1.3 Identifying cyclical systemic risk: credit is the key

As underlined by Schinasi (2004), financial stability is a complex and multidimensional phenomenon; leaving the policymaker with a practical problem: how to empirically identify imminent systemic threats. Borio's distinction between the structural and time dimensions of systemic risk has provided a useful and widely employed framework to decompose this abstract concept into concrete variables that can guide the conduct of policy. Let us do a brief review on some of the indicators that have surfaced for the structural dimension, based on the survey by Benoit et al. (2017). The trend has been towards the construction of indicators that measure either specific emergent vulnerabilities within the financial system or generalized systemic stress. Some indicators attempt to assess the degree to which banks take large and correlated exposures, typically calculating the probability of default of a large number of entities conditional on the materialization risk in some sector or asset class (Lehar, 2005; Cai et al., 2018; Giesecke & Kim, 2011). Others try to measure the risk of contagion mechanisms, useful for the identification of systemic institutions as they capture the degree to which a single actor can trigger domino effects because of size and interconnectedness (Upper, 2011; Acemoglu et al., 2015; Drehmann & Tarashev, 2011; Gouriéroux et al., 2012). Certain indicators measure how market mechanisms amplify risk, notably through liquidity spillovers like fire sales (Greenwood et al., 2015; Brunnermeier et al., 2013; Jobst, 2014). Popular global indicators based on market data include SRISK (Acharya et al., 2012), which measures the capital shortfall of banks conditional on generalized financial stress; and Adrian & Brunnermeier (2016) CoVaR, the Value-at-Risk of the financial system conditional on the stress of an individual institution. While most indicators are based on supervisory data available at monthly or quarterly frequency, SRISK and CoVaR use market data that can be tracked in real time. While this provides the advantage of immediacy, they have been criticized for their dependence on market valuations (Tavolaro & Visnovsky, 2014). We will leave here the discussion on structural risk and focus on the area most concerned by countercyclical macroprudential policy, the time dimension.

1.3.1 Excess credit as the common denominator of systemic crises: a look at the evidence

On the time dimension, the search for early warning indicators that can be followed to calibrate countercyclical instruments has happened within a wide-ranging shake-up in our understanding of the relationship between financial crises, credit and property valuations. In the Bretton Woods era, low capital mobility, fixed exchange rates and repressed domestic banking conspired to create a period of exceptional tranquility (Reinhart & Rogoff, 2011; Taylor, 2015), leading the study of financial crises to be neglected in mainstream macroeconomics. Interest in the subject was reignited by the emerging market crises of the 80's and 90's, and in particular the twin banking and currency crises in emerging Asia that gave rise to the so-called "third generation models" of currency crises (Kaminsky & Reinhart, 1999; Chang & Velasco, 2001; Goldstein, 2005). While bank runs and the intermediation of foreign currency debt were recognized as crucial factors in these crises, excess credit had not yet been identified as the common denominator behind financial instability. Even still, the perception remained that industrialized countries with sound policies and mature financial systems were not vulnerable to financial instability like emerging countries were. The real warning for the west should have been Japan, where a leverage-fueled property boom in the 80's resulted in a prolonged period of low growth, eventually leading the BoJ to be the first major central bank to implement quantitative easing (QE) in 2001 (Koo, 2009). Similarly, the literature on the financial accelerator (Bernanke et al., 1999; Kiyotaki & Moore, 1997) has raised awareness of credit frictions as an amplification mechanism of exogenous shocks, yet it did not go as far as to consider that shocks could emanate and be driven by the financial sphere itself (Borio, 2008; Hume & Sentance, 2009).

A consensus has since emerged in the empirical literature around the importance of private credit¹⁵ as a driver of financial crises and business fluctuations (Lo Duca & Peltonen, 2011; Drehmann et al., 2011; Dell’Ariccia et al., 2016; Behn et al., 2013). Of course, not all credit booms are systematically followed by crises, but most crises are preceded by credit booms. To differentiate abnormal expansions from regular growth, the statistic often studied is the credit gap, the difference between the credit-to-GDP ratio and its long-term trend. Most of the empirical work on the determinants of financial crises has exploited cross-country panel datasets spanning the last 40 or 50 years and combining emerging and advanced economies. Gourinchas & Obstfeld (2012) underline that, although crises in emerging economies were often considered idiosyncratic, crises in emerging and advanced economies have common predictors: domestic credit expansions and real currency appreciation. Using a sample of 34 advanced and emerging economies over 1960-1999, Borio & Lowe (2002) find that the combination of rapid credit growth and rises in asset prices increase the probability of episodes of financial instability, a finding later corroborated by Borio & Drehmann (2009a) and Anundsen et al. (2016) for OECD economies. Alessi & Detken (2011) use a signaling methodology to test a host of real and financial macro variables as early warning indicators. The credit gap outperforms the rest of the variables: in 95% of high-cost episodes of boom and bust, it yields a signal in at least one of the six preceding quarters; while yielding false alarms in 32% of cases where booms did not result in crisis. On a sample of 170 countries, Dell’Ariccia et al. (2016) find that one in three credit booms end in crisis; with growth speed, duration and the starting level of financialization significantly influencing the likelihood of a credit boom turning bad¹⁶.

Now conscious of these financial boom and bust patterns, economists have adopted the concept of the **financial cycle** as the relevant object of study for financial stability. Borio (2014a) summarizes its essential properties as follows:

1. ***“It is most parsimoniously described in terms of credit and property prices.”***. Many authors equate the financial cycle with the credit cycle (Aikman et al., 2015) while others try to synthesize a wide array of variables (Hatzius et al., 2010). Credit and property prices have strong co-movement at the low frequencies associated with the occurrence of financial crises, and their interaction has the highest information content for business cycles and crises (Borio et al., 2012). It is the smallest set of macro variables that capture the essential dynamics of financial booms and busts. Equity prices, a variable commonly perceived as relevant financial instability, does not fit into the pattern.
2. **Compared to the business cycle, the financial cycle is longer (i.e. low frequency) and with greater amplitude in its fluctuations.** While a business cycle rarely exceeds 8 years, Borio et al. (2012) estimate an average duration of 16 years on a sample 7 industrialized countries since the 1960’s. Furthermore, expansions and contractions of the financial cycle are roughly symmetrical; while business cycle contractions are typically shorter than expansions.
3. **There is a strong association between its peaks and systemic crises.** Crises systematically coincide with peaks in the domestic financial cycle or exposures to peaks of foreign financial cycles. Most (though not all) peaks coincide with crises.

¹⁵In almost all cases, this refers to bank lending to households and non-financial corporations. This captures the vast majority of credit of macrofinancial relevance throughout the studied periods. Bank finance remains predominant in most of the world (including the Euro Area), but shadow banking played a crucial role in the subprime crisis and is poised to gain in prominence globally in the decades to come.

¹⁶More precisely, the likelihood of a boom ending in crisis increases noticeably when a) the episode lasts 4 years or more, b) the annual growth rate of credit-to-GDP ratio reaches 25% or c) The credit-to-GDP ratio is 45% or higher at the start of the episode.

4. **Its monitoring can help to anticipate systemic crises in real time with significant lead.** The best-performing leading indicators are based on simultaneous gaps between the trajectory of credit/property price indicators and their historical trends (Borio & Drehmann, 2009b; Alessi & Detken, 2011). For the subprime crisis, these indicators were emitting signals as early as 2000-2001. If one of the two variables must be privileged, it should be credit. Equity prices lack predictive power.
5. **Its intensity depends on policy regimes.** Specifically, it is conditioned by developments in financial regulation, monetary policy and supply-side policies¹⁷. For the sample in Borio et al. (2012), the combined effect of financial deregulation, inflation targeting and trade globalization increased the average duration of the financial cycle from 16 to 20 years for cycles that peaked after 1998.

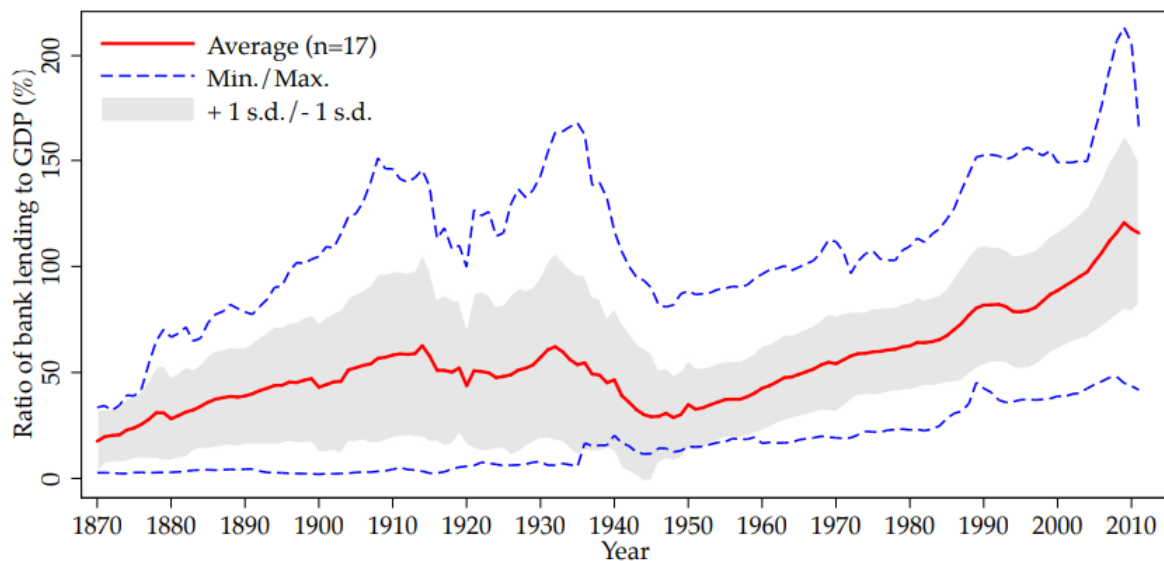
Since financial crises are relatively rare events, occurring every 15-20 years on average (Taylor, 2015), inferring general knowledge about them from empirical data is complicated, as macroeconomic data sets rarely go further than the 1970's. This motivated an effort to construct from primary sources deeper data sets, such as the Jordà-Schularick-Taylor Macrohistory database or that of Reinhart & Rogoff (2011), both of which reach back into the 19th century. Using the local projections methodology pioneered by Jordà (2005), a series of studies have exploited the Macrohistory data and yielded insights on the processes behind financial crises that are remarkably robust across geography and time. The recent leverage-fueled crises are consistent with the patterns of major crises that emerged with the development of financial capitalism in the second half of the 19th century (Taylor, 2015). Notwithstanding the period bookended by the two world wars, advanced economies have been on a trend of persistent leverage accumulation (figure 1.3), with periodic instances in which a large share of countries are experiencing financial crises (figure 1.4). During the Bretton Woods period, leverage grew steadily and crises all but disappeared. But as liberalization took hold in the 80's and the pace of leveraging accelerated, crisis incidence quickly returned to the levels of the pre-war era. Schularick & Taylor (2012) confirm the predictive power of credit aggregates: a credit boom lasting five years substantially increases the probability of crisis. Furthermore, they find that though money and credit aggregates could be used as proxies of each other in the pre-war era, these variables have been decoupling ever since; positing that liberalization, financial innovation and moral-hazard-inducing government guarantees have unshackled credit creation from monetary anchors¹⁸. The link between credit and financial crises appears to be more than a regularity of the last few decades, it seems to be an intrinsic feature of modern capitalism. Credit booms not only make downturns more likely, they also increase their cost Jordà et al. (2013)¹⁹. In a standard business cycle recession, per capita GDP falls by 1.5% and takes 2 years to regain its previous peak; while a financial crisis recession reduces per capita GDP by 5% and depresses output for 5 years. This evidence lends credence to the concept of "balance-sheet recession" posited by Koo (2009) (also referred to as "debt overhang"): the deleveraging pressures that follow crises have an unusually durable negative impact on aggregate demand.

¹⁷Positive supply shocks increase growth prospects and decrease inflation, thus encouraging credit creation and lower policy rates.

¹⁸This is consistent with the finding by Kaminsky & Reinhart (1999) that the money multiplier increases in the eve of a crisis.

¹⁹This finding is corroborated by Dell'Ariccia et al. (2016), Jokipii & Monnin (2013) and Lane & Milesi-Ferretti (2011).

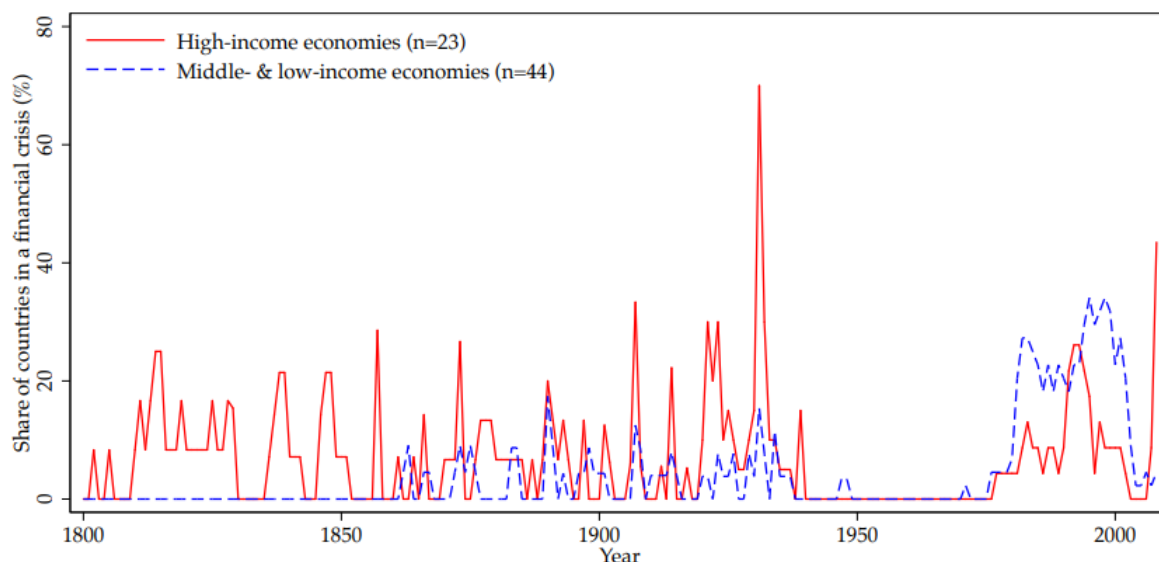
Figure 1.3: The long-term leveraging of advanced economies



Source: Taylor (2015)

The red line plots the average bank loans to GDP ratio in the 17 countries in the Macroeconomy dataset, the dashed blue lines the minimum and maximum at a given period, and the shaded area the 1 standard deviation range.

Figure 1.4: Incidence of financial crises across time



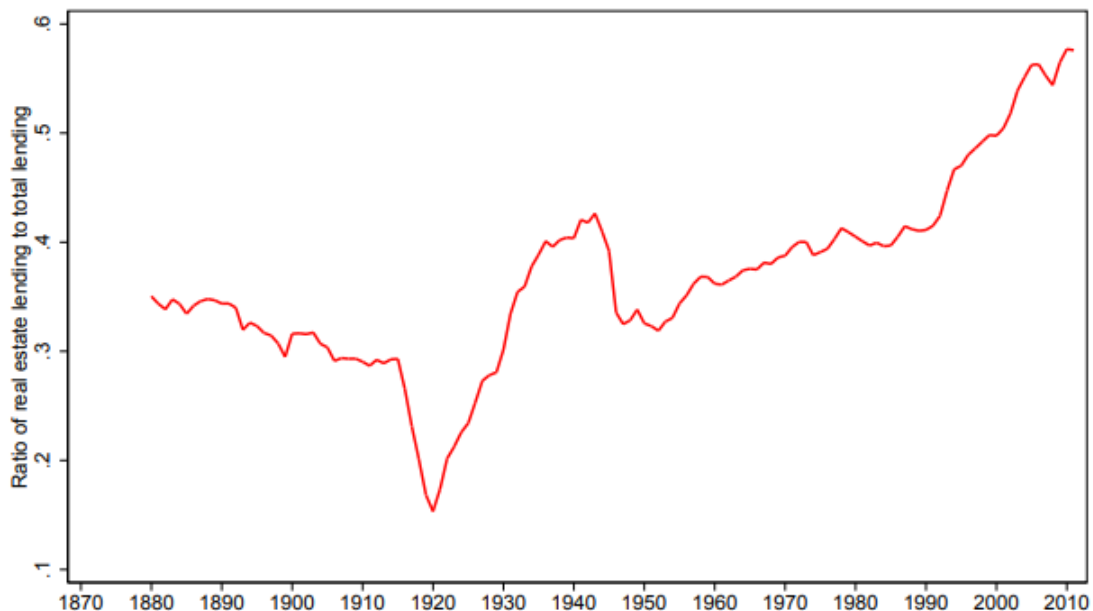
Source: Taylor (2015)

Though domestic credit to the private sector is the quintessential variable to surveil, financial stability monitoring can be enriched by considering developments in housing, public and external indebtedness. Not all types of credit are equally dangerous: mortgage lending, the nexus between the two components of the financial cycle, is particularly prone to generating systemic risk. The first obvious explanation for this is that, as advanced economies have undergone financialization, mortgage lending has become the predominant business of the banking industry (Jordà et al., 2016a, 2015a): lending related to real-estate rose from less than a third of loan portfolios at the start of the 20th century to about two thirds on the eve of the GFC

(figure 1.5). Consequently, mortgage lending booms have become a stronger determining factor of financial instability and the business cycle, to the detriment of corporate lending. Not only has the relationship between mortgage booms and crises strengthened in the postwar era, real growth becomes depressed in the aftermath of a mortgage bust regardless of whether a crisis has occurred. This generalizes the influential findings of Mian et al. (2013)²⁰ for the subprime crisis, who argue that the key mechanism to understand the severity of the great recession was the coincidence of high household leverage with the bursting of the real-estate bubble; which wiped out the net worth of many households and thus exerted a durable downward pressure on aggregate demand.

Upon testing the power of equity and property bubbles for explaining crises and recessions; Jordà et al. (2015b) find that only leverage-fueled bubbles pose a threat to financial stability, and that leveraged property bubbles are by far the most dangerous kind. Aldasoro et al. (2018) study the performance of the property price gap, the analogous of the credit gap for property prices. They find that the property price gap provides useful signals two years before crises, but become uninformative in the preceding year. On the subject of public debt, what the literature has documented is an association between subdued economic performance and public debt growing beyond a certain threshold (Reinhart et al., 2012; Minea & Parent, 2012) and a reduced capacity to respond to downturns when fiscal space is tight (Corsetti et al., 2013; Obstfeld, 2013b). Jordà et al. (2016b) conclude that public debt has little predictive power for financial crises in advanced economies when compared to private debt. The correlation between rising private and public debt that they document since the 1970's arises because crises make tax revenues collapse and spending expand. Excepting cases of gross negligence (ex: Greece), public debt appears more as a consequence, rather than a cause, of financial instability.

Figure 1.5: Real estate lending overtakes banking



Source: Jordà et al. (2016a)

External imbalances are also a classic studied determinant of financial crises, especially in the context of emerging economies. The prototypical patterns behind sudden stop crises was reasonably well understood even before the GFC (Kaminsky & Reinhart, 1999; Milesi-Ferrett &

²⁰See also Mian et al. (2017).

Razin, 1998; Eichengreen & Adalet, 2005; Freund & Warnock, 2005): an emerging economy with promising growth potential opens its financial account and attracts foreign capital (reflected by current account deficits), domestic agents accumulate foreign currency liabilities and the real exchange rates becomes overvalued, and a crisis erupts when investor expectations reverse and the flow of foreign capital suddenly dries up. Perhaps more surprising was the relevance of external imbalances for the subprime and Euro crises, as many popular interpretations highlight foreign capital flows as instrumental for the domestic imbalances that emerged in the U.S. and the Euro periphery. According to Bernanke's global savings glut hypothesis, the easy financial conditions that propitiated the subprime crisis were facilitated by the demand of U.S. dollar safe assets by emerging countries seeking to accumulate reserves. In the Euro area, internal imbalances between peripheral countries with emerging economy characteristics and financially mature core countries were crucial drivers of domestic debt accumulation (Lane & Pels, 2012; Lane & McQuade, 2014; Giavazzi & Spaventa, 2010; Hobza & Zeugner, 2014). The association between deficits and the recent financial instability is becoming well established in the empirical literature (Lane & Milesi-Ferretti, 2012; Borio et al., 2011; Kaminsky & Reinhart, 1999; Catão & Milesi-Ferretti, 2014). In fact, the crises in the Euro periphery fit the pattern of emerging market sudden stop crisis, with the crucial distinction of not having the nominal exchange rate as an adjustment mechanism in the recovery. Moreover, as highlighted by Bruno & Shin (2015) and Calderon & Kubota (2012), it is flows of debt, rather than equity or FDI, that are associated with instability, especially when they are short-term in nature. Taking a longer-term perspective, Jordà et al. (2011) find that external deficits are a good predictor of financial crises, yet it fails to outperform domestic credit growth; underlining that surplus countries are also often vulnerable to crises. They interpret that capital flows are dangerous when and if they fuel domestic credit growth. However, they also find that the relationship between deficits and crisis has strengthened in the post-war era. Furthermore, Aizenman & Jinjara (2009), Adam et al. (2011) and Favilukis et al. (2012) have found a link between the current account deficits and domestic property price cycles. All of this seems consistent with the "global financial cycle" narrative pioneered by Rey (2015), whereby financial globalization has made national outcomes increasingly related to global liquidity and asset cycles²¹.

1.3.2 Credit as a driver of the economy: a course correction in the history of economic thought

If one appreciates this newfound consensus on the perils of credit under the lenses of economic history, the naive view of the past few decades appears as chronologically exceptional (Turner, 2015; Werner, 2014; Borio, 2014a; Borio & Disyatat, 2011). In fact, mainstream macroeconomic models not only neglected the dangers of credit, it fundamentally misrepresented the functions performed by the banking sector; dismissing what used to be a relatively uncontroversial world-view espoused (to varying degrees) by the likes of Keynes (1924), Hayek (1933), Schumpeter (1934), Fisher (1933) and Wicksell (1907). Starting in the second half of the 20th century, mainstream macroeconomics have viewed banks first and foremost as intermediaries of loanable funds: they pool household savings in the form of deposits and allocate them across firms, thus financing investment²². The corollary of this view is that banks are constrained in their capacity to create credit by the present availability of real resources in the economy: they can only lend as much as households save. Functionally, this makes a bank indistinguishable from an asset manager. Even after the crisis, many models used to study macrofinancial phenomena implicitly

²¹There is considerable debate as to the empirical validation of the global financial cycle, see Cerutti, Claessens, & Rose (2017).

²²This influential loanable funds theory of banking can be traced to the work of Gurley & Shaw (1955, 1956) and Tobin (1964).

subscribe to this view²³ In reality, however, banks do not need to backstop their lending with pre-existing savings, they are invested with the faculty of creating credit entirely (or almost entirely) *ex nihilo*. To understand this, a useful distinction is that made by Borio & Disyatat (2011) between real savings (that result ex-post as residual unconsumed income) and monetary financing (that is determined ex-ante in large part by the decision to lend)(Borio & Disyatat, 2011, p.7):

*“**Saving**, defined as income not consumed, is a national accounts construct that traces the use of real production. It does not represent the availability of financing to fund expenditures. By construction, it simply captures the contribution that expenditures other than consumption make to income (output). Put differently, in a closed economy, or for the world as a whole, the only way to save in a given period is to produce something that is not consumed, i.e. to invest. [...] In ex post terms, being simply the outcome of various forms of expenditure, saving does not represent the constraint on how much agents are able to spend ex ante. The true constraint on expenditures is not saving, but **financing**. In a monetary economy, all financing takes the form of the exchange of goods and services for money (settlement medium) or credit (IOUs). Financing is a cash-flow concept. When incoming cash flows in a given period fall short of planned expenditures, agents need to draw down on their holdings of money or borrow. This is true for every transaction. And it is only once expenditures take place that income, investment, and hence saving, are generated.”*

Using these concepts, Jakab and Kumhof succinctly articulate a contemporary version of the view of banks as credit creators as opposed to mere intermediaries (Jakab & Kumhof, 2015, p.ii-iii):

“In the [intermediaries of loanable funds] model, bank loans represent the intermediation of real savings, or loanable funds, between non-bank savers and non-bank borrowers. But in the real world, the key function of banks is the provision of financing, or the creation of new monetary purchasing power through loans, for a single agent that is both borrower and depositor. The bank therefore creates its own funding, deposits, in the act of lending, in a transaction that involves no intermediation whatsoever. Furthermore, if the loan is for physical investment purposes, this new lending and money is what triggers investment and therefore, by the national accounts identity of saving and investment (for closed economies), saving. Saving is therefore a consequence, not a cause, of such lending. Saving does not finance investment, financing does. To argue otherwise confuses the respective macroeconomic roles of resources (saving) and debt-based money (financing).”

As one can expect, changing from a loanable funds to a credit creation vision of banks is of major consequence for our understanding financial stability and the determination of business cycles. For one, it unshackles the time path of credit from the accumulation of real savings. This explains how credit can expand and contract at rhythms that far outpace booms and busts in real income, and thus the greater amplitude of the financial cycle. While one could think that in a fractional reserve system the power of commercial banks to create credit is at least constrained by reserve requirements (the money multiplier theory), in an IT monetary policy regime the central bank targets interest rates but is committed to supply the liquidity needed to meet the reserve requirement; meaning that reserves (like deposits) are determined endogenously (Goodhart, 2007; Borio & Disyatat, 2009; Disyatat, 2010). In the words of Jakab and Kumhof, “the most important limit, especially during the booms periods of financial cycles when

²³For example, Kumhof et al. (2015) study the relationship between income inequality, household leverage and crises in a model where saver households lend directly to borrower households, abstracting from banking altogether.

all banks simultaneously decide to lend more, is their own assessment of the implications of new lending for their profitability and solvency”(Jakab & Kumhof, 2015, p.iii). Indeed, they build several versions of the same DSGE model, some where banks are credit creators and others where they are intermediaries; finding that business and financial cycles are systematically more volatile when banks are modeled as credit creators. Second, it makes economic outcomes highly dependent on expectations of future growth prospects and perceptions of value and risk that can become perniciously disconnected from fundamentals. A loan contract is not a zero-sum re-allocation of purchasing power from a saver that postpones it to a borrower eager to expend it. Rather, it is a positive-sum origination of purchasing power justified by the expectation of future value creation. It is a bet, placed both by the borrower and the banker, on the borrower’s capacity to generate a future income stream sufficient to reimburse the nominal and remunerate the risk within a certain time limit (maturity); and it is this very bet that makes the income creation (present and future) possible. A systemic financial crisis is an event where, following a period where such bets accumulate at an accelerating pace, a critical amount of them fail to pay off at the same time. It follows that the occurrence of such events depends on whether or not the expectations implicit in credit contracts made in the past are validated by the present state of the economy. Conversely, future crises depend on whether the loans being underwritten in the present are underpinned by reasonable expectations about future states of the economy.

The preceding line of thought is most attributable to the work of heterodox Post-Keynesian economist Hyman Minsky (1986, 1992) and his “financial instability hypothesis”, who built on the intuitions of Keynes (1924), Kindleberger (1978) and Fisher (1933). Economic agents use debt to finance the acquisition of capital assets expected to yield income over time. These agents can be divided into three kinds according to their capacity to meet their obligations. “Hedge” agents generate enough income to cover the repayment of principle and interest expenses, “speculative” agents can meet interest expenses but need to roll over liabilities, and “Ponzi” agents cannot meet interest expenses and must sell assets or further increase their debt burden, teetering on the verge of default. The economy is in stability when hedge agents are predominant and converges to states of instability as the share of speculative and Ponzi units increases. Bankers lend prudently at the beginning of expansions and so hedge agents abound, but as collateral values take off and competition for an apparently booming market intensifies, underwriting standards degrade and latent speculative and Ponzi agents are engendered. Under market forces, the seeds of instability are sown during good times and the economy endogenously fluctuates between states of stability and instability.

the financial instability hypothesis is remarkable for promoting a theoretical framework where systemic crises and business fluctuations emerge from endogenous processes within the economy at a time where the reigning paradigm saw these as driven by exogenous shocks. Starting in the 1970’s, mainstream theories of finance (the efficient markets hypothesis (Fama, 1970)) and of agent behavior more broadly (the rational expectations hypothesis (Muth, 1961; Lucas, 1972)) popularized the perception of an economy where self-regulating market forces ensured a seamless return to equilibrium after being disturbed by stochastic perturbations. The macroeconomic theory that resulted from these building blocks (real business cycle theory (Kydland & Prescott, 1982)) left little role for banking in their models and advised against government intervention, creating a pro-deregulation intellectual environment and thus enabling the great leveraging of the late 20th and early 21st centuries. In parallel, other segments of the economics profession have been going in directions that are at odds with the pre-crisis neo-classical consensus. Behavioral economics has convincingly showed that agents make choices subject to a myriad of cognitive biases rather than rationality,²⁴ giving a microeconomic foundation to the waves of

²⁴These include “disaster myopia”(Guttentag & Herring, 1984), the tendency to disproportionately discount low-probability/high-cost events; herd behavior (Avery & Zemsky, 1998; Scharfstein & Stein, 1990; Long et al.,

generalized euphoria and panic described by Kindleberger (1978) and dubbed “animal spirits” by Keynes. Even without considering bounded rationality; moral hazard, perverse incentives and asymmetric information can produce market failures to which finance is particularly vulnerable²⁵. Finally, the empirical macroeconomic literature surveyed above robustly establishes stylized facts consistent with an economy vulnerable to recurrent episodes of instability, where banks and credit play an absolutely pivotal role. While this is a fundamental property of all financial market economies, some have proven to be more vulnerable to instability than others. Borio & Disyatat (2011) and Borio (2014b) introduce the concept of “financial elasticity” to designate the relative volatility of financial cycles in an economy. Beyond the inherent destabilizing tendencies of the private sector, they stress out that financial elasticity is greatly determined by policy regimes. All other things equal, financial elasticity will be increased by accommodative monetary policy and regulatory policies that fail to sufficiently constrain risk-taking and credit creation, especially in a context of globalized finance. As we will see in section 1.5, the gestation of the Euro crisis was a perfect storm of destabilizing policies: a common monetary policy that was way too lax for the booming high-inflation Periphery, a wave of precipitous liberalization that overflowed the periphery with more liquidity that it could invest wisely; all with fiscal backstops fractured along national lines and a reluctant lender of last resort. Countercyclical macroprudential policy can be interpreted as a way to adjust regulatory policy so as to reduce excessive financial elasticity and, in the Euro area, adjust for differentials between member states.

1.4 How to fight financial instability: the macroprudential toolkit

How, concretely, is the macroprudential regulator expected to achieve his mandate? As we mentioned before, the basic idea behind macroprudential policy is to take what used to be static microprudential requirements and calibrate them in tandem to the evolution of systemic, rather than idiosyncratic, risks. In practice, there are many levels at which the regulator can intervene, the potential instruments at his/her disposal are many. To grasp this panoply of tools with more structure, taxonomies have been proposed based on different criteria: whether they address the time dimension or the structural dimension of systemic risk (Borio, 2009); whether they constrain borrowers, lenders or capital flows (Blanchard et al., 2013); what kind of market failure they address (De Nicolo et al., 2012). In this section, we provide a brief review of the theoretical and empirical literature, focusing on instruments that address the time dimension of systemic risk and considering them along the lender/borrower dichotomy. In fact, this allows us to treat the two types of instruments that have by and large dominated the attention of macroeconomists: countercyclical capital buffers and countercyclical restrictions on lending standards. We should emphasize, that this review is by no means exhaustive. We have selected a sample of papers that we deem representative, influential and relevant to our subject; and we do not treat some important papers that concern macroprudential pigouvian taxation (Perotti & Suarez, 2011; Jeanne & Korinek, 2010) and capital controls (Jeanne, 2014; Farhi & Werning, 2016; Magud et al., 2014).

1.4.1 The Basel III countercyclical capital buffer

The global transition to a macroprudential world has been spearheaded by the Basel Committee on Banking Supervision, a leading international forum of central bankers and regulators

1990), the tendency of agents to act based on mimetic rather than analytic thinking; and more recently narrative economics hypothesis by Shiller (2017), which posits that decision-making is driven as much by the pre-existing stories and morals of the collective imagination as any kind of information processing or analysis.

²⁵The archetypal example being the coordination failure that arises among depositors and gives rise to bank runs (Diamond & Dybvig, 1983), where agents have an incentive to feed a misalignment even in the knowledge of an impending crash.

1.4. HOW TO FIGHT FINANCIAL INSTABILITY: THE MACROPRUDENTIAL TOOLKIT

housed at the BIS and focused on global regulatory banking standards. It has historically had a microprudential purpose, notably setting previous benchmarks on microprudential capital requirements, the original Cooke ratio (Basel I, 1988) to cover counterparty risk, and then the McDonagh ratio (Basel II, 2004) that introduced the concept of risk-weighted assets (RWA)²⁶. Basel III, the post-crisis round of reforms, strengthened microprudential standards²⁷ and had the explicit agenda of establishing a common international foundation for macroprudential policy. On structural systemic risks, the framework provides common principles for stress-testing, the practice of assessing an institution's resilience through detailed real-time simulations of generalized stress scenarios. Furthermore, it creates instruments that target the structural systemic risk brought by too-big-to-fail banks; such as the systemic risk buffer, a capital add-on applied to institutions deemed systemic for their size and interconnectedness²⁸. But the innovation that is most emblematic, that has been most discussed and has been of most interest to the macroeconomic literature is the Countercyclical Capital Buffer (CCyB). The CCyB is a supplement to the microprudential capital ratio that is adjusted at a quarterly frequency according to the evolution of cyclical risks. It can be raised up to 2.5% of RWA, and banks have one year to ensure compliance as of the date of announcement. This notably concerns aggregate credit growth, as the Basel methodology promotes the credit gap as the main indicator to guide the setting of the CCyB. The Basel Committee describes the rationale underlying the CCyB as follows (BCBS, 2015, p.1):

“The countercyclical capital buffer aims to ensure that banking sector capital requirements take account of the macro-financial environment in which banks operate. Its primary objective is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. Due to its countercyclical nature, the countercyclical capital buffer regime may also help to lean against the build-up phase of the credit cycle in the first place. In downturns, the regime should help to reduce the risk that the supply of credit will be constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system.”

As implied above, the CCyB has both (i) a resilience objective and (ii) a credit stabilization objective. First, it acknowledges that systemic risk is higher during periods of boom, and demands that the shock absorption capacity of banks is increased accordingly. Second, it internalizes the role of banks in generating these macro cyclical risks, and intends to slow down the credit boom and cushion the credit crunch. This mechanism, formalized for instance in the capital cost function by (Gerali et al., 2010), deserves some clarification. In the low interest rate environment that is typical of booms, cheap liquidity is easy to access and the leverage effect is positive²⁹. In contrast, capital is relatively expensive and raising it dilutes the stake of individual shareholders. Adrian & Shin (2010) show that banks manifest high leverage targets during booms and low targets during downturns. The idea is that a rise of the CCyB will increase the amount of capital needed to extend a marginal unit of created credit, and that to meet the requirement banks will prefer to curtail lending rather than raise new capital. Conversely, the relaxation of these constraints is expected to make banks ration less than what they would otherwise in a downturn. Finally, an important aspect to consider from an international perspective is the mandatory reciprocity framework. To ensure protection against the cyclical

²⁶Whereas the ratio used to be calculated on a blunt measure of exposures, the idea here is to account for the myriad of idiosyncratic risks entailed by the holding an asset: market risk, operational risks.

²⁷This included raising microprudential capital requirements, creating a non-risk sensitive leverage ratio along with liquidity requirements.

²⁸These can be systemic at a global (Global Systemically Important Financial Institutions, G-SIFIs) or local scale (Domestic SIFIs and Other SIFTs).

²⁹When the cost of debt is lower than the cost of capital, increasing leverage raises the return on equity.

risks in foreign markets and prevent cross-border regulatory arbitrage, foreign exposures are to be subject to the CCyB rate enforced in the foreign jurisdiction.

There is an often unacknowledged tension, we believe, that comes from the CCyB wanting to achieve a countercyclical objective through an instrument (the capital requirements ratio) that was originally conceived for microprudential purposes, to protect banks from the economy rather than the economy from banks. This is most evident in the specifics of the reciprocity framework, which applies to corporate exposures but excludes interbank exposures. From a microprudential logic, or even for the systemic resilience objective, there is no contradiction: interbank lending poses little risk to the originator. It is not clear whether the same is true for the countercyclical objective. Let us remember that the objective of countercyclical macroprudential policy is to contain the systemic risk externality banks generate by constraining their ability to create credit, to protect the economy from a leverage-fueled boom likely to end badly. While cross-border interbank exposures are unlikely to bring down the creditor, they represent one of the most dangerous forms of capital flows for the borrower: short-term debt. By excluding this asset class from reciprocity, the originator is not discouraged from engaging in this kind of lending when cyclical risks in the host jurisdiction increase. While one can hope that the host country regulator can impede this foreign liquidity from feeding a domestic credit boom, this will depend on the efficacy of its own macroprudential instruments; knowing that countries that attract foreign capital tend to have stronger financial elasticity. And even if its volume can be constrained, a higher reliance on this type of funding leaves the host country exposed to a sudden stop, as it happened to the periphery during the Euro crisis³⁰. We will further explore this tension in chapter 2, as we believe it to be of particular relevance to the EMU.

Notwithstanding this potential ambiguity in the Basel III framework, the theoretical macroeconomic literature (dominated by DSGE modeling) has studied countercyclical capital requirements almost exclusively as a cyclical stabilization tool, taking for granted that its ultimate purpose is to reduce macrofinancial volatility rather than strengthening resilience. The rule for setting the CCyB is typically a Taylor rule-like function that responds to credit or asset-prices, or in some cases real output. The standards by which the success of the CCyB is measured in this literature ranges from the volatility of credit (Poutineau & Vermandel, 2017; Angelini et al., 2014) to the volatility of macro indicators directly or partially determined by credit (Kannan et al., 2012; Darracq-Pariès et al., 2011), or even the welfare of non-financial agents (Quint & Rabanal, 2014; Rubio & Carrasco-Gallego, 2016). Angeloni & Faia (2013) examine how the CCyB can influence the vulnerability to bank runs, but this interest in resilience is the exception rather than the rule. Essential building blocks recurrent in this literature are Gerali et al. (2010) capital cost function and the financial accelerator (Bernanke & Gertler, 1995), often applied within Iacoviello's framework to model dynamics between housing prices, collateral constraints and monetary policy (Iacoviello, 2005). The overall consensus is that the use of the CCyB is beneficial to macrofinancial stabilization in most situations, and that it can complement monetary policy. The literature also validates the choice of the credit gap as the privileged indicator for the policy rule, as alternatives fail to deliver a better performance (Poutineau & Vermandel, 2017; Quint & Rabanal, 2014)³¹. An interesting nuance is that the benefit of using the CCyB varies depending on the types of shocks; excelling under financial shocks, much less so in response supply shocks (Kannan et al., 2012; Quint & Rabanal, 2014; Poutineau & Vermandel,

³⁰It is one thing when crisis strikes in a country where banks rely on domestic funding markets, and another where foreign creditors can panic and decide to drastically reduce their exposure to a toxic country from one day to the next. So even if a credit boom is averted, a mere substitution of domestic for foreign liquidity can be destabilizing if it happens on a large enough scale.

³¹An exception to this is Lozej et al. (2017), who for the case of Ireland argue that responding to the credit gap can amplify foreign demand shocks. The Central Bank of Ireland has, in practice, shown reservations about using the credit gap to guide the CCyB.

2017). To a degree, this makes intuitive sense: macroprudential policy is supposed to counter credit expansions that are not justified by fundamentals, while supply shocks increase the real productive capacity of the economy. It also shows why the regulator should be allowed to exercise discretion, since for a given change in the credit gap different reactions may be warranted depending on the conditions. Studies that consider welfare criteria reveal that the aggregate stability benefits do not map perfectly to the individual level, as they uncover distributional effects along borrower-saver lines. Besides Poutineau & Vermandel (2017), who include central bank loans in bank liabilities, banks are modeled as intermediaries of loanable funds, which could be underestimating financial elasticity.

Some studies opt for a stylized representation of the CCyB (Quint & Rabanal, 2014; Kannan et al., 2012), modeling it ad-hoc as an element affecting directly the financing conditions offered by banks (lending rate); or a semi-stylized mechanism that incorporates the capital dimension but without considering the implications of risk heterogeneity in the loan portfolio (Rubio & Carrasco-Gallego, 2016). The more sophisticated approach proposed by Gerali et al. (2010) and used by Angelini et al. (2014), Darracq-Pariès et al. (2011) and Poutineau & Vermandel (2017) considers the specific transmission mechanism of the CCyB, thus taking into account the effect of different risk-weights. The capital cost function takes the following general form:

$$F = \frac{\chi}{2} \left(\frac{K}{RWA} - \nu \right)^2$$

With $RWA = \sum_{i=1}^n a_i w_i$ being the sum of all asset side positions (a_i) adjusted by their risk weights (w_i), K is bank capital, ν the bank's target capital ratio (which may be equal or slightly superior to the regulatory requirement), and χ a parameter determining the strength with which the deviation from the capital target affects the bank's costs. In this framework, an increase in capital requirements should, barring an increase in capital, prompt an across-the-board decrease in the loan portfolio, as in Poutineau & Vermandel (2017). However, banks can respond to tighter capital requirements not only by reducing the size of their balance sheets but also by shifting to assets with lower risk-weights. Evidence supporting this kind of behavior has been found for U.S. (Jokipii & Milne, 2011), British (Francis & Osborne, 2012) and German (Heid et al., 2004) banks. Jacques (2008) builds a microeconomic banking model in which such re-composition increases not only the share of low-risk lending but also the volume, and Gauthier et al. (2012) estimate a network model for Canadian banks in which macroprudential capital requirements result in an increase in interbank assets. If capital requirements produce this kind of substitution arbitrage between asset classes, reducing one kind of lending may come at the price of stimulating another. This can notably have implications for cross-border policy spillovers, as for the reasons cited previously lending to other jurisdictions can be stimulated by a CCyB tightening. This could point to a drawback in the design of the CCyB as a countercyclical tool: its transmission to the asset side of bank balance sheets can be too blunt to address specific risks posed by specific assets. For this reason, there are some that argue in favor of sector-specific capital buffers (see BCBS (2018) and the references therein). Beyond this, the CCyB and other lender-based tools can be vulnerable to a migration of activity towards local branches of foreign banks or the shadow banking sector, what Fahr & Zochowski (2015) call a "waterbed effect". Luckily, the CCyB is only one of the tools at the policymaker's disposal.

1.4.2 Countercyclical lending standards

Probably the most widely considered alternative to the CCyB are time-varying limits on the standards of new credit contracts. By targeting the borrower rather than the lender, these instruments can have a more granular and direct effect on specific types of lending, notably mortgages. Usually these restrictions force banks to be more selective regarding the riskiness of prospective borrowers: they concern the leverage of the loan (the Loan-to-Value ratio, LTV),

the borrower's reimbursement capacity (the Debt-to-Income ratio, DTI), or his capacity to meet interest expenses (the Debt Service-to-Income ratio, DSTI). These tools have also received considerable attention in the theoretical literature, studying predominantly the LTV instrument and finding reason to be optimistic about its stabilization capacity. Evaluating a battery policy measures (LAW monetary policy, mortgage interest tax deductions, property taxes and LTV policy) for controlling household indebtedness for the U.S., Alpanda & Zubairy (2017) find that the LTV yields the best stabilization-macroeconomic cost trade-off. Mendicino & Punzi (2014) address the case of property booms fueled by foreign capital flows, recommending a combination of LAW monetary policy and LTV policy that respond to housing prices. Studies that consider agent welfare show that this instrument also has distributive implications. In Lambertini et al. (2013), borrower welfare is optimized when booms are stabilized with the LTV instrument while LAW monetary policy is the preferred tool from the point of view of savers, and a similar trade-off is present in Rubio & Carrasco-Gallego (2014). Pool (2018) shows that the LTV can influence not only the quantity of credit but also the quality of its allocation, inciting a reallocation from mortgage to corporate loans. For the EMU case, Brzoza-Brzezina et al. (2015) and Rubio (2018a) evaluate LTV policy in core-periphery models, with the former recommending an independent national implementation while the latter suggests that they be coordinated and supervised by a supranational body (the ECB). While a robust supranational framework has been constructed in the E.U. for harmonizing capital tools (CRD IV), mortgage market tools have remained a national prerogative, sometimes entirely under the control of governments (Belgium and the Netherlands). The ECB has called for reforms to build a European legal framework for these instruments (Evrard et al., 2018).

1.4.3 The observed effects of macroprudential policy

The first major challenge that the empirical literature on macroprudential policy has been confronted with is one of data: when, and where, has macroprudential policy been used? As we discussed before, the term itself did not become established until after the GFC, but regulatory policy has often been conducted with objectives that we can retrospectively deem macroprudential in spirit, especially in emerging countries. To fill this gap, there have been several efforts to construct databases on the use of macroprudential instruments; based on official documentation or surveys addressed to policymakers and with varying degrees of coverage across countries, time and instruments. These include the IMF's Macroprudential Policy Survey Database, covering 135 countries in 2013 and 141 in 2017. Borio & Shim (2007) and Shim et al. (2013) construct a database focused on focus on real estate-related measures for 60 countries between 1995 and 2012, while the IMF (2011) gathers data on LTV policy, capital requirements and ceilings on credit growth for 49 countries over 2000-2010. Probably the richest dataset is that of Cerutti, Claessens, & Laeven (2017), covering 12 instruments³² for 119 countries for the 2000-2014 period. Of particular interest for our purposes is the database built by Budnik & Kleibl (2018). They identify a large sample of policy interventions (1700), though a large share of these only qualify as macroprudential under a very broad definition³³. An interesting superficial observation that emerges from their data is that the crisis-struck countries were, before the crisis, much less active in the field of prudential measures than other countries running current account deficits³⁴; be it the Baltic countries or in emerging Eastern and Central Europe (figure 1.6)³⁵.

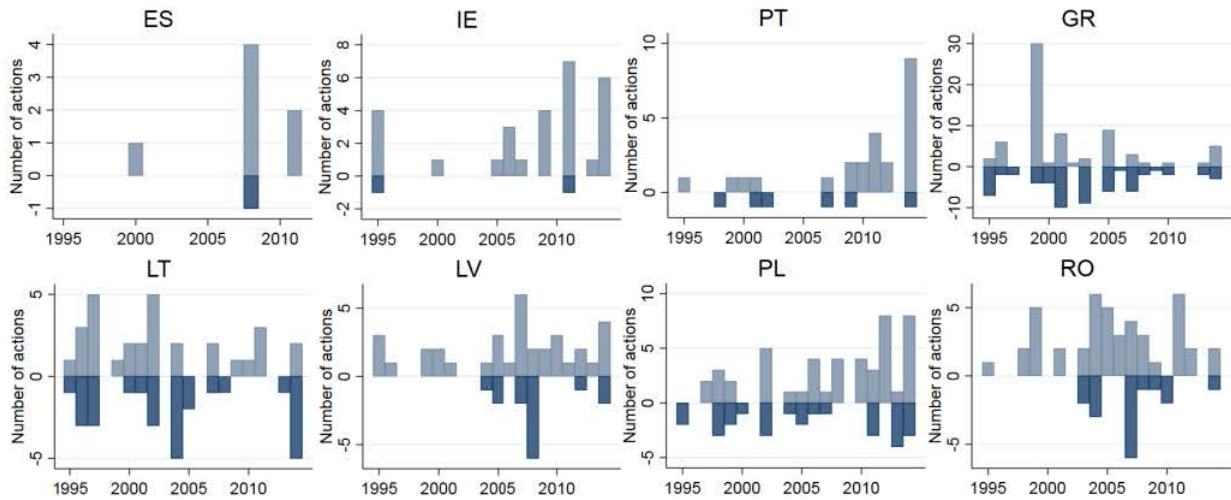
³²General Countercyclical Capital Buffer/Requirement ; Leverage Ratio for banks; Time-Varying/Dynamic Loan-Loss Provisioning; Loan-to-Value Ratio; Debt-to-Income Ratio ; Limits on Domestic Currency Loans; Limits on Foreign Currency Loans; Reserve Requirement Ratios; and Levy/Tax on Financial Institutions ; Capital Surcharges on SIFIs; Limits on Interbank Exposures; and Concentration Limits.

³³A majority of the measures documented are in fact microprudential. It would be more appropriate to refer to their full sample as just prudential.

³⁴With the exception of Greece, where financial imbalances built-up in the public sector.

³⁵Though the Baltic countries were also experiencing booms and were strongly shocked by the GFC, their situation stabilized relatively quickly. Like the EMU periphery, non-euro E.U. countries had been recipients of

Figure 1.6: Prudential policy activism in deficit countries



Source: Budnik & Kleibl (2018)

Endogeneity is a significant challenge for identifying the effects of macroprudential instruments: they react to credit, so are they causing the variations in credit or is it the other way around? Cross-country panel regression studies deal with the endogeneity problem by using instrumental variable estimation, in particular the Generalized Method of Moments (Cerutti, Claessens, & Laeven, 2017; Claessens et al., 2013; Zhang & Zoli, 2014). Using bank-level data rather than macro aggregates, as in Claessens et al. (2013), has the advantage of reducing the endogeneity issue: the chances of macroprudential policy being adjusted in reaction to the behavior of one bank are much smaller. However, this comes at the expense of sacrificing information about aggregate outcomes, since they cannot be inferred from effects on individual banks. Another solution to this is event study regressions Kuttner & Shim (2012), where the effect of policies are identified as the difference between the data around an event window (the time at which the measure is enacted) and the values predicted by a forecast. Cross-country panel studies (Cerutti, Claessens, & Laeven, 2017; Kuttner & Shim, 2016; Vandenbussche et al., 2015) are also useful in controlling for confounding factors at the country level (through individual fixed-effects and local policy variables) or global level (with global variables such as the VIX). Regarding the quality of the data, there is often a trade-off between coverage of countries and industries on the one hand; and frequency; time span and detail on the measures (duration, intensity) on the other Galati & Moessner (2018).

So far, evidence for effectiveness is most clear for borrower-based instruments: reductions in house price growth are achieved through LTV (Kuttner & Shim, 2012; Cerutti, Claessens, & Laeven, 2017; Zhang & Zoli, 2014) and DSTI policy Kuttner & Shim (2016), while house price growth is responsive to LTV and property taxes (Zhang & Zoli, 2014; Kuttner & Shim, 2016). Wong et al. (2011) and Ahuja & Nabar (2011) find that the effect on household credit growth for the LTV is robust across exchange rate regimes, which could signal this instrument as appropriate for sterilizing the domestic credit side-effects of currency pegs. Moreover, Claessens et al. (2013) show that LTV and DTI policies also have a stabilizing influence on individual bank balance sheets, since they are shown to reduce leverage and increase reliance on stable sources of funding. The evidence on the effectiveness of lender-based measures is positive on balance, if more ambiguous. Jiménez et al. (2017) study the Spanish experience with dynamic provisioning (a tool similar to the CCyB) with bank-level data in 2000-2008, finding that it did

capital flows from the EMU core, notably Germany.

have restrictive effects on loan supply, but not enough to prevent the crisis. For the U.K., Meeks (2017) concludes from a panel VAR of 21 banks that raising prudential capital requirements reduced credit growth, real expenditures and increased credit spreads; and runs a counterfactual exercise finding that tighter capital requirements would have moderated mortgage lending in the 2000's. Claessens et al. (2013) and Zhang & Zoli (2014) also use cross-country bank-level panel data to study the CCyB; with the former finding a statistically significant effect on asset growth and bank leverage in their 48 country sample, and the latter finding no effect for Asian countries. In the cross-country macro data panel study by Cerutti, Claessens, & Laeven (2017), lender-based measures appear as successful in curtailing credit growth in emerging countries but not in advanced economies. Overall, both borrower and lender-based policies appear better suited for moderating booms than for softening busts (Cerutti, Claessens, & Rose, 2017; Ostry et al., 2012).

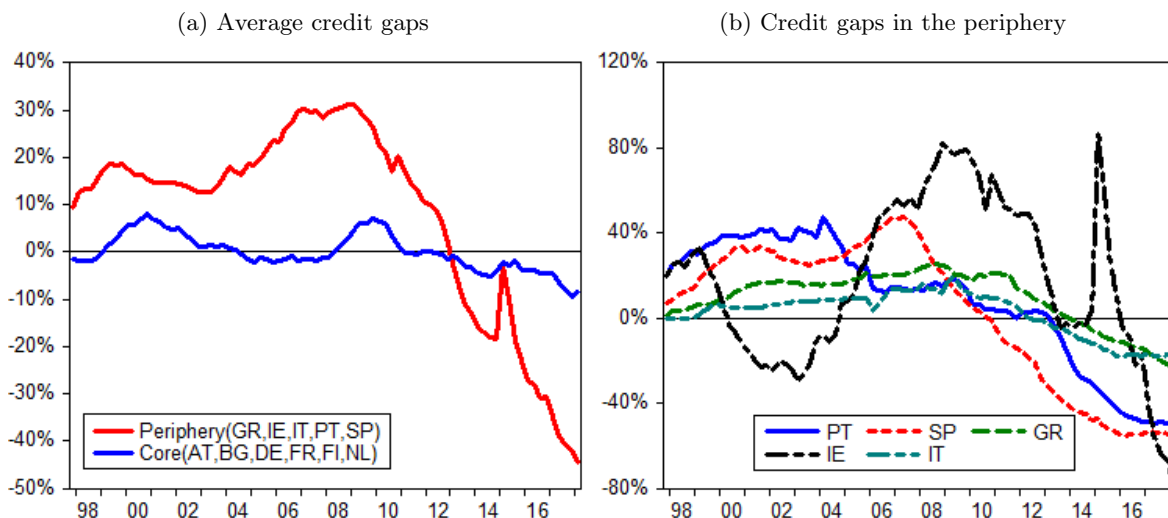
1.5 Financial Instability during the Euro Crisis

1.5.1 A sudden stop crisis with irrevocably fixed exchange rates

The GFC originated in the United States and spread to Europe first either through asset-side exposures to the subprime mortgage market, or through the liability side exposure to the global liquidity shortage. However, ten years after the collapse of Lehman, the U.S. is experiencing what could become its longest uninterrupted expansion in recent history while the Euro area is barely coming out of what many see as a lost decade of prosperity (Eichengreen et al., 2014). The U.S. subprime mortgage bubble is in fact only one of the pockets of systemic risk that emerged across industrialized economies during the so-called great moderation of the 90's and 00's. Very similar patterns came into play in the periphery of the Euro area, with the common currency being a factor both in the gestation and the troubled resolution of the crisis. The unification had very different effects depending on each country's macro profile. For the periphery, a common policy stance that by construction was set to fit the macroeconomic environment of more advanced countries³⁶ combined with above-average growth and inflation resulted in persistently negative real interest rates, loose financial conditions and their natural consequence: an irregularly rapid expansion of credit (Lane & McQuade, 2014; Unger, 2017). As shown in figure 1.7, panel a, the periphery experienced a pronounced boom and bust cycle measured by the high amplitude of the credit gap: from a pre-crisis peak of around 30% to a low of -40% in 2017. Ireland and Spain were the two clearest examples of this phenomenon, with an acute rise in the credit gap just after the unification and until the GFC; while Portugal was experiencing a boom going into unification that got gradually substituted by a rise in public indebtedness (figure 1.7, panel b). All countries, however, suffered a bust from 2010 onward.

³⁶Each country's influence in the area-wide inflation rate is proportional to its economic weight.

Figure 1.7: Evolution of private debt in the Euro area



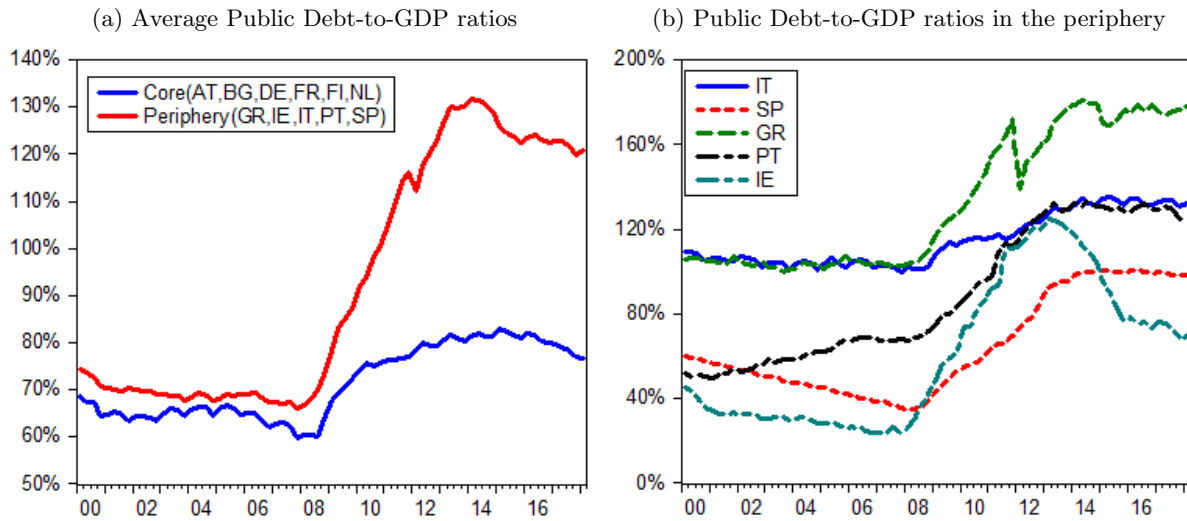
Data source: ECB, February 2019.

The acute spike in private credit for Ireland circa 2015 is a result of intra-firm liquidity flows of large foreign-owned corporations, see the Central Bank of Ireland's Macro-financial Review for the first semester of 2017, Box 2.

Before going into depth, we should have a brief discussion on the terms in which the debate of this crisis has been had. In the public discourse, it is common to speak of the European “sovereign” or “public” debt crisis, and the formulation is regularly used in reputable research papers and central bank speeches³⁷. Most crucially, the financial assistance programs provided *in extremis* by European institutions and the IMF to troubled countries was conditional on the implementation of procyclical austerity policies. Underlying this stance is an interpretation of the crisis as being chiefly the result of irresponsible fiscal profligacy characteristic of southern countries; and that any policy response should involve the immediate stabilization of public finances. With Greece and its up-to-then concealed 2009 deficit of 12% of GDP as the perceived epitome of the debacle, the “sovereign debt crisis” narrative seems intuitive on the surface. But, as pointed out by Gros & Baldwin (2015) and Baldwin et al. (2015), this reading only tells half the story at best.

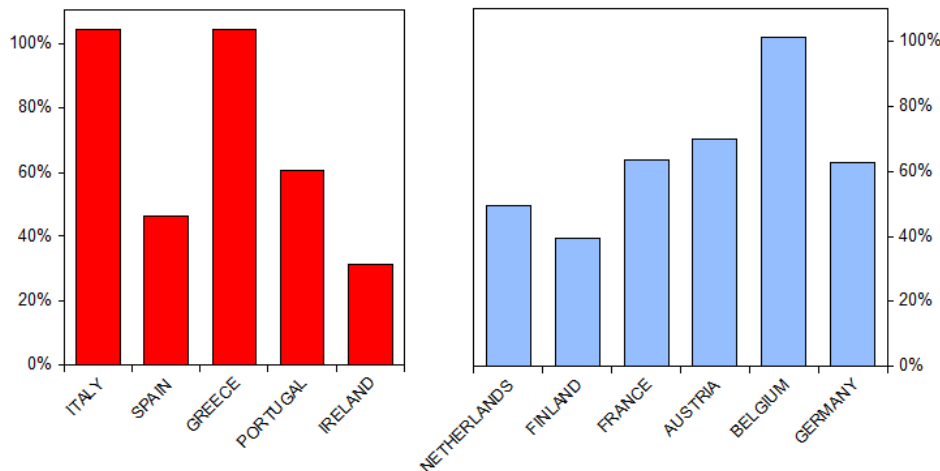
³⁷We can cite, for instance, Lane (2012) or Beirne & Fratzscher (2013).

Figure 1.8: Evolution of public debt in the Euro area



Data source: BIS, February 2019

Figure 1.9: Public debt-to-GDP ratio: average over 2000-2008



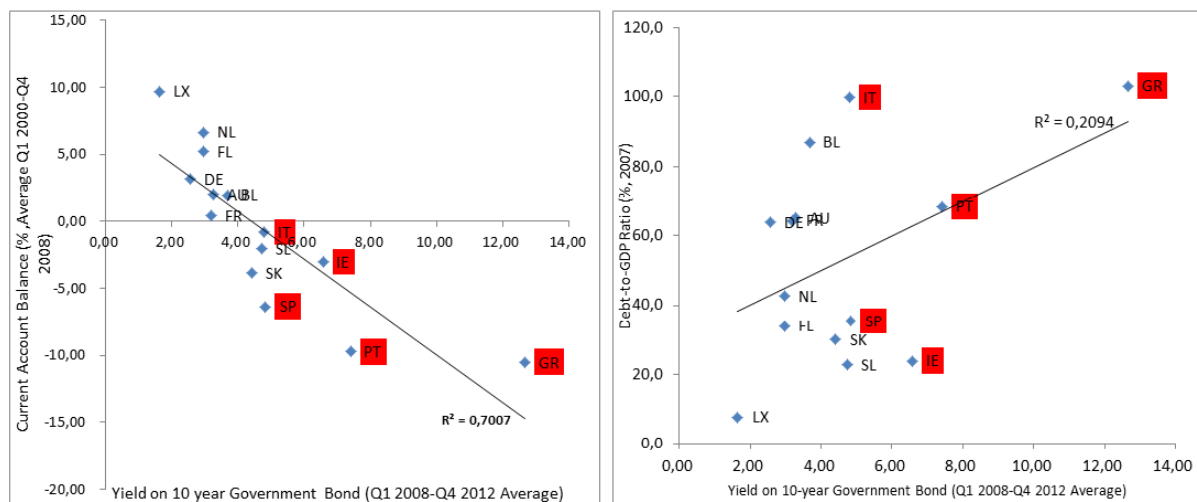
Data source: BIS, February 2019

Figure 1.8 tracks the evolution of the ratio of central government debt to GDP. Panel a shows that, at the aggregate, public debt was only between 10 and 5% higher in the periphery during the pre-crisis period with respect to the core; the scissors effect does not start until after 2008. In fact, public debt in Spain and Ireland was on a downward trajectory (perhaps inflated by tax receipts from the property boom fueled growth), which inflected precipitously with the GFC. If we compare the average debt-to-GDP ratio during the pre-crisis period between core and periphery countries (figure 1.9), we fail to notice a systematic difference: Ireland ranks lower than any core country, Portugal did not average a worse performance than France and Austria, and Belgium is closer to Italy and Greece than to the other core countries. At any rate, unsustainable sovereign debts appear as having been at least as much a consequence as a cause of the crisis. The “sovereign debt crisis” narrative focuses on the proximate causes of systemic stress and ignores its ultimate roots. In reality, the common denominator to crisis-struck economies was external debt, and the most appropriate categorization for the Euro crisis is as a balance of payments crisis fueled by intra-area capital flows (Merler & Pisani-Ferry, 2012; Liu & Kool,

1.5. FINANCIAL INSTABILITY DURING THE EURO CRISIS

2018). Figure 1.10 plots the of the average yield on sovereign bonds during the crisis period against the average of the current account balance over 2000-2008 (left) and the debt-to-GDP ratio in 2007 (right), showing that the latter is a better indicator of future systemic stress ³⁸.

Figure 1.10: Euro crisis: External (not sovereign) debt crisis



Data source: OECD, February 2019

It is by now well documented in the literature that the unification fostered an “Euro bias” in investment strategies across asset classes to different but always considerable degrees (Lane, 2006; Lane & Milesi-Ferretti, 2001; Coeurdacier & Martin, 2009; Fund, 2010). Unification had aligned incentives and expectations in a way that favored a reorientation of financing flows towards the periphery. With lower starting levels of leverage and assumed higher potential yields, the pull factors were in place to attract foreign capital. In contrast, core economies presented a more mature investment profile, but the financial institutions that populate them had preferential access both to ECB funds and global liquidity markets. As a result, they became the central nod in a chain of intermediation with domestic savings, ECB funds and global liquidity at one end; and public and private borrowers in the emerging half of the Euro area at the other (Lane, 2013; Hale & Obstfeld, 2016)³⁹. Empirically, this reading of the crisis is notably supported by the work of Hobza & Zeugner (2014), who analyze data on bilateral financial flows constructed by correcting for asset valuation discrepancies. The broad picture painted by their results deserves to be quoted at length:

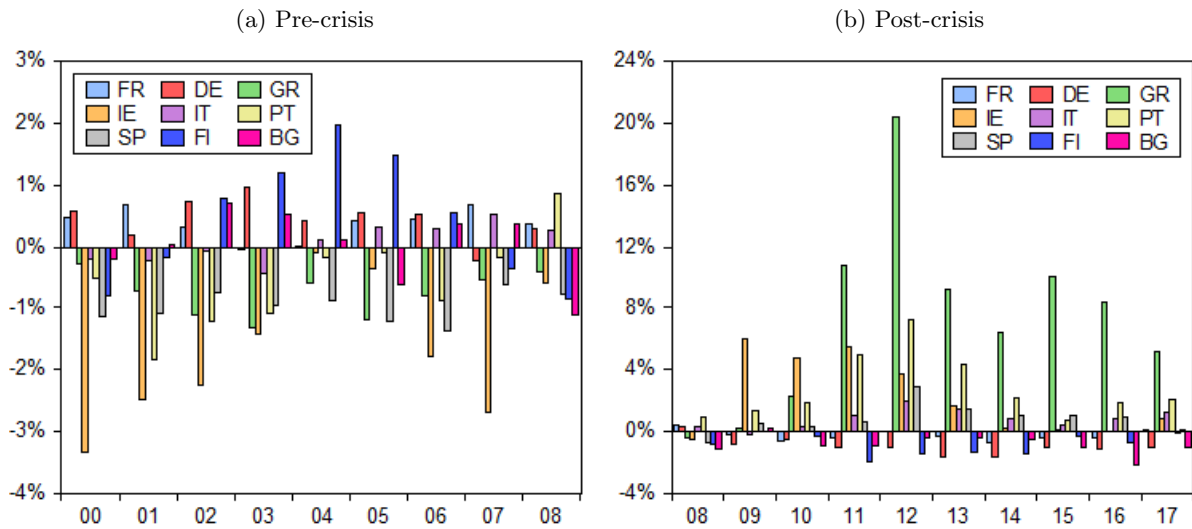
*“First, there has been an important degree of ‘euro’ bias in the gross as well as net financial flows. The current account deficits in the euro area periphery were **almost exclusively financed from within the rest of the area**, mostly by countries with current account surpluses but also through flows intermediated via France and the UK. Second, a lion’s share of this financing took the form of debt in the pre-crisis period. Third, the intensity and direction of financial flows with the non-EU countries differ between surplus and deficit economies. While the deficit countries depended on their euro area partners to cover their net financing needs, they were only one among the many important financial partners of the surplus countries.”*

³⁸Hope (2016), through a counterfactual exercise, provides evidence on the casual relationship between unification and current account deficits in the periphery.

³⁹One interpretation proposed by Ersal-Kiziler & Nguyen (2016) is that Core banks, who are not exposed to currency risk, capture and channel the extra-euro area flows that in a non-euro world would have otherwise gone directly to the periphery.

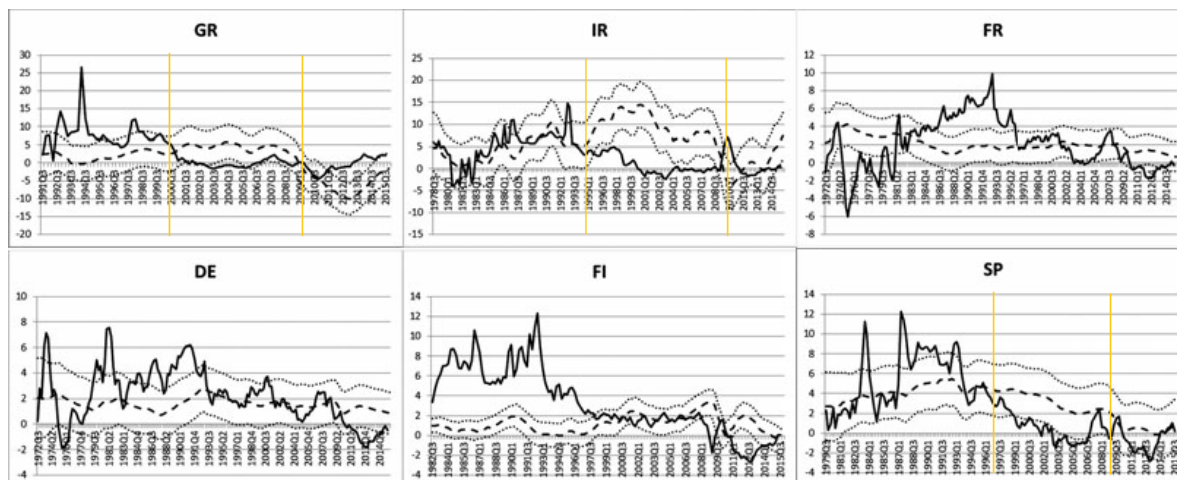
It is possible to describe the conditions that propitiated the debt bubbles in the periphery using the concept of financial elasticity (Borio & Disyatat, 2011) and how it is shaped by monetary and regulatory regimes. Among decades-long trends of deepening financial globalization, decreasing long interest rates and low inflation despite loose monetary policies, imposing a common monetary regime on heterogeneous countries resulted in asymmetric credit environments. Figure 1.11 plots, for each nation, the difference between the real interest rate and the EMU average, showing how rates are persistently negative (positive) differentials for the periphery (core) in the pre-crisis period and vice versa afterwards. If, as advocated by Borio & Disyatat (2011), we also consider a wicksellian perspective; it follows that a considerable differential between market interest rates and the unobservable natural interest rate would imply a substantial need for foreign capital to cover the gap between domestic savings and investment. Belke & Klose (2017) estimate equilibrium interest rates series for Euro area members with the purpose of testing a secular stagnation hypothesis; their results show significant and persistent gaps between real market rates and real natural rates in the periphery, implying loose financial conditions (figure 1.12). Finally, the common monetary regime sent a powerful message to financial markets by allowing the ECB to accept sovereign bonds of any member state as riskless collateral, resulting in a rapid convergence in interest rates across the union.

Figure 1.11: Real interest rate differential with respect to area average



Data source: BIS, February 2019

Figure 1.12: Periphery: gaps between market rates and natural rates



Source: Belke & Klose (2017)

Solid line: market real interest rates. Dashed line: estimates for ex-ante natural (i.e. non-inflation accelerating) real interest rate. The yellow lines isolate periods in which market rates were noticeably and persistently lower than natural rates in Ireland, Spain and Greece.

On the regulatory regime front, It is important to consider the purpose of the EMU within the European Union's long term objective of converging towards an "ever closer union". Beyond its role as a substitute to previous failed attempts at fixed exchange rate regimes (the "snake" and the European Monetary System) or as an international currency capable of rivaling the US dollar, the Euro was conceived by its founders as the next logical stage of the economic integration process that had been a driving force of the European project from the beginning. By eliminating exchange rate risk and other transaction costs, the euro was meant to achieve the single market for financial services and foster the free transit of financial flows across national borders. The first (1977) and second (1989) banking directives, along with the Financial Services Action Plan (1999), laid out the terms on which the integration of European finance would take place; implicitly guided by a belief in the efficiency of frictionless markets. Among the instituted reforms are the repeal of controls over interest rates and cross-border capital flows, the harmonization of regulatory standards as well the establishment of a single banking license under which foreign banks could operate abroad while remaining subject only to the supervisory standards of their home country; to name a few. The free-market philosophy that was intrinsic to the construction of the single market and then the Euro is well illustrated by the following excerpt of European Commission White Paper (European Commission, 2005, p.5):

*"Financial markets are pivotal for the functioning of modern economies. **The more they are integrated, the more efficient the allocation of economic resources and long run economic performance will be.** Completing the single market in financial services is thus a crucial part of the Lisbon economic reform process; and essential for the EU's global competitiveness."*

Though pointing out that a project of regional integration is based on liberal doctrine might come off as tautological, it is worth emphasizing that countries lured by the benefits of the common currency (such as the importation of monetary discipline) had to implicitly subscribe to that doctrine as the price of admission. For countries such as Germany or the Netherlands that had started liberalizing and opening their financial sectors as early as the 1950's and 1960's.; the implementation of these reforms was relatively straightforward. In contrast, finance in peripheral countries remained stringently regulated and heavily influenced by an interventionist state

apparatus well into the early 1980's. It was not until the 1990's that peripheral countries fully permitted foreign bank ownership and ensured national treatment of foreign banks, developed securities markets and removed restrictions on capital flows and other financial activities (see table 2). Abiad et al. (2008) build a composite database of financial reforms that shows that Greece, Ireland, Italy, Portugal and Spain all liberalized their financial sectors much later than their core country peers, and did so with the express motivation of qualifying for Euro membership. In countries where institutions have less of a tradition in overseeing free markets, rapid financial liberalization can result in irresponsible lending practices (Fernández-Villaverde et al., 2013).

Table 1.2: Timeline of financial liberalization reforms

	First Banking Directive (1977)	Second Banking Directive (1989)	Lifting of Capital Controls	Interest Rate Deregulation
Germany	1978	1992	1967	1981
Netherlands	1978	1992	1980	1981
Greece	1981	1992	1980	1981
Ireland	1989	1992	1985	1993
Italy	1985	1992	1983	1990
Portugal	1992	1992	1992	1992
Spain	1987	1994	1992	1992

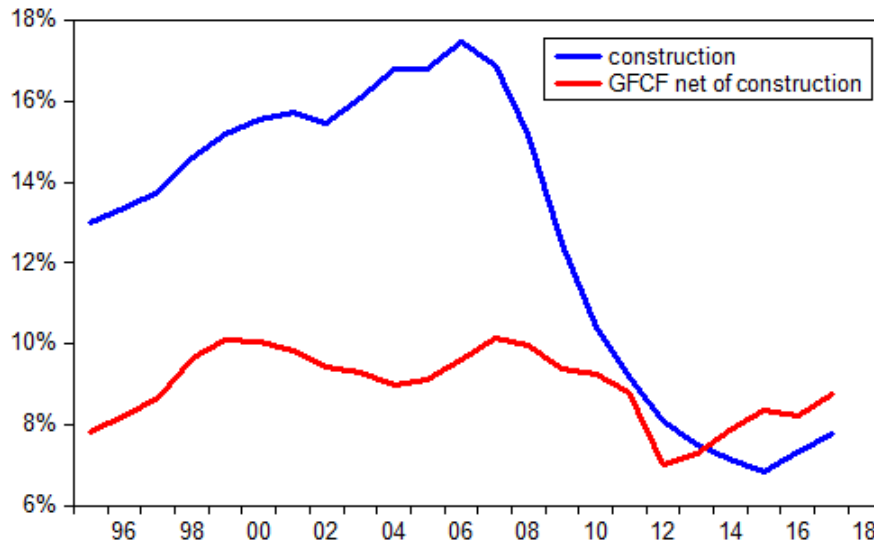
Source: Author

Both regulatory and monetary regimes evolved in a direction favorable to financial integration, and under the trend of deepening globalized financialization it was natural for emergent Europe to become a net importer of capital. But this begs the perennial question: are current account deficits necessarily bad? According to the standard intertemporal view on the current account (Obstfeld & Rogoff, 1995), it is natural for a less developed country to import foreign capital to fund its catch-up process, while also allowing for a more efficient allocation of capital at the global level. However, whether a deficit is benign in the long run will depend on how well the foreign capital is being spent. If it finances investment by productive and competitive firms, this will increase productivity, potential output and the exportable surplus of the economy. If, however, it is mainly used to prop-up real estate and construction or current period consumption, it is unlikely that the country will produce the necessary economic value to generate future surpluses and stabilize its external position. What's more, since a real-estate boom is underpinned not by value-creating potential but expectations of continually rising house prices, the adjustment that comes when the housing bubble bursts is particularly costly for aggregate demand. As shown by Blanchard (2007), it is common for the non-tradable sector to grow disproportionately after consecutive current account deficits, and thus for the exporting sector to decrease in relative weight, with negative consequences for long-term growth (Krugman, 1987; Rodrik, 2008). Finally, due to the irreversible fixation of nominal exchange rates and the perception in some policymaking circles that the burden of adjustment must fall on the debtor, rebalancing of the current account must come from internal devaluation (adjustment of wage competitiveness and internal demand), making the recessionary shock stronger than it would be otherwise. Giavazzi & Spaventa (2010) document how most of the capital flows that the periphery received went into the non-tradable sector. While private capital investment remained relatively stable (between 8 and 10% of GDP), construction soared from 15% in 2000 to almost 20% in 2007, before undergoing a major collapse to a trough of 7% in 2015 (figure 1.13)⁴⁰. Gopinath et al. (2017) show that, to the extent that capital flows financed firms in

⁴⁰For the Spanish economy during the pre-crisis period, these dynamics between intra-area capital flows, domes-

Spain, Italy and Portugal, they disproportionately financed less productive firms with inflated market values, thus harming aggregate productivity.

Figure 1.13: Periphery: gross fixed capital formation and construction investment (% of GDP)

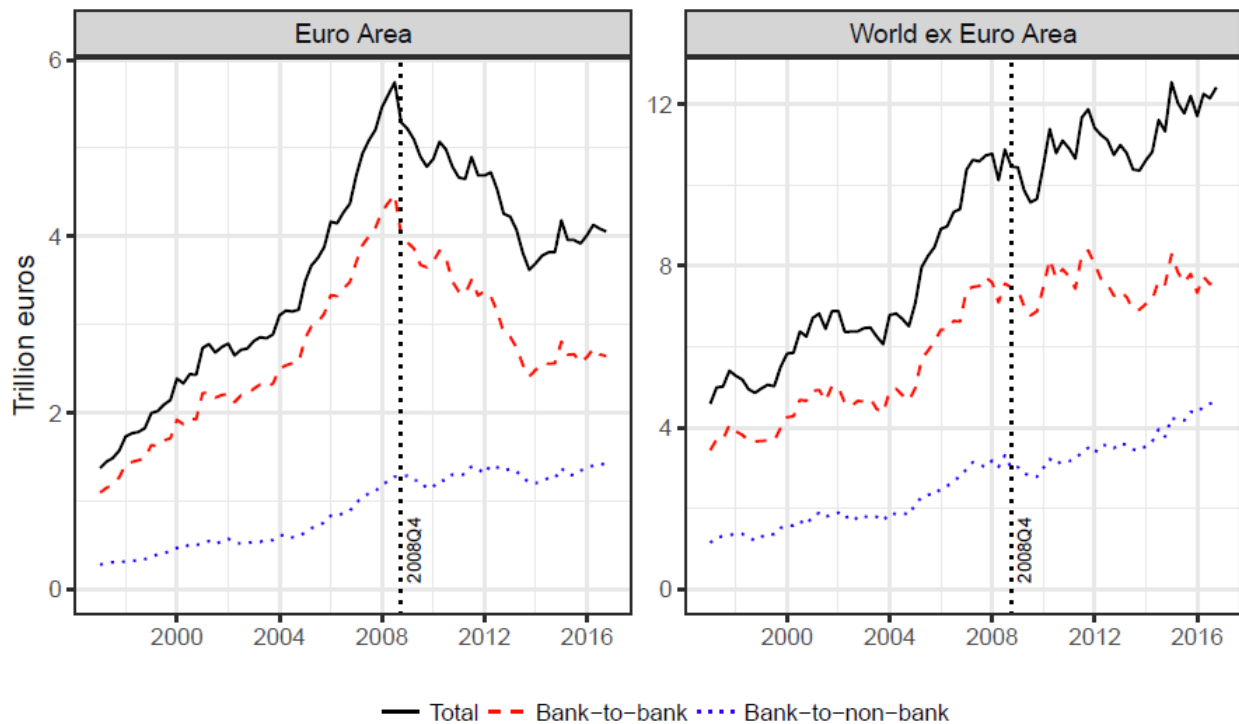


Data source: Eurostat, February 2019

Whether capital inflows are destabilizing depends not only on what they finance but also how easily they can be reverted. Notably, if the inflows take mostly the form of short-term debt instruments, as opposed to long term equity assets or FDI, the host country is more vulnerable to a sudden stop crisis because all it takes is for creditors to refuse to roll over short-maturity claims. As exposed by Hoffmann et al. (2018) and Poutineau & Vermandel (2015), financial integration in the Euro area was essentially driven by integration in the interbank market. While direct cross-border lending to NFAs grew modestly and steadily, cross-border interbank lending experienced an acute boom cycle followed by a precipitous bust (figure 1.14, left panel). In contrast, the retrenchment of interbank flows in the rest of the world was not nearly as strong (figure 1.14, right panel). In fact, the Euro interbank market became fractured along national lines, with periphery banks facing noticeably more restrictive financing conditions (Abbassi et al., 2014). This is especially true of the period where concerns about sovereign debt were most acute (see Garcia-de Andoain et al. (2014)). Gabrieli et al. (2018) analyze bank-level data and find that sovereign debt holdings of troubled countries (which were disproportionately held by their domestic banks) were priced in interbank borrowing rates.

tic credit booms and property bubbles are illustrated by In 't Veld et al. (2014) in an estimated New-Keynesian model and Maas et al. (2018) in a mixed-frequency VAR framework.

Figure 1.14: Euro interbank lending boom and bust



Source: Hoffmann et al. (2018)

1.5.2 Policy responses

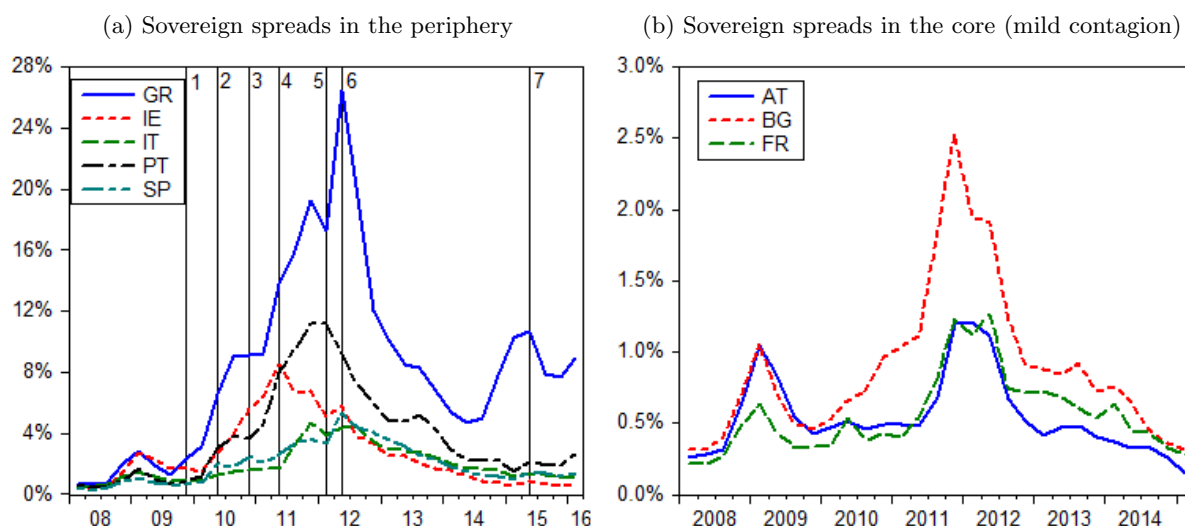
By 2007, aggregate liabilities were being accumulated at a pace such that a critical mass of borrowers had most likely become Ponzi units (in the Minsky sense), meaning that the only thing keeping them solvent was the easy credit environment and the continuous appreciation of their collateral but had no credible way of generating the necessary cash flows to meet their commitments. With the vulnerabilities set up, the only thing needed to trigger a crisis was a reversal of expectations; a sudden and widespread realization among creditors that what they thought of as a boom was in fact a bubble. In Ireland, house prices had stabilized circa 2006, but the GFC's effects on export demand and global liquidity put strains on growth and, most importantly, the funding schemes of banks with excessive maturity mismatch (Lane, 2011). In October 2009, the newly invested Greek government revealed the true size of the budget deficit concealed by their predecessors, a scandalous 12%. This was interpreted by markets as a signal of public debt going into an explosive path. Greece attempted to stabilize its finances, but the combined effects of more expensive borrowing conditions, lower external demand and the contraction of an economy highly dependent of government spending quickly doomed this effort. It was here that another fault line in the Euro's construction became apparent: given the ECB's no-bailout clause⁴¹, the Greek state had no lender of last resort.

In May 2010, a bailout packaged was provided by the ECB, the European Commission and the IMF of around EUR 100 billion, around a third of the central government debt balance at that point. This failed to reassure markets, and in fact the symbolic significance of a member state requiring official assistance might have contributed to fuel the contagion that quickly spread to

⁴¹Article 125 of the Treaty of the Functioning of the European Union. Because the ECB is owned by the members states, the direct purchase of sovereign bonds by the ECB is to be considered an indirect fiscal transfer between members.

Ireland and Portugal, who subsequently needed rescue packages themselves (figure 1.15, panel b). After weathering the storm of the Lehman shock, the Spanish banking sector (and local savings institutions in particular) suffered when the Euro money market dried up from 2010 onward while taking more and more losses on domestic mortgage assets. It would eventually need an emergency recapitalization, of which around 40 bn came from European funds. During the most acute phase of the crisis in 2011-2012, some high-debt core countries began to exhibit early signs of contagion (figure 1.15, panel b). Ad-hoc supranational institutions were created to administer the bailouts: the European Financial Stability Facility and its successor, the European Stability Mechanism (ESM); owned by the member states and with a capacity to extend up to EUR 500 bn in loans. While the creation of these emergency mechanisms is a welcome improvement for fiscal risk-sharing, they lack the capacity or the mandate to act as tools of fiscal stabilization. The argument that a fiscal transfer union is necessary to render the EMU macroeconomically consistent has garnered significant support (Berger et al., 2018; Aguiar et al., 2015; Farhi & Werning, 2017; Furceri & Zdzienicka, 2015; Hjortsoe, 2016).

Figure 1.15: Sovereign spreads, failed bailouts and contagion



Data source: OECD, February 2019

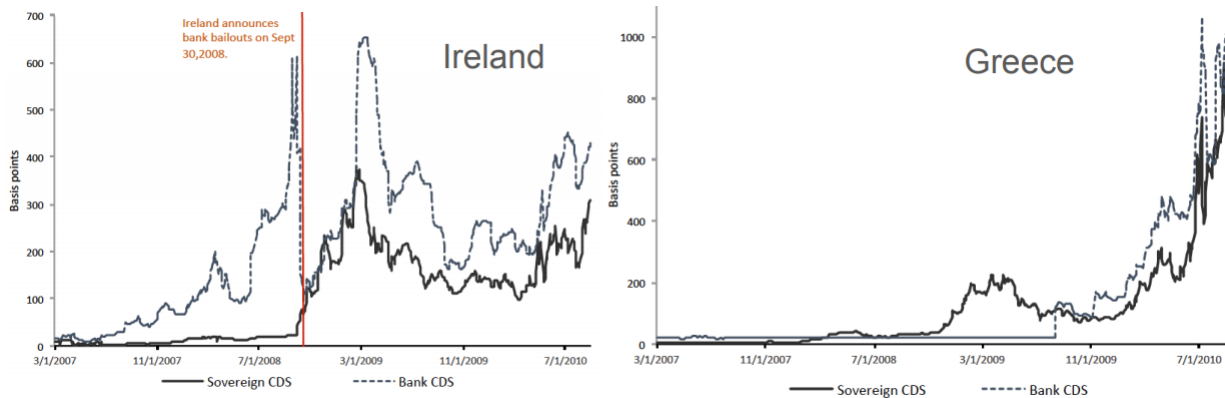
(1) Announcement of Greek deficit, (2) 1st Greek bailout, (3) Irish bailout, (4) Portuguese bailout, (5) 2nd Greek bailout (6) Spanish Bank bailout, "whatever it takes" announcement (7) 3rd Greek bailout. Spreads are calculated with respect to yield on German bonds.

To fully understand how contagion can spread so quickly between member states, it is imperative to grasp the relationship between sovereign and bank solvency, nicknamed the "doom loop". Despite the rise of financial integration, a strong home bias had persisted in bank holdings of sovereign debt (Altavilla et al., 2017; Battistini et al., 2014), making the quality of their portfolio inextricably linked to the sovereign's perceived solvency. At the same time, financialization had bloated the balance sheets of banking industries to the point of becoming several times larger than the national economies that housed them (Hale & Obstfeld, 2016). Therefore, the mere prospect of them needing a bailout was enough to make investors worry about public finances⁴². This is how, for instance, Ireland's primary balance could approximate -30% of GDP in 2010 coming from a surplus in 2007: with bank liabilities standing at over 700% of GDP, backstopping its banks collapsed the Irish government's fiscal position at a stroke. As explained

⁴²The paradox of this situation is famously captured by former BoE governor Mervyn King's depiction of banks as "global in life and national in death".

by Brunnermeier et al. (2017), this creates a fragile situation in which a significant shock to the creditworthiness of either results in a spiral that threatens to bring down both (see also Acharya et al. (2014)). As shown in Greece and Ireland, the result is the same regardless of where the spiral starts (figure 1.16).

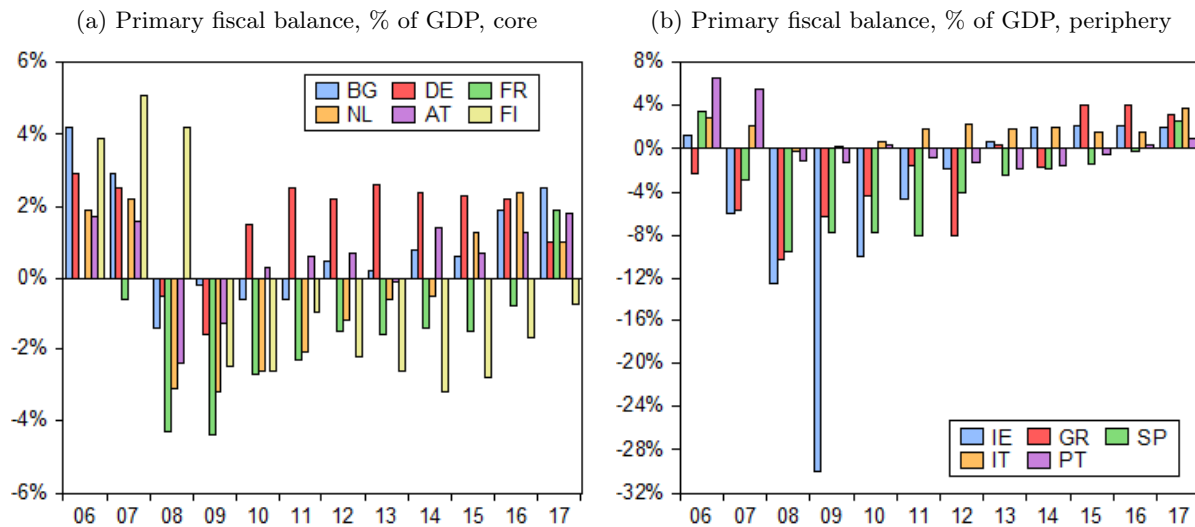
Figure 1.16: Sovereign and bank CDS premia comove in Ireland and Greece during the crisis



Source: Farhi & Tirole (2018)

A crucial amplifier of market reactions was the Greek debt restructuring agreed in March 2012 as part of the terms of a second bailout package. The measure involved a 50% haircut on private holders, a move that shattered the long-defended perception that a sovereign default was not possible in the EMU (Baldwin et al., 2015). This was not to be the only miscalculation of European policymakers in their response to the crisis. Austerity measures of the scale that were imposed by the bailout packages had an acute and quickly felt effect on demand and therefore tax invoices (Mastromatteo & Rossi, 2015; Heimberger & Kapeller, 2017), especially since they were implemented through tax hikes which tend to have stronger negative multipliers (Alesina et al., 2015). After some initial stimulus right after the GFC, fiscal policies became procyclical across the board. This happened at the national level, where the economies that had lost the most output were the ones to suffer the strongest consolidations; but also at the area-level, where a synchronized tightening by all countries ensured that support for aggregate demand was nowhere to be found. Figure 1.17 tracks primary deficits in the core (panel a) and the periphery (panel b), showing that after a period of deficit spending in the immediate aftermath of the GFC, all countries save for Finland engaged in fiscal tightening, with the German shift to surplus starting in 2010 being particularly significant to the area's aggregate demand. When demand contracts severely, the positive effects of nominal debt reduction are offset by the loss of GDP growth. The trajectory of periphery public debt during 2009-2014 is a testament to the failure of austerity policies (figure 1.17, panel b): debt continuously accumulated until the ECB explicitly assumed its role as lender of last resort for EMU states in the summer of 2012 and put an end to the precipitous rise of sovereign yields.

Figure 1.17: Fiscal policy: procyclical shift after the initial stimulus

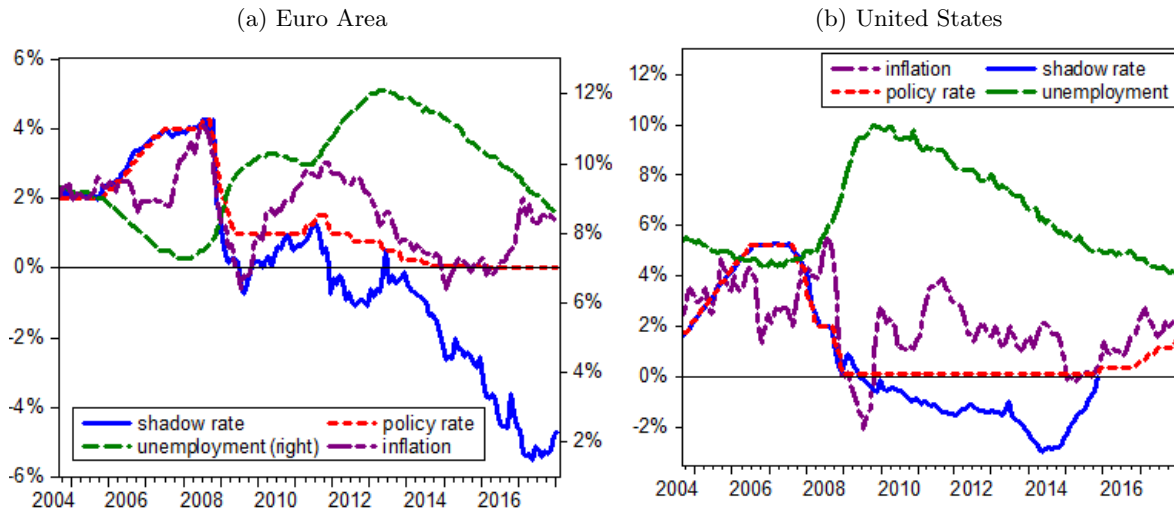


Data source: OECD, February 2019

The primary balance is the fiscal balance net of debt service expenses.

The performance of the ECB has been more nuanced: it has eventually risen to the occasion with extraordinary measures when needed and partially filled the void left by fiscal policy as a provider of stimulus; but its slow reactivity has been source of unnecessary pain, especially in the early years of the crisis. Ligthart et al. (2015) employ event study methodology to compare the ECB's reaction to the crisis to the Fed's. They find that the ECB was noticeably more hesitant in its monetary stimulus, waiting until July 2012 to bring policy rates under 1 percent and even raising rates twice in the first semester of 2011, in fear of inflationary effects of commodity prices rebounding from their GFC plunge. In contrast, the Fed was practicing near zero rates by January 2009, a mere year and a half after the start of the subprime crisis. It is well-known that the FED has a dual mandate of ensuring price stability and full employment, while the ECB's design, history and culture results in a stronger aversion to inflation risk. While the FED hit the ZLB in 2009, the ECB did not take nominal rates to zero until 2014.

Figure 1.18: Monetary policy responses: the ECB and the FED



Data sources: BIS, ECB and Wu & Xia (2016), February 2019

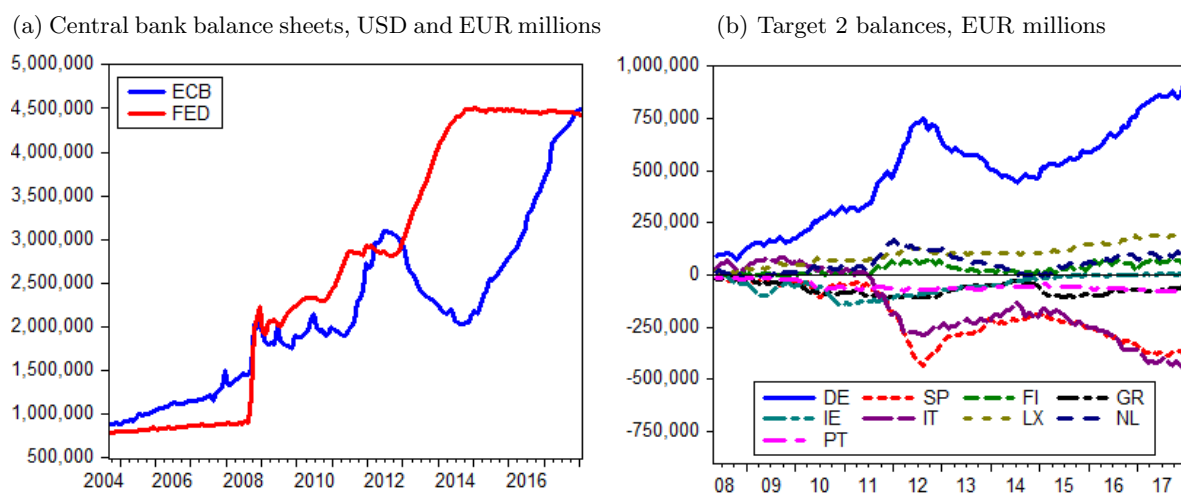
The Shadow Rate is an alternative measure for the central bank policy rate that incorporates the effect of unconventional monetary policy, notably quantitative easing (Wu & Xia, 2016).

As for its role of lender of last resort, the ECB reacted to the Lehman shock by reorganizing its main refinancing operations around a fixed rate full allotment policy. Alongside this, the range of assets that could be accepted as collateral was widened (i.e. credit easing), the Long-Term Refinancing Operations (LTROs) programs were instituted which granted refinancing at 6-month and 1-year maturities, and swap lines were agreed with major central banks to curb the shortage in FX markets. For all intents and purposes, the ECB had substituted itself to the interbank market that had broke down along with confidence (Garcia-de Andoain et al., 2016). However, due to inflation hawkishness and its supposed statutory prohibition to monetize debt, it was initially reluctant to react to the Euro crisis in the same extraordinary way the FED reacted to the subprime crisis. In 2010-2011, as the bailouts came in quick succession, the only noteworthy intervention was the Securities Market Program (SMP) where 100 bn worth of government securities were purchased on secondary markets in August 2011 and subsequently sterilized due to inflation concerns. Once again, the intervention was too tame to reassure investors and sovereign premia continued their ascension. The difference in reaction between the ECB and the Fed can be further examined by comparing their unconventional stances with the help of the shadow interest rate. Very shortly after the outbreak of the GFC, the FED reaches its ZLB and will immediately engage in successive QE programs that will last until late 2014, resulting in a negative shadow rate during the period and a steady decrease in unemployment to pre-crisis levels (figure 1.18, panel b). The ECB, on the other hand, started to tighten unconventional policy after the initial post-GFC stimulus (making the shadow rate briefly converge towards the policy rate), before reversing course once the deflationary pressures of the Euro crisis became evident (figure 1.18, panel a). The rebound of the unemployment rate in 2011 is evidence of the Euro area's double dip recession, and the deflationary episode of 2014-2015 was materially longer than in the US.

It was not until 2012, after the sovereign spreads of some core countries with high public debt (France, Belgium and Austria) had started to manifest signs of contagion that the ECB stopped delaying the inevitable. The tone was emphatically set by Draghi's "whatever it takes" speech, the turning point of the crisis and a signal of how unconventional policies would be

scaled up in years to come. Gone was the official posture that unconventional measures were temporary in nature; LTROs had now been extended to 36 months and in August 2012 it was explicitly stated that extraordinary measures would stay in place as long as they were needed. The SMP was succeeded by the Outright Monetary Transactions (OMT) program, which allows the ECB to make potentially unlimited sovereign bond purchases on the secondary market for countries that have entered a bailout program with the ESM. OMT is therefore the mechanism by which the ECB signals itself as a lender of last resort, and it had a resounding stabilizing effect despite never being used (Gabrieli et al., 2018; Altavilla et al., 2016; Szczerbowicz, 2015). However, it should be emphasized that OMT can only be used after an ESM bailout agreement has been reached, meaning that whether and how quickly the ECB can act as a lender of last resort is conditioned by political variables⁴³. With the worst case scenario now abated, the ECB turned its focus to fighting the deflationary pressures stemming from private sector deleveraging. In 2013, the ECB started using forward guidance (announcements on the future conditional path of policy instruments) to strengthen downward pressures on long-term interest rates. By 2014, with the zero lower bound approaching and inflation stubbornly low, more radical unconventional measures were introduced into the toolkit: negative interest rate policy and a true quantitative easing program including government securities to be launched in late 2014-2015. Just as the FED was starting to halt its QE program, the ECB was launching its own (figure 1.19, panel a). Panel b of figure 1.19 plots the diverging trajectories of Target 2 balances, the net claims of each national central bank on the ECB. We can see that each time the ECB's balance sheet expands, the core increases its net creditor position and the periphery deepens its net liabilities. Unconventional monetary policy was the channel by which official financial flows substituted the private capital flight.

Figure 1.19: Central bank balance sheets and Target 2 (im)balances



Data sources: BIS and ECB, February 2019

Beyond the macrofinancial asymmetries on which we have focused thus far, the crisis showed that a national approach to supervision and crisis management was inappropriate. In Spain, the process of resolving the troubled savings bank sector at times ended up creating more systemic endangered entities, as shown by the Bankia case. Moreover, resolution for cross-border banks may lead to coordination failures as national interest can conflict, as was the case with Fortis and Dexia (BCBS, 2010). De Larosiere et al. (2009) and Goodhart & Schoenmaker (2009)

⁴³For example, the decision by German head of state Angela Merkel to manifest support for OMT despite the Bundesbank's opposition to it is recognized as having been fundamental to the program's success

stressed the importance of supporting the single market for financial services with a harmonized infrastructure for supervision, regulation and resolution. The response came in the form of the Banking Union, a set of reforms spearheaded by the creation of a Single Supervisory Mechanism (SSM) for microprudential supervision under the auspices of the ECB and of a Single Resolution Mechanism (SRM) to lead crisis management⁴⁴. As of 2015, the EMU's 120 or so most significant banks (comprising 80% of banking sector assets) are under the direct oversight of the SSM⁴⁵, while the rest are indirectly supervised through national authorities. The SRM is charged with creating a common and harmonized framework for resolution that can improve upon the ad improvisation that was seen at times during the crisis. Notably, the decision to trigger resolution has been transferred to the supranational level in order to avoid national conflicts of interest. By setting the decision-making power at a level that is less vulnerable to national vested interest, intervention should take place earlier, which is crucial for minimizing systemic costs (Hoshi & Kashyap, 2015). In addition, the existence of a common fund for bank resolution is a good first step to breaking the doom loop, but doubts have been raised regarding the adequacy of its size (De Groen & Gros, 2015) and its contribution rule (Beranger & Scialom (2015) argue that, by making contributions proportional to deposits, the rule creates an incentive to rely on market funding). Area-wide deposit insurance, the third pillar of the banking union, has been a part of the discussion from the beginning but it is unclear whether its implementation is politically feasible given the opposition for fiscal risk-sharing; and many consider it quintessential for truly putting an end to the doom loop and completing the EMU (Gros & Schoenmaker, 2014; Howarth & Quaglia, 2014; Beranger & Scialom, 2015; Obstfeld, 2013a).

In the few years it has been in place, resolution under the SRM has shown both signs of promise and fragility. In order to protect the taxpayer and combat moral hazard that comes with the expectation of bail-outs, the SRM has sought to institute bail-in as the resolution mechanism *par excellence*: no external funds may be mobilized until the bank's shareholders and creditors have been imputed losses equal to 8% of liabilities. In 2017, two cases in the periphery showed that success in implementing this new status quo is all but guaranteed (Beck, 2017). In Spain, the SRM oversaw the takeover of Banco Popular by Santander with shareholders and creditors undertaking the totality of the losses. Italy, in contrast, failed to resolve Banca Popolare di Vicenza and Veneto Banca without taxpayer involvement. Troubled assets were taken over by a government-sponsored bad bank, while good assets were bought by Intesa Sanpaolo with the help of government subsidies. Most troubling, senior bondholders did not suffer haircuts. In fact, the current framework gives national resolution authorities discretion to exclude selected liabilities under exceptional situations. Even if the two banks in question were relatively small, it was assessed that the broader Italian banking system could not absorb them on its own without creating broader systemic vulnerabilities. As the single resolution fund will not be operational until 2023, public funds had to be mobilized. Therefore, at least until this date, it seems that the credibility of bail-in will be conditioned by national situations (Beranger & Scialom, 2015). As long as this persists and common deposit insurance remains off the table, it is likely that investors will continue to behave under the assumption that banking systems are backstopped by increasingly indebted national states, and so the threat of the doom loop is very much alive (see also Altavilla et al. (2017), who show that the intertwining of bank and sovereign solvency might be stronger post-crisis).

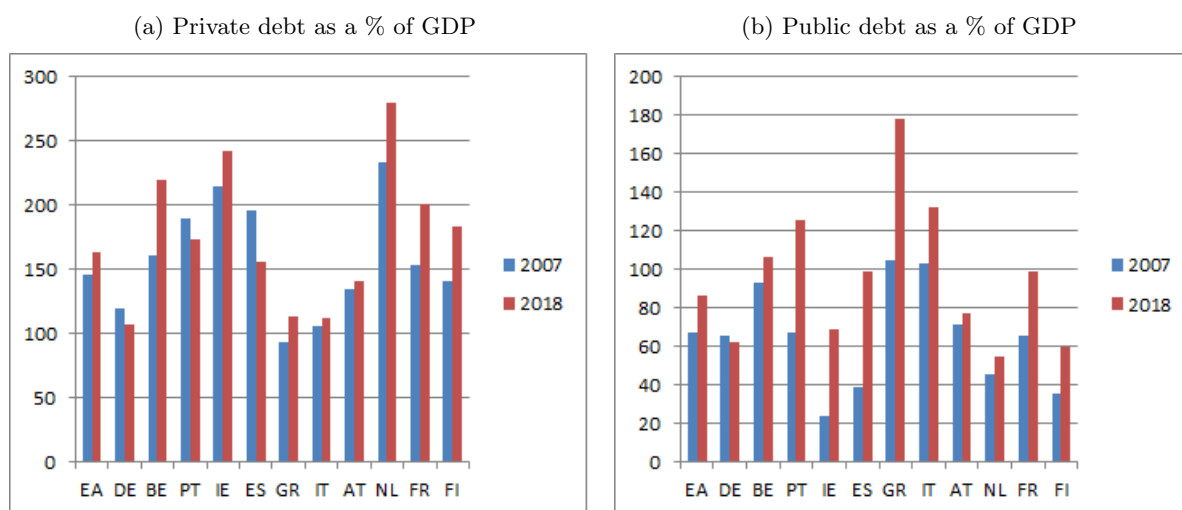
⁴⁴See Howarth & Quaglia (2014) for an overview of the rationale and construction of the SRM.

⁴⁵To enter direct SSM oversight, a bank must either (a) hold at least EUR 30 bn in total assets, (b) be one of the top 3 largest banks in its country (c) have a balance sheet that represents 20% or more of its country's GDP, or (d) have benefited from official EMU assistance.

1.5.3 Financial stability issues in a fragile recovery

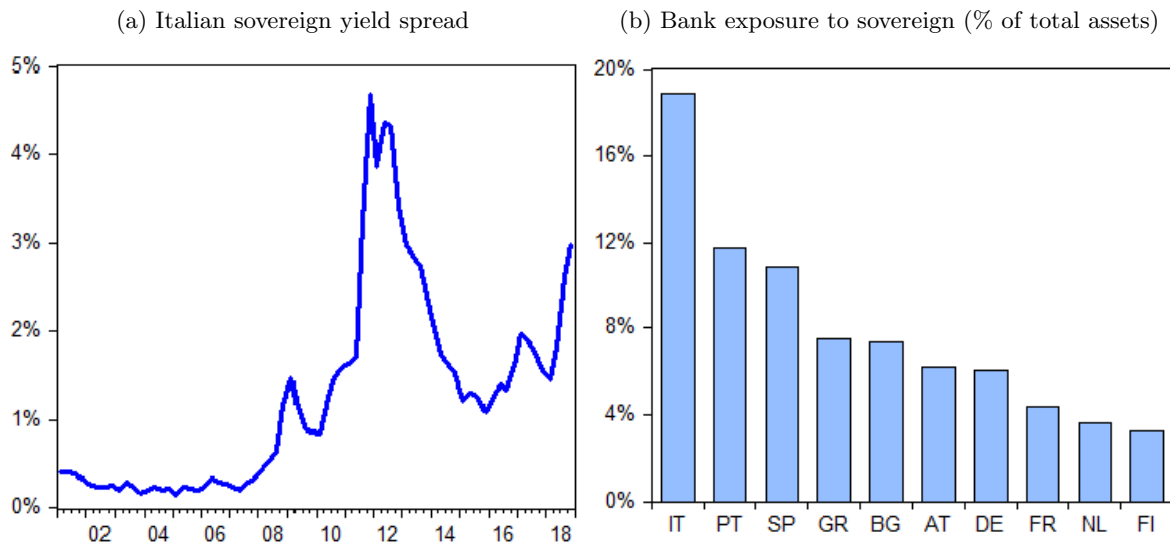
As highlighted in the IMF’s World Economic Outlook update for January 2019 (IMF, 2019), current prospects for global growth are positive but conditioned by a series of uncertain factors. Most of these are external to the Euro area: Brexit, protectionist tensions, geopolitical risks and emerging market external debt. Others hit closer to home: a slowdown of the German economy, a populist Italian government reigniting preoccupations about sovereign debt. Since the second quarter of 2013, the Euro area has been undergoing recovery, yet growth has failed to reach pre-crisis levels. While private debt has increased in most countries (barring deleveraging in Spain, Portugal and Germany; see figure 1.20, panel a), it is public indebtedness that raises the most concerns (figure 1.20, panel b). Three of the block’s big four economies (France, Italy and Spain) have debt-to-GDP ratios close to or above 100%, leaving them with little fiscal space. In Italy, a growth slowdown and the election of a populist government campaigning for fiscal spending has made the sovereign spread double through the year from 1.5 % to roughly 3%, reaching levels last seen during the crisis (figure 1.21, panel a). Given the high exposure of Italian banks to their sovereign (figure 1.21, panel b), they are threatened by a return of the doom loop if the situation were to worsen. Euro area countries need to generate income to bring down the high levels of public and private leverage that leave it vulnerable to a rise in interest rates. As argued by Hofmann & Peersman (2017), high leverage amplifies the recessionary effects of monetary tightening through what they call the “debt service channel”. While the ECB ended its bond-buying program in 2018, rates are expected to stay low, by historical standards, for the foreseeable future. An environment of fragile growth and high leverage makes it difficult for the ECB to normalize monetary policy and restore a maneuvering margin for the next downturn. The post-crisis period seems characterized by a longer lag between business and financial cycles: the economic expansion has not been accompanied by meaningful growth in credit. At the moment, risk emanates more from vulnerabilities inherited from the recent crisis and the non-completion of the banking union than from the gestation of new imbalances. But the empirical properties of the financial cycle show that cyclical risks can build up suddenly, and so it is important to monitor early signs of where they might surface.

Figure 1.20: Debt in the Euro area one decade after the GFC



Data source: BIS, February 2019

Figure 1.21: Sovereign debt-related vulnerabilities persist



Data sources: OECD and ECB, February 2019

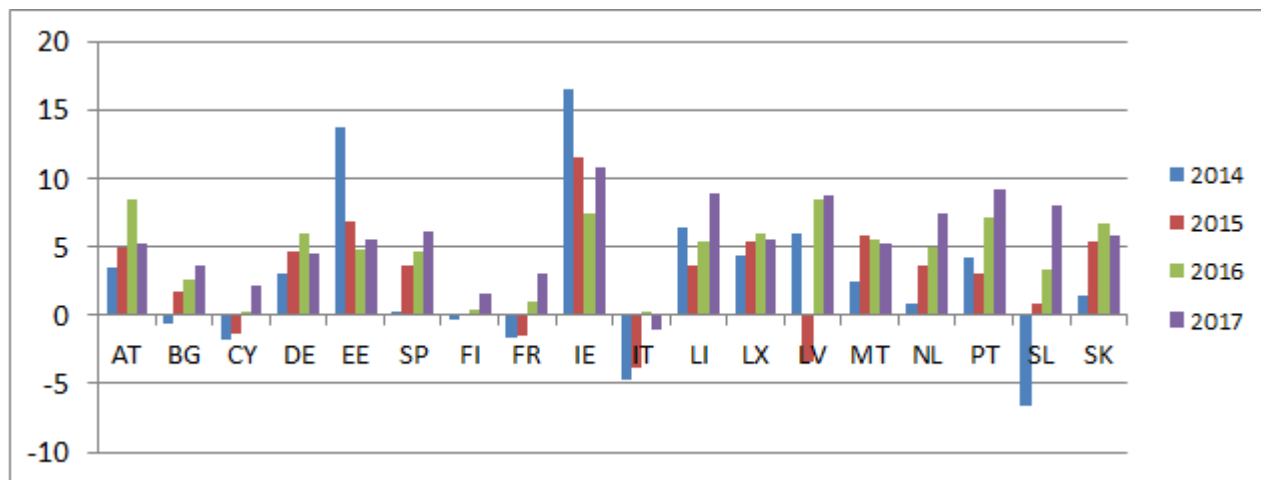
While UMP had an undeniably stabilizing effect during the acute phases of the crisis, this continued dependence on extremely accommodative monetary policy could create financial stability risks. Most works that study this hypothesis have focused on the quality of bank lending in a UMP environment. There is evidence that the LTRO programs have led banks to relax their lending standards (Ciccarelli et al., 2013; Darracq-Pariès & De Santis, 2015) although García-Posada & Marchetti (2016) contend that this does not apply to Spain. Heider et al. (2018) study the effect of negative interest rate policy on the risk profile of bank loan portfolios and find that it encourages lending to riskier firms through an unexpected channel: since banks are reluctant to pass the negative rates through to depositors, the measure reduces income more than costs for banks that rely on deposit funding, thus encouraging a search for yield. Acharya et al. (2017) worry that a significant share of the lending that has been extended under the support of OMT⁴⁶ has gone on to finance “zombie firms”⁴⁷. By examining data from individual bank-firm relationships, they estimate that in Italy, up to 18% of post-OMT loans have been extended to firms that would become insolvent if they were not getting refinancing at extremely favorable conditions; with the figure being 11% for Spain and Portugal. This happens because banks have an incentive to support non-viable firms to avoid recognizing losses that would degrade their capital adequacy, but it leaves them and their borrowers dependent on easy liquidity and postpones potentially unavoidable adjustments. Most troubling is the fact that, as argued by Schivardi et al. (2017), the diversion of funds from healthy to zombie firms increased the failure rate of the former in Italy, thus inducing long-term macroeconomic distortions.

⁴⁶In their interpretation, the OMT announcement acted as an “indirect recapitalization” of banks by restoring the creditworthiness of their sovereign bond holdings, thus freeing up liquidity to support lending.

⁴⁷Evidence corroborating this dynamic is provided by Storz et al. (2017) and Lamers et al. (2016).

1.5. FINANCIAL INSTABILITY DURING THE EURO CRISIS

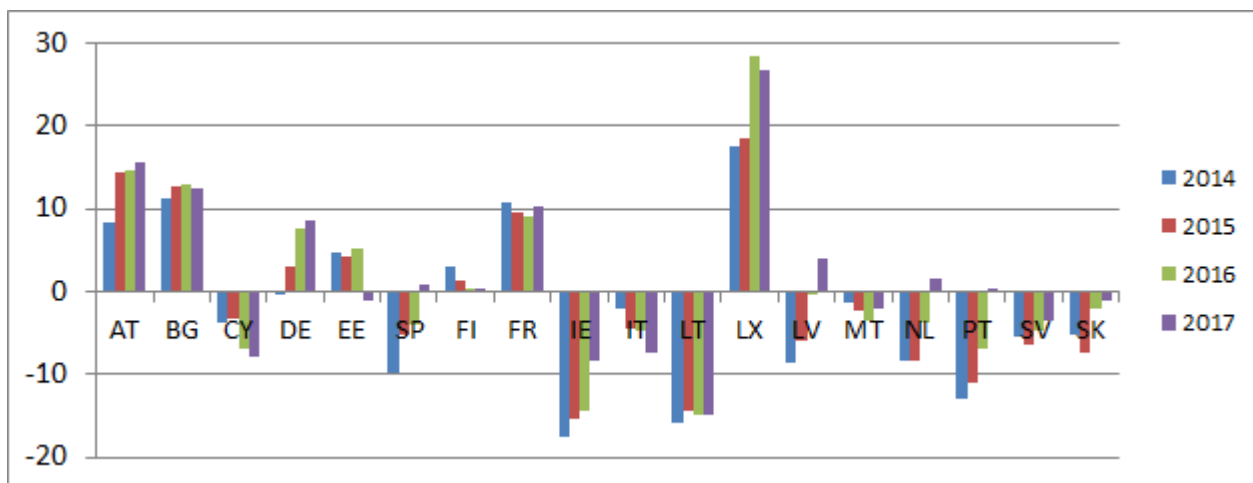
Figure 1.22: Annual % increase in Eurostat house price index



Data source: Eurostat.

For reference, pre-crisis year-on-year house price growth peaked at 18% in Spain (2003) and 17% in Ireland.

Figure 1.23: ECB estimates of over/undervaluation of average residential properties (% of fundamental value)



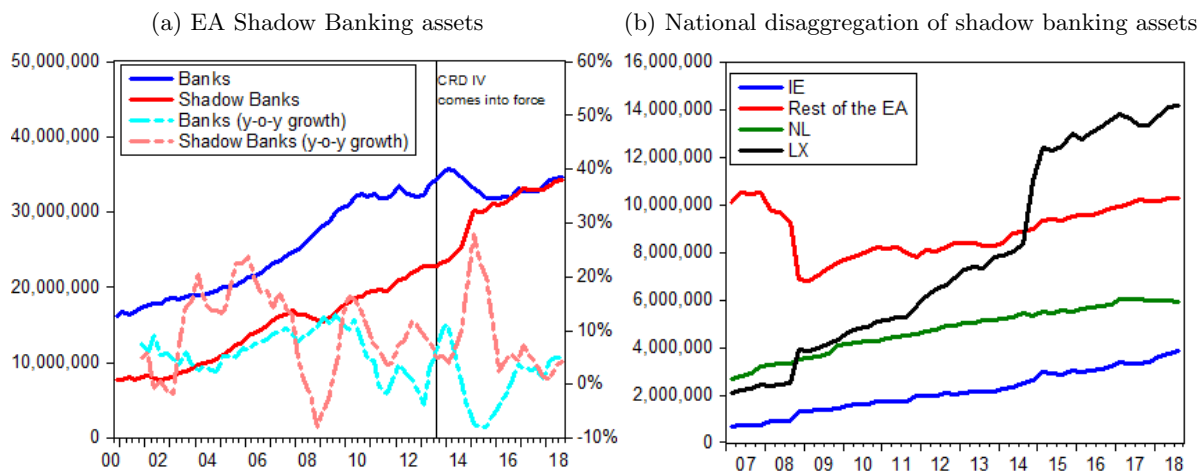
Data source: Eurostat.

Note: for reference, overvaluation in Spain and Ireland circa 2007 was of around 30%.

There are other channels by which the prolonged expansionary policy stance might have financial stability implications. Avalos & Mamatzakis (2018) identify the effect of quantitative easing on bank loss-absorption capacity as measured by the Z-score, finding that it may have increased heterogeneity. While resilience of core banks was strengthened, the same effect failed to manifest in the periphery where asset yields were compressed but, due to a weaker capital position, refinancing costs did not go down as much. Another important variable to keep track of is the evolution of house prices. Rahal (2016) finds evidence from a sample of 8 advanced economies that unconventional monetary policy shocks stimulate the growth of house prices and residential investment, although this effect is weaker in the Euro area than in other jurisdictions. Since this cross-country study takes the area as a whole, it is possible that the result masks country heterogeneity. It is useful, as the ECB does in the latest financial stability review,

to reason in terms of pockets of risk; and in fact from this perspective there some jurisdictions where real estate prices begin to show early signs of a boom. The Eurostat house price index (figure 1.22) has exhibited double-digit or near double-digit growth in some peripheral economies (Ireland, Portugal and the Baltic countries), although they are still rebounding from post-bust undervaluation (figure 1.23). Some core countries (Luxembourg, Austria, Belgium and France) are undergoing growth despite signs of overvaluation. These upturns are not yet as pronounced and prolonged as those that usually precede crises, and most importantly, they are not fueled by leverage. But, as documented by Goodhart & Hofmann (2008) expansions in money and house prices rarely occur without credit following suit sooner or later. Overvalued real estate can lead lenders to underestimate the riskiness of prospective borrowers (for example by depressing LTV ratios) and thus encourage risky lending (Koetter & Poghosyan, 2010; Hott, 2011; Pan & Wang, 2013). The direction of causality in the housing prices-credit nexus has been the subject of a respectably rich empirical literature that has yielded contradictory results overall ⁴⁸. Nonetheless, Brissimis & Vlassopoulos (2009) and Hofmann (2001) provide evidence that house prices have been shown to lead credit in Greece and for a panel of industrialized economies, respectively. Wherever housing prices continue their rising trend, it will be important to keep track of credit. In November 2016, the ESRB issued warnings of medium-term vulnerabilities in the residential real estate sector for Austria, Belgium, Denmark, Finland, Luxembourg and the Netherlands.

Figure 1.24: Growth of the shadow banking sector in the Euro area (EUR Millions)



Data source: ECB, February 2019. Bank assets are the assets of Monetary and Financial Institutions, while shadow banking assets are defined as the assets of Investment Funds and Other Financial Institutions, following the ESRB's definition (ESRB, 2018a).

Finally, the shadow banking sector is likely to play an increasingly determinant role in matters of financial stability. Figure 1.24 plots the total assets of the regulated and shadow banking sectors in the Euro Area, showing how they have converged in size over the last decade. In particular, 2014-2015 shows an acute spike in the growth of shadow banking assets coinciding with a noticeable reduction in bank assets. The fact that this happens shortly after the CRD IV reforms could indicate the presence of leakages, a migration of activity from the bank to the non-bank sector in response to stricter regulations. Indeed, this kind of effect is not without precedent. Cizel et al. (2016) explore the hypothesis of bank to non-bank arbitrage using event study methodology on a diverse sample of 40 countries over the 1976-2016 period. Their findings

⁴⁸See Anundsen & Jansen (2013) and the references therein for an overview.

reveal leakages to the shadow banking sector: macroprudential interventions restrict total credit less than bank credit, and stimulate the growth of non-bank assets and issuance of corporate debt securities. Moreover, these arbitrage effects are stronger for lender-based instruments. As evidenced by figure 1.24, panel b, the expansion of the shadow banking sector has been dominated by three countries (Ireland, the Netherlands and Luxembourg), with Luxembourg in particular emerging as a major shadow banking hub. A rise in the relative prominence of the shadow banking sector can create risks in the structural dimension, by increasing the systemic importance of entities that are otherwise less regulated, but also on the cyclical dimension, either by facilitating extra provision of liquidity to the financial sector (like money market funds in the U.S. during the build-up of the subprime crisis) or by providing credit directly to the non-financial sector. Though these entities have historically had equity-intensive liability structures, they can use derivatives to create what is called synthetic leverage off-balance sheet. According to the ESRB shadow banking monitor for September 2018 (ESRB, 2018b), bond funds are increasing their maturity transformation as the share of non-liquid assets on their portfolio has risen from 30% to 40% between 2009 and 2017. The ECB (Evrard et al., 2018) has called for strengthening the EU macroprudential toolkit with tools tailored specifically to the shadow banking sector, such as countercyclical margin and/or haircut requirements, plus leverage and liquidity requirements for investment funds.

1.6 Conclusion

Macroprudential policy has emphatically arrived on the global policy stage as the most significant innovation to macroeconomic and financial regulatory policies in recent memory. After a decades-long hiatus, mainstream economics is becoming rapidly reacquainted with issues of financial (in)stability and acknowledging the central role of finance in the determination of macroeconomic outcomes. The remarkable challenges of the macroprudential regulator become evident from the earliest stages of policy design. Its ultimate objective, financial stability, is significantly more difficult to conceptualize than the more classic macroeconomic policy objectives of price stability and full employment. A particular point of controversy concerns how far macroprudential policy should go: should it be content with ensuring that the financial system is sufficiently resilient to shocks, or aim to prevent the occurrence of those shocks by managing the financial cycle? Historically, economists from across the intellectual spectrum have warned against the dangers of excess credit creation (even liberal-leaning ones like Fisher and Hayek), and the recent empirical macroeconomic literature validates a significant and robust relationship between credit booms and financial crises. The case in favor of a credit stabilization view of macroprudential policy seems compelling. Furthermore, a definition of financial stability that applies to the Euro Area must recognize that the systemic threat of a member state is not proportional to its economic significance. Due to its relative novelty, the macroprudential regulator operates in mostly uncharted territory, but the literature (empirical and theoretical) gives reasons to be optimistic about the stabilization capacity of these instruments. Nowhere are the challenges and expectations for macroprudential policy higher than in the Euro area. The Euro crisis painfully revealed latent vulnerabilities that arose when a heterogeneous monetary union was established in the absence of a lender of last resort for sovereigns, union-wide countercyclical fiscal stabilization and a unified approach to banking regulation and resolution. Despite its popular categorization as a sovereign debt crisis, the roots of the Euro crisis are found in the macrofinancial heterogeneity of member states and the capital flow dynamics to which they gave rise, and in particular interbank debt flows. It follows from this that for macroprudential policies to succeed at ensuring area-wide stability, they must go beyond a narrow focus on the domestic stability of member states and be mindful of the interactions between national financial systems, especially since macroprudential instruments can cause cross-border spillover effects.

Much progress has been achieved since the crisis. The ECB, despite its initial hesitations and controversies regarding its statutory limitations, has embraced its role as lender of last resort and gone over and beyond its mandate to support the economy. A banking union has been established to centralize microprudential supervision under the SSM, and a common bail-in-centered approach to resolution has been instituted in the SRM. On the macroprudential front, a hybrid institutional infrastructure has been created where national authorities own and implement macroprudential instruments and supranational authorities (the ESRB and the ECB) function as a platform for voluntary coordination and systemic risk monitoring; while CRD IV has created a harmonized legal framework for lender-based instruments. Although systemic vulnerabilities do not appear imminent at the moment, policymakers cannot afford complacency. The recent Italian experience has shown that successful implementation of the common resolution framework not guaranteed (at least in spirit). Most worryingly, prospects for a common deposit insurance scheme to complete the banking union and a macroeconomically significant common budget are dimmed by political opposition to fiscal risk-sharing. Thus, a resurgence of the doom loop is anything but impossible, and fiscal stabilization cannot be conducted at the area level, two problems compounded by unprecedented levels of public debt. Monetary policy is caught between the imperative of normalization and the risk of undermining a fragile recovery. Put together, this means that the Euro area would be more troubled than most jurisdictions in the event of a systemic financial crisis, and thus the stakes for macroprudential regulators are especially high.

Chapter 2

Cross-Border Spillovers of Macroprudential Policy in the Euro area

2.1 Introduction

Much of the EMU's fragility came from macroeconomic policy being designed without sufficiently accounting for the importance and persistence of macroeconomic heterogeneity between member states. The common monetary policy ignored the fact that, in the presence of growth and inflation differentials, area-wide inflation targeting would destabilize national economies whose characteristics diverged from the mean. On the fiscal policy side, supranational institutions provided assistance to the troubled periphery conditional on austerity, while failing to support area-wide aggregate demand through stimulus in countries with more fiscal space. Indeed, this was a failure to recognize that countercyclical national fiscal stances could have avoided prolonging the depressive effects of the crisis, especially in a context of private deleveraging, subdued global growth and the zero lower bound. If Euro area macroprudential (MaP) policies are to be successful, ignoring national heterogeneity is the first mistake to avoid; failing to account for the interlinkages between member states the second. In a set of economies with such deep financial integration, coherent policymaking is likely to be conditioned by cross-border spillover effects and therefore successful cross-country coordination. Reforms were made with this imperative in mind: coordination and harmonization of policies have become institutionalized in the European Systemic Risk Board (ESRB), and the ECB has been granted the faculty of imposing tighter policy stances on CRD IV instruments. Still, a great number of elements necessary to envision the future shape of such coordination remain, as of the moment, unknown: will MaP have a macroeconomically significant effect on the geographical lending decisions of banks? If so, will the spillovers be outward or inward? Will these effects vary across countries? Given this uncertainty, it can be useful for policymakers to think about the possible scenarios and the associated courses of action beforehand, notably through general equilibrium simulations. This chapter aims to explore a scenario where spillovers create policy challenges through the channel of financial integration that was most integral to the last crisis: the interbank market. We do so with the use of a static reduced-form New Keynesian model applied to a core-periphery monetary union framework, inspired from Dehmej & Gambacorta (2017) (itself an extension of the founding work by Bernanke & Blinder (1988)). This stylized approach can help us achieve a tractable, general understanding of how these spillovers could play out in the context of different policy regimes.

Internal imbalances between heterogeneous member states are essential for understanding the Euro crisis (Lane, 2013; Hobza & Zeugner, 2014). Following unification, capital flowed from

mature core economies to the less developed periphery where the common policy stance resulted in looser real financial conditions (Coupey-Soubeyran & Dehmej, 2016). This created persistent current account imbalances that facilitated unsustainable accumulations of debt (Lane & McQuade, 2014; Unger, 2017) both in the state (Greece and Portugal) and in the private sector (Ireland and Spain). As highlighted by Poutineau & Vermandel (2017), the blunt of these core-to-periphery flows of financing took place on the interbank market. Indeed, the creation of the EMU suddenly gave periphery banks access to cheap and abundant market funding, which fueled the excessive credit expansions that would lead to the crisis. Ever since, there has been a significant retrenchment in cross-border interbank lending; but until other financial markets develop further, this will likely remain the preeminent channel of financial integration. Therefore, it is important for policymakers to anticipate how cross-border interbank lending could condition the conduct of countercyclical macroprudential policies (MaP).

We will focus on the Basel III countercyclical capital buffer (CCyB), a supplement to the traditional capital requirements ratio that is built up during booms and released in downturns to strengthen resilience and lean against the credit cycle. The CCyB is mostly set by national regulators whose mandate is to ensure financial stability within their borders¹; but due to the design tensions we explored in section 1.4.1 it could create cross-border spillovers, which would raise important questions. Will setting the CCyB along national lines always be enough to safeguard the financial stability of the Euro area as a whole? While a framework for coordination exists between national regulators and supranational institutions², what happens if spillovers imply a trade-off between the national stability of two member states, and therefore a trade-off between national and union-wide stability?

The question of whether regulators should target national or area-wide stabilization is at the center of the recent literature on macroprudential policy in the EMU (Brzoza-Brzezina et al., 2015; Poutineau & Vermandel, 2015; Dehmej & Gambacorta, 2017; Rubio, 2018b). In general, the findings favor setting MaP at the national level: it acts as granular stabilizer to the destabilizing effects of the one-size-fits-all monetary stance. We notice that these models differ in their apprehension of cross-border financial flows, with only Poutineau & Vermandel (2017) according a central role to interbank lending integration³. We seek to contribute to this literature by reevaluating the claim that strictly national implementation of MaP is invariably preferable in a heterogeneous monetary union. To do so, we use a small static core-periphery model calibrated to the Euro area, based on the well known 3-equation New Keynesian model⁴ and introducing a banking sector in the vein of the IS-LM-CC framework of Bernanke & Blinder (1988). Our model is close in spirit to Poutineau & Vermandel (2017), insofar as they also accord a fundamental role to credit market integration, but features some key conceptual differences. First, we account for banking system heterogeneity by making the periphery structurally dependent on the core for refinancing, while they consider heterogeneous distributions of banks with preferential access to ECB funds. Second, by assuming that raising the CCyB incites core banks to increase outward interbank lending (in virtue of the substitution effect described in section 1.4.1), the spillover effect accelerates the periphery's credit cycle, while in Poutineau & Vermandel (2017) the spillover is contractionary, meaning that a restrictive MaP stance results in slower credit

¹ Authorities also have a mandate to cooperate with their counterparts in other member states, notably through the European Systemic Risk Board and the ECB.

² The ESRB acts as a platform for coordination between national regulators (but lacks binding powers), and the ECB is the direct microprudential supervisor of the most important Banks. CCyB decisions are systematically consulted with these institutions, and the ECB has the power to impose a tighter stance. Nonetheless, barring the use of the ECB's "top-up" power, the final decision is in the national regulator's hands.

³ Darracq Pariès et al. (2019) also build a Euro area model with interbank lending, but do not treat the question of the preferable implementation level.

⁴ See Poutineau et al. (2015).

growth within and outside the jurisdiction⁵. Third, we introduce a new approach to modeling the alternative rule against which the national stabilization rule is compared. Instead of using a “federal” or “supranational” rule by which MaP in both countries is set to stabilize area-wide aggregate credit, as is commonly done in the literature; we formulate a rule in which the core regulator internalizes the spillover if and when the periphery’s CCyB reaches its upper bound, finding that it outperforms the national rule regime when the union is subjected to strong and synchronized booms. While the national rules regime delivers the best credit stabilization performance in most scenarios, there are certain scenarios that call for internalization of spillovers.

If core banks respond to tighter capital standards at home by substituting with interbank lending abroad, then periphery countries might once again face excessively lax funding conditions, making it difficult for the regulator to successfully stabilize domestic credit. Considering that the common currency makes the financial stability of member states deeply interdependent, a localized crisis can quickly spread. A basic calibration of our model shows that, in the scenario of a strong and synchronized boom, there comes a point where internalization by the core country regulator becomes the preferable option. This finding brings nuance to the consensus view supporting strictly national policy rules. The remainder of the paper is structured as follows: section 2.2 reviews the literature related to our work, section 2.3 presents the model, sections 2.4 and 2.5 compare the performances of policy regimes. We devote our concluding section to commenting the implications of our model’s result.

2.2 Literature survey

The creation of macroprudential instruments has signified a major development in macroeconomic policy, and so their study has become a priority of the theoretical macroeconomic research agenda⁶. Although DSGE modeling has been the standard approach, important contributions have come from smaller static or multi-period analytical models (Jeanne, 2014; Korinek & Sandri, 2016; Kara, 2016). A strand of the literature has specialized in addressing the specific challenges that emerge in the context of the EMU using core-periphery models. A recurring question concerns the ideal level of stabilization: are the national stabilization rules that define the status quo the best policy rule? Or does targeting the stability of the union deliver better results⁷? To be clear, by national stabilization rules we are referring to Taylor-like rules where macroprudential instruments are set as a function of growth in national credit, usually normalized by output. While this rule is straightforward and representative of Basel III, the way in which supranational rules have been modeled so far in the literature merits discussion. But first, let us review the results.

Brzoza-Brzezina et al. (2015) stress out that, for MaP to have a positive impact, it must be implemented at the national level. However, their model ignores structural heterogeneity, considers only asymmetric shocks, and focuses on borrower-based instruments which should *a priori* be less prone to spillovers. Poutineau & Vermandel (2017) reach a similar conclusion for the CCyB. Their model includes both interbank and corporate cross-border lending, and they compare national and union-wide stabilization rules across different degrees of integration. They find that national rules always perform better, but the performance of the union-wide rule improves with higher levels of corporate lending integration. However, it is surprising that stronger interbank

⁵In a model that is conceptually very similar to Poutineau & Vermandel (2017), Darracq Pariès et al. (2019) find that restricting capital requirements in core countries results in looser lending conditions in the periphery.

⁶For a recent comprehensive survey, see Ebrahimi Kahou & Lehar (2017).

⁷For other questions related to MaP in the EMU, see Gerali et al. (2010), Angelini et al. (2014), Quint & Rabanal (2014), Rubio & Carrasco-Gallego (2016), Martin & Zhang (2017), Bielecki et al. (2019) and Darracq Pariès et al. (2019).

lending integration does nothing to influence the relative performance of these rules, considering this channel's central role in the gestation of the crisis. Dehmej & Gambacorta (2017) use a static analytical model to show that MaP can be used to correct the distortions of the common monetary policy, but only when regulators follow a national rule. While the literature broadly tilts in the direction of favoring a strictly national implementation, Rubio (2018a) finds that the inclusion of heterogeneity in the prevalence of variable rate mortgages produces increased volatility in the periphery, and justifies a supranational approach to setting the LTV instrument.

These results should be examined in parallel to the empirical and theoretical bodies of work on international MaP spillovers. While the effectiveness of MaP to shape the financial cycle is increasingly supported by evidence (Cerutti, Claessens, & Laeven, 2017), trying to identify cross-border spillovers has yielded ambivalent (if not contradictory) results: they exhibit significant variation in sign and intensity (if they are at all present) depending on the instrument, the jurisdiction and individual bank characteristics (Kang et al., 2017; Buch & Goldberg, 2017). While in the U.K. banks cut back on cross-border loans across the board in response to the significant post-crisis increase in minimum required capital (Forbes et al., 2017), Canadian and French banks reacted heterogeneously: entities with strong deposit bases increased their cross-border claims (Damar & Mordel, 2017; Bussière et al., 2017), while those with higher levels of illiquid assets rationed. It is important to consider that most of the evidence for advanced economies concerns the post-crisis period where banks were transitioning to Basel III, had vulnerable balance sheets and low risk appetite. We should be careful about extrapolating these behaviors in a boom context, hence the interest of exploring our substitution hypothesis. Otherwise, it is worth considering that the theoretical literature on international MaP spillovers tends to advocate internalization and coordination (Jeanne, 2014; Kara, 2016; Korinek & Sandri, 2016; Agénor et al., 2017). Notably, Agénor et al. (2017) argue that when peripheries are overly dependent on financial hub core countries to finance their economies, there are significant gains to policy coordination. While it stands to reason that in the EMU national MaP can be used as a partial adjustment mechanism that compensates the loss of national monetary autonomy, there is a chance that the asymmetrical relationship of financial dependence that links the Euro periphery to the core has not been fully accounted for in the literature.

Like Dehmej & Gambacorta (2017), we take a two-country version of the standard 3-equation NK model and introduce a banking sector through a fourth financial frictions equation that determines the bank lending rate as a function of the conditions on the market for loans to the non-financial sector, taking inspiration from the IS-LM-CC model by Bernanke & Blinder (1988). Our key innovation is the introduction of an interbank market that creates financial integration between the core and the periphery. This interbank market functions asymmetrically: core banks, in virtue of their preferential access to ECB funds, provide the supply of interbank funding to periphery banks who therefore depend on the latter for financing credit creation. In this sense, there is a relationship of financial dependence as in Agénor et al. (2017). Our objective is similar to that of Poutineau & Vermandel (2017), but beyond the reduced-form nature of our model there are some key axiomatic differences. First, we model interbank flows to be one-sided: core banks finance the periphery but not the other way around. This is done to reflect the fact that periphery banking systems tend, on the aggregate, to be structural borrowers on the Euro money market⁸. Additionally, even if financial inflows and outflows between the core and the periphery banking systems were to balance out, massive gross inflows of liquidity would still create an easier funding environment and thus, combined with lower real interest rates, stimulate domestic credit growth. Therefore, our asymmetrical interbank market can be seen as reflecting the financial dependence relationship, but also as focusing on the effects of gross, and not net,

⁸Poutineau & Vermandel (2017) achieve this by considering heterogenous banks (creditors and debtors) and distributing them asymmetrically.

liquidity inflows⁹. Second, raising the CCyB in Poutineau & Vermandel (2017) makes banks cut back in all forms of lending. In our model, since banks see domestic and foreign interbank lending as substitutes and the CCyB's capital compliance costs disproportionately affect the former, tightening MaP creates an incentive for lending to periphery banks. This mechanism changes the cost-benefit balance of national rules. Finally, beyond differences on the mechanics of the model economy, a crucial element that conditions any result is the alternative rule that is used as a benchmark for comparison. So far, the approach has been to use a rule that responds to aggregate Euro area credit, in the image of a Taylor rule that responds to Euro area inflation. The issue here is that, while the area inflation rate is equal to the weighted average of national inflation rates, taking the weighted average growth in credit as a proxy of area-wide systemic risk misses the complexity of this phenomenon. Due to the EMU's design vulnerabilities, a crisis in a member state can destabilize the area to an extent that is disproportionate to its size. Therefore, considering alternative ways of modeling supranational policy regimes is necessary to reach a robust conclusion. This type of rule is consistent with EMU financial stability as defined in section 1.1.

Departing from most works in the theoretical macroprudential policy literature, we opt to use a reduced-form static general equilibrium model rather than a fully fledged DSGE. The basic template of the model is a reduced-form, two-country static version of the canonical New Keynesian model as described by Poutineau et al. (2015), meaning that it represents the standard aggregate macroeconomic relations (IS curve, Phillips curve and the Taylor rule) without explicitly incorporating the microfoundations from which they are derived. By using a static specification, we can expose in a tractable and intuitive way the basic mechanics of the spillover effect and its initial consequences on the economy. Recently, it has been argued by several prominent voices that, despite (or perhaps in virtue of) their simplicity, small models can play a complimentary role to fully-fledged DSGE models. Blanchard, one of the early pioneers of solution methods for DSGE models (Blanchard & Kahn, 1980), highlights the capacity of this approach to provide initial intuitions on policy problems (Blanchard, 2016, p.3):

“Not all models have to be explicitly microfounded. While this will sound like a plaidoyer pro domo, I strongly believe that ad hoc macro models, from various versions of the IS-LM to the Mundell-Fleming model, have an important role to play in relation to DSGE models. They can be useful upstream, before DSGE modeling, as a first cut to think about the effects of a particular distortion or a particular policy.”

In an essay on the biases introduced by the dominance of DSGE modeling in the macroeconomics profession, Korinek argues that the demanding methodological requirements that this approach imposes (microfoundations, ergodic steady state, matching the empirical moments of the distributions of macro variables) have the undesirable side-effect of limiting the scope of ideas that macroeconomics can explore (Korinek, 2018, p.168):

“There is a bias in the positive mechanisms that the profession is able to describe in DSGE models. Mathematical and computational complexity impose serious restrictions on the set of models that DSGE macroeconomists can analyze. In other words, the set of ideas that we can describe in rigorously quantified DSGE models is smaller than the set of ideas that we can express in simpler models. These methodological restrictions limit our modeling and, ultimately, our thinking. [...] the complexity introduced by the DSGE approach conflicts with Occam's razor, i.e. with the scientific principle that models should be as simple as possible. This implies that ideas are presented in a fashion that is less clear than possible and that some economic insights

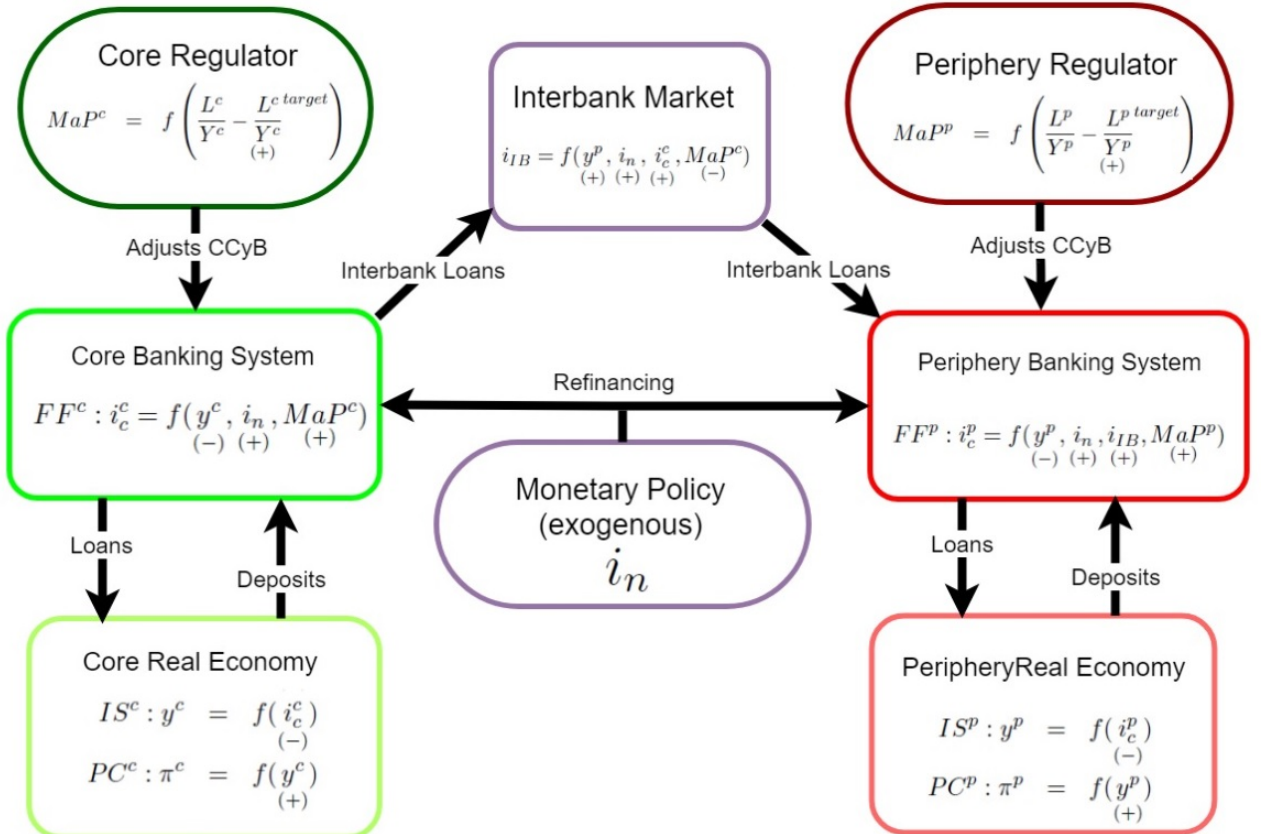
⁹For financial stability purposes, focusing on gross flows is at least as important as looking at the current account (Borio & Disyatat, 2011; Obstfeld, 2012).

are clouded or obscured by complexity. [...] the average DSGE macroeconomist spends a considerable amount of time, energy and effort dealing with the complexity generated by satisfying simultaneously the conceptual and numerical requirements of the DSGE approach. At the margin, society may benefit more if some of these resources were spent on tackling macroeconomic problems without being subject the methodological restrictions imposed by the DSGE approach.”

Globally, these critiques should not be interpreted as an indictment of the DSGE approach, which they recognize as the best tool among those that are currently available; but rather a questioning of the idea that DSGE models are the only way of conducting valuable policy analysis. As Blanchard puts it, “*DSGE modeling [...] has to become less imperialistic*”, and the profession “*must realize that different model types are needed for different tasks*.” (Blanchard, 2016, p.3). With this in mind, there have been some contributions to the macroprudential policy literature that employ simple general equilibrium models. With a two-period deterministic analytical model of a small open economy, Jeanne (2014) defends the case for international coordination of macroprudential policy in the case of a global downturn, and Korinek & Sandri (2016) evaluate the case for combining macroprudential policies and capital requirements in a similar framework. For the Euro area case, Dehmej & Gambacorta (2017) use a static core-periphery model to illustrate how national-based macroprudential regulation can moderate the distortions introduced by the common monetary policy. Our contribution is positioned in the continuation of this line of work. While the robustness of our result should be further tested in a dynamic framework, the model helps us provide an initial exposition of a plausible unintended side-effect of the current CCyB policy regime.

2.3 The model

Figure 2.1: The structure of the model



2.3.1 Real economy

The overall structure of the model is summarized in figure 2.1 above. The basic template¹⁰ is a standard two-country reduced-form New Keynesian model composed, for each country, of simplified IS and Phillips Curves. The model is expressed in log-deviations from steady-state values. As a departure from the baseline three-equation model, monetary policy (defined by the common policy rate i_n) is left exogenous¹¹. Heterogeneity will be introduced through each country's role on the interbank market (creditor for the core, borrower for the periphery). To simplify the reading, it is assumed that agents have perfect foresight of inflation expectations and that the central bank has full credibility. This implies equivalence between expected, realized and target inflation rates ($\pi^e = \pi^* = \pi$). Variables are expressed in log-deviations from their steady state values¹². The IS and PC curves have the same form for both countries indexed “p” for periphery and “c” for core:

$$IS^p : y^p = -\beta(i_c^p) + \epsilon_d^p \quad (2.1)$$

$$IS^c : y^c = -\beta(i_c^c) + \epsilon_d^c \quad (2.2)$$

In contrast to traditional IS curves, here output (y) responds not to the monetary policy rate but to the bank lending rate (i_c) which includes a risk premium over the policy rate. It is also affected by demand shocks (ϵ_d) that will come into play in our policy simulation. We assume a higher sensitivity of the real economy to financial conditions in the periphery ($\beta^p > \beta^c$)¹³

Inflation is determined by the relative overheating or slack of the economy and is therefore a positive function of output:

$$PC^p : \pi^p = \lambda y^p \quad (2.3)$$

$$PC^c : \pi^c = \lambda y^c \quad (2.4)$$

2.3.2 Core credit market

A banking sector is added to this standard baseline and is captured by a financial frictions equation (FF^c)¹⁴, which determines the domestic lending rate (i_c) as the rate that balances supply and demand on the domestic credit market. Domestic loan supply grows with with profitability (as captured by the unit margins on new loans, $i_c^c - i_n$) and the stock available loanable funds, which are here equivalent to household deposits (D^c). Since household deposits are in fact savings (unconsumed income), they grow with output and decrease with the policy rate¹⁵: $D^c = \eta_y^c y^c - \eta_n i_n$. It is important to emphasize that the power of banks to extend lending is not limited by the availability of real savings (deposits). While some of the growth in domestic credit comes from an increase in the stock of loanable funds, the lion's share of fluctuations in credit supply comes from “pure” credit creation; financing underpinned by the expectation of future income generation by borrowers and not by a reallocation of present unconsumed income

¹⁰In addition, a summary of variables and parameters may be can be found in Appendix A, tables A.1 to A.4.

¹¹Endogenizing monetary policy through a Taylor Rule encumbers the model without adding any meaningful insights, the effect of monetary policy reaction does little to affect the result; hence we exogenize it to keep the model tractable.

¹²Except for interest rates and inflation which are simply expressed in deviation from their steady-state level.

¹³This comes from structural characteristics that make the periphery more volatile, such as the higher prevalence of variable-rate lending documented by Rubio (2014) and the precipitous liberalization process in the run-up and after unification.

¹⁴Originally, this approach is inspired by the seminal work of Bernanke & Blinder (1988).

¹⁵This is due to the opportunity cost of alternative risky investments, when rates rise the return on this kind of assets typically increases by more than that of deposits, making them less attractive

from savers to borrowers¹⁶. To capture this growth generated by “pure” credit creation, we include the term $M^c = \zeta_y y^c$ ¹⁷; positively related to output growth as the bank’s expectations and risk appetite respond to growth signals:

$$L_s^c = D^c + M^c + \omega_{cs}(i_c^c - i_n) \quad (2.5)$$

The core loan demand equation depends positively on output growth (to finance desired investment and consumption) and negatively on the lending rate:

$$L_d^c = \mu_y y^c - \mu_c i_c^c \quad (2.6)$$

By equalizing loan supply and demand and solving for i_c^c , we obtain the core’s financial frictions (FF) equation:

$$FF^c : i_c^c = \gamma_n^c i_n - \gamma_y^c y^c \quad (2.7)$$

where $\gamma_y^c = \frac{\eta_y + \zeta_y - \mu_y}{\omega_{cs} + \mu_c} > 0$ and $\gamma_n^c = \frac{\eta_n + \omega_{cs}}{\omega_{cs} + \mu_c} > 0$

To have a procyclical relationship between financial conditions and the business cycle, loan supply has to be more sensitive to output than loan demand ($\eta_y + \zeta_y > \mu_y$). Underlying this assumption is the systematic tendency of banks to over-lend during booms when expectations are exuberant and over-ration after the bust as expectations reverse and confidence breaks down (Minsky, 1986; Kindleberger, 1978). Non-financial agents, motivated by positive demand signals (μ_y), solicit banks to fund projects that they judge to be fundamentally viable at the ex-ante prevailing lending rates. Banks, themselves encouraged by the positive business environment and eager to defend or expand their market share, not only satiate this initial demand but provide excess liquidity; loosening financial conditions and financing high-risk projects of questionable intrinsic value¹⁸.

2.3.3 Interbank market

Periphery banks have limited access to ECB liquidity; they must borrow on the interbank market to cover their refinancing needs. The explosive growth in external market funding in Ireland and Spain during the boom period indicates that periphery banks were using these loans to fund their domestic credit expansion (see figure 2.2). Mirroring the behavior of non-financial borrowers, the periphery bank’s demand for interbank funds is a positive function of output¹⁹ and a negative function of the prevailing interbank rate, i_{IB} :

$$IB^d = \delta_y y^p - \delta_{IB} i_{IB} \quad (2.8)$$

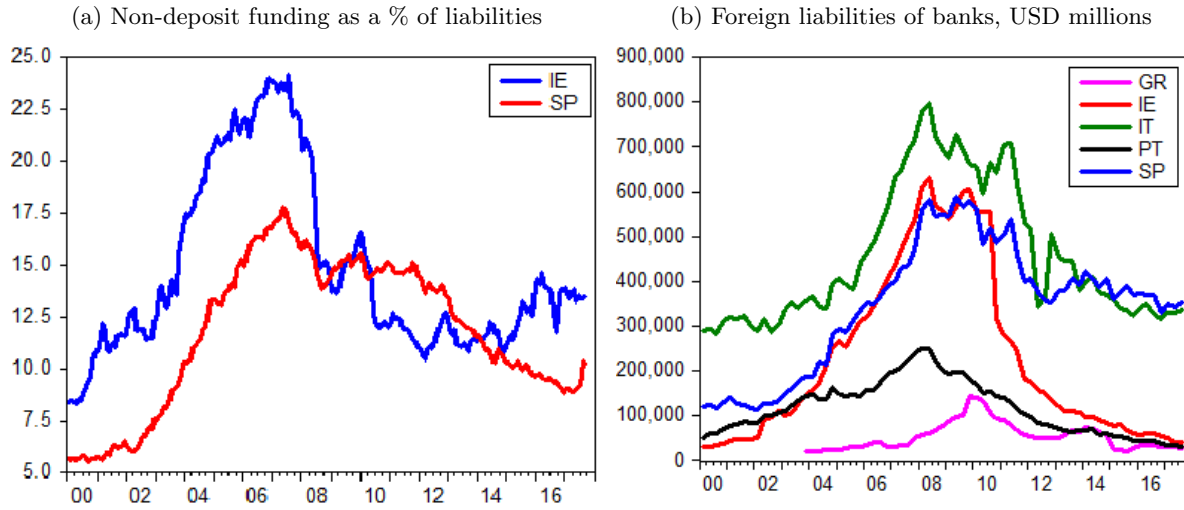
¹⁶As stressed by Borio & Disyatat (2011), in a fractional reserve banking system where monetary policy is implemented by targeting interest rates, the only real constraint on credit growth is how much banks are willing to lend given their expectations of future growth, perceptions of value and risk, the price of liquidity, the regulatory regime and the availability of willful borrowers.

¹⁷We name this term “Minsky’s residual” after Minsky (1986, 1992), who insisted on the role procyclical expectations for the determination economic fluctuations.

¹⁸This is visible, for instance, in the loosening of lending standards that typically go hand in hand with credit booms (Dell’Ariccia et al., 2012).

¹⁹Growth in the domestic economy encourages greater expectations for future yields and hence motivates borrowing to finance credit expansion.

Figure 2.2: Liabilities of periphery banks during the boom



Data sources: ECB and BIS, February 2019

The dynamics of interbank supply are at the core of the spillover effect, in particular the hypothesis of partial substitutability with respect to domestic lending. Due to the secular downward trend in market interest rates, unit margins on domestic lending to non-financial agents (NFAs) have been low since well before the crisis; especially for core countries. On the other hand, the process of financial integration culminating in the common currency greatly reduced the transaction cost and perceived risk of lending to periphery banks. In 03-08, compressing margins on domestic lending in France and Germany were accompanied by a noticeable rise in loans to Euro area banks as a share of total bank assets (see figure 2.3 below). While it is unlikely that banks ration domestic lending to divert funds towards the interbank market²⁰, an erosion of the **relative** profitability of domestic lending can motivate an increase in the preference for interbank lending. Therefore, interbank supply reacts to lending margins on both markets:

$$IB^s = \omega_{IB}(i_{IB} - i_n) - \omega_L(i_c^c - i_n) \quad (2.9)$$

Solving $IB^s = IB^d$ for i_{IB} yields the law of motion of the interbank rate, or the interbank financial frictions equation:

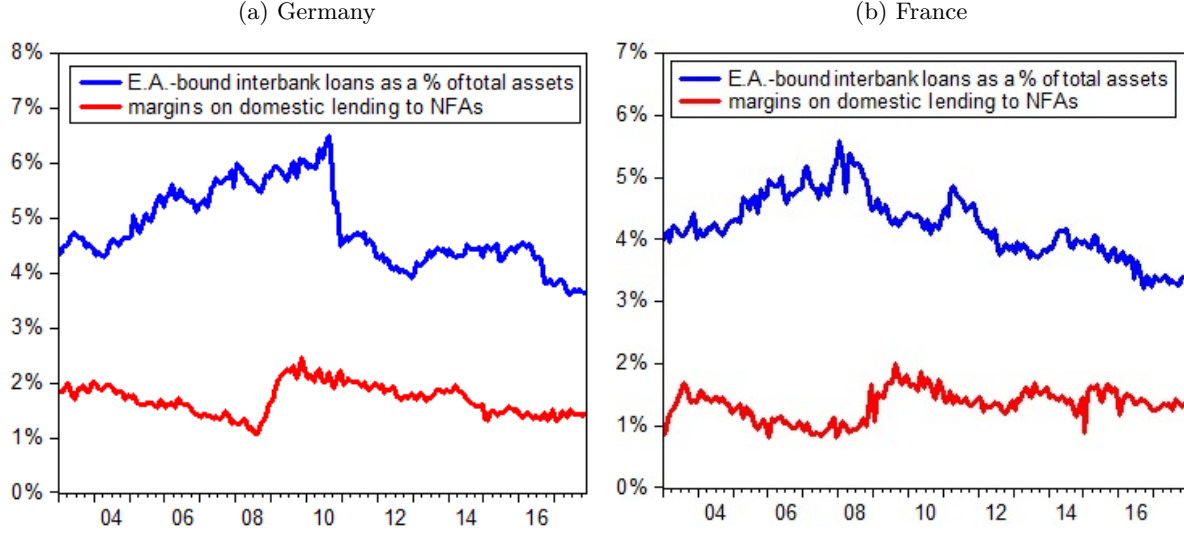
$$FF_{IB} : i_{IB} = \phi_n i_n + \phi_y y^p + \phi_L i_c^c \quad (2.10)$$

where $\phi_y = \frac{\delta_y}{\omega_{IB} + \delta_{IB}} > 0$, $\phi_n = \frac{\omega_{IB} - \omega_L}{\omega_{IB} + \delta_{IB}} > 0$ and $\phi_L = \frac{\omega_L}{\omega_{IB} + \delta_{IB}} > 0$

The interbank rate therefore depends on the policy rate that acts as its lower bound, demand conditions as determined by growth prospects in the periphery, and on core domestic lending rates that act as a benchmark.

²⁰These remain two different types of investment, what substitutability may exist is partial. Once the core bank decides on the desired level of domestic lending, it places some liquidity on the interbank market. To determine how much it wants to lend on this market, profitability will be evaluated using domestic lending margins as the benchmark.

Figure 2.3: EA-bound interbank lending and domestic margins



Data source: ECB, February 2019

2.3.4 Periphery credit market

The loan supply function in the periphery takes the following form:

$$L_s^p = D^p + M^p + IB^d + \omega_{cs}(i_c^p - i_{IB}) \quad (2.11)$$

The presence of interbank funds on the liability side marks the main difference between core and periphery banks and the associated loan supply functions. Notably, the term that links interbank demand to output growth (δ_y^p) increases the sensitivity of domestic credit supply to the business cycle. Put otherwise, the presence of an abundant and cheap marginal source of external funding increases the financial elasticity of the periphery²¹. In fact, as highlighted by Poutineau & Vermandel (2015), Darracq Pariès et al. (2019) and Hobza & Zeugner (2014), much of the monetary transmission in the Euro periphery happens through the interbank market, as many banks lack the preferential access to ECB funds their core counterparts enjoy. To capture this, the unit margin on domestic lending in the periphery is defined as the spread between the domestic lending rate (i_c^p) and the interbank rate (i_{IB}) instead of the policy rate.

It follows from this that the periphery's loan supply will be affected by conditions on the interbank market. Looser (tighter) conditions on the interbank market lighten (raise) the marginal cost of funding for periphery banks, stimulating (slowing down) supply-side credit growth and thereby lowering (raising) the domestic lending rate:

$$L_s^p = D^p + M^p + (\delta_y y^p - \delta_{IB} i_{IB}) + \omega_{cs}(i_c^p - i_{IB})$$

Demand for loans is identical to that in the core country:

$$L_d^p = \mu_y y^p - \mu_c i_c^p \quad (2.12)$$

²¹According to Borio & Disyatat (2011), p.5, “[Mobile financial capital] adds an external source of finance that boosts further domestic financial booms. In fact, almost by definition, external funding is the marginal funding source.[...] In particular, the cross-border component of credit tends to outgrow the purely domestic one during financial booms, especially those that precede serious financial strains”.

Resulting in the periphery's financial frictions equation:

$$FF^p : i_c^p = \gamma_n^p i_n - \gamma_y^p y^p + \gamma_{IB}^p i_{IB} \quad (2.13)$$

where $\gamma_y^p = \frac{\eta_y + \zeta_y + \delta_y - \mu_y}{\omega_{cs} + \mu_c} > 0$, $\gamma_n^p = \frac{\eta_n}{\omega_{cs} + \mu_c} > 0$ and $\gamma_{IB}^p = \frac{\delta_{IB} + \omega_{cs}}{\omega_{cs} + \mu_c} > 0$

As anticipated, the interbank rate takes replaces the policy rate as determinant of liquidity conditions. Earlier, we mentioned how the fact that interbank funds are used to finance credit expansion increases the sensitivity of the loan supply to output. This in turn strengthens the procyclicality of domestic financial conditions: the negative relationship between output and financial conditions becomes stronger compared to the core country: $\gamma_y^p > \gamma_y^c$ because of δ_y . Due to the impact of output growth on interbank loan demand (δ_y), the negative relationship between output and financial conditions becomes stronger compared to the core country: $\gamma_y^p > \gamma_y^c$. This means that domestic financial conditions are more procyclical in the periphery than in the core. Summing it up, we notice that financial conditions in the core are determined by the domestic business cycle and the policy rate (1.7), while in the periphery credit growth and financial conditions depend on the interbank rate; and hence on the decisions of core banks and, as we will see in the following section, the core regulator. Therefore, there is a relationship of financial dependence of the periphery with respect to the core.

2.4 National macroprudential rules and the interbank spillover

We now introduce macroprudential policy (MaP) in the form of a countercyclical capital buffer (CCyB). This instrument acts by increasing (lowering) the ratio of required capital to risk-weighted assets when total credit expands (contracts) at a pace deemed undesirable by the policymaker. Capital is a costly resource for banks: investor's required rate of return is typically higher than the cost of debt, and raising capital can be a costly and time-consuming process²². All other things equal, raising the capital requirement ratio augments the implicit marginal cost of credit extension since every unit of risk needs to be backed by an increasing share of equity²³. Therefore, the CCyB performs a countercyclical function by discouraging excessive credit expansion in booms and encouraging lending in the aftermath of busts. Defined as such, MaP is incorporated to the credit supply equations (2.5) and (2.11):

$$L_s^c = D^c + M^c + \omega_{cs}(i_c^c - i_n - MaP^c) \quad (2.14)$$

$$L_s^p = D^p + M^p + IB^d + \omega_{cs}(i_c^p - i_{IB} - MaP^p) \quad (2.15)$$

MaP enters the margin term with a negative sign, representing the implicit marginal cost of additional capital: even though credit creation is financed with central bank and money market funding, every additional unit of lending imposes an allocation of scarce and costly capital. However, this does not apply equally to all forms of lending: interbank loans are considered low-risk exposures and hence carry a low coefficient in the computation of risk-weighted assets²⁴. Furthermore, under the current regime, regulators set the CCyB according only to the evolution of credit that is domestic and directed to NFAs; lending to periphery banks can expand indefinitely without triggering a response from the core regulator²⁵. While raising

²²In fact, share buybacks are an increasingly common practice both within and outside the banking industry (Brav et al., 2005). This is why, in contrast to Bernanke & Blinder (1988) and Dehmej & Gambacorta (2017) we do not consider bank capital as a variable that increases the stock of loanable funds; we assume that all profits are distributed to shareholders.

²³For an in-depth look at the transmission mechanism of the CCyB, see Gerali et al. (2010) or Tayler & Zilberman (2016).

²⁴In the interest of tractability, we assign a zero risk-weight to interbank loans.

²⁵In contrast, the reciprocity mechanism requires banks to apply the foreign country's CCyB to cross-border exposures if the borrowers are NFAs. Exposures to banks are exempt from mandatory reciprocity.

the CCyB makes domestic lending less profitable, it does little to discourage interbank lending, improving its relative attractiveness. As a result, tightening the CCyB stimulates the supply of interbank liquidity²⁶:

$$IB^s = \omega_{IB}(i_{IB} - i_n) - \omega_L(i_c^c - i_n - MaP^c) \quad (2.16)$$

MaP also affects conditions on the interbank market through the demand side. A tightening of the CCyB has a direct effect on the liability side of periphery banks by imposing a more capital-intensive funding structure. Hence, the periphery's *MaP* exerts downward pressure on interbank demand:

$$IB^d = \delta_y y^p - \delta_{IB} i_{IB} - \delta_{Map} MaP^p \quad (2.17)$$

Subsequently, both core and periphery *MaP* affect negatively the interbank interest rate:

$$i_{IB} = \phi_y y^p + \phi_n i_n + \phi_L i_c^c - \phi_{Map}^p MaP^p - \phi_{Map}^c MaP^c \quad (2.18)$$

where $\phi_{i_n} = \frac{\omega_{IB} - \omega_L}{\omega_{IB} + \delta_{IB}} > 0$,²⁷ $\phi_y = \frac{\delta_y}{\omega_{IB} + \delta_{IB}} > 0$, $\phi_L = \frac{\omega_L}{\omega_{IB} + \delta_{IB}} > 0$, $\phi_{Map}^c = \frac{\omega_{Map}^c}{\omega_{IB} + \delta_{IB}} > 0$ and $\phi_{Map}^p = \frac{\delta_{Map}^p}{\omega_{IB} + \delta_{IB}} > 0$

Naturally, the effect of MaP on the credit supply trickles down to domestic financial conditions, and in fine to output. To identify the general equilibrium effect of MaP, we recompute the FF equations, this time replacing output by its expression in the IS equations (2.1 and 2.2) and, for the periphery, the interbank rate (2.18); yielding:

$$i_c^c = \psi_n^c i_n + \psi_{MaP}^c MaP^c - \psi_{yc}^c \epsilon_d^c \quad (2.19)$$

$$i_c^p = \psi_n^p i_n + \psi_{MaP^p}^p MaP^p - \psi_{MaP^c}^p MaP^c - \psi_{yp}^p \epsilon_d^p - \psi_{yc}^p \epsilon_d^c \quad (2.20)$$

With ψ_n^c , ψ_{MaP}^c , ψ_{yc}^c the in-fine sensitivities of the lending rate to the policy rate, domestic MaP and the domestic demand shock in the core; and $\psi_n^p > 0$, $\psi_{MaP^p}^p$, $\psi_{MaP^c}^p$, ψ_{yp}^p , ψ_{yc}^p their counterparts in the periphery, with added sensitivities to the core's MaP and demand shock. All coefficients are positive²⁸.

In equation (2.20), the spillover effect appears explicitly: a core MaP tightening loosens financial conditions in the periphery. As expected, the core credit market is only affected by its own domestic policy: a higher CCyB ($\nearrow MaP^c$) contracts the loan supply and increases domestic lending rates. The periphery credit market, on the other hand, depends on its own MaP and also, crucially, on the core's MaP because of its effects on interbank supply. This is, in fact, the essential mechanic of the spillover effect. When the core regulator tightens MaP, the profitability of core domestic lending erodes²⁹. All other things equal, this favors the relative profitability of interbank lending, motivating core banks to increase supply. This creates an

²⁶see appendix B for a microfounded argument that illustrates our reasoning.

²⁷Given the shorter maturity of interbank loans, we can expect fuller transmission to interbank rates ($\omega_{IB} > \omega_L$) and hence a positive sign for this parameter.

²⁸Expressions of derived parameters begin complicating at this point, they can be found on Appendix A, tables A.1 to A.3 Unless specified otherwise, all new coefficients introduced from here onward are positive.

²⁹For this to hold, it is necessary that the direct effect of MaP on profitability be stronger than its second order effect on the lending rate i_c^c . This way, profitability erodes even though the lending rate rises due to the constriction of credit supply. Violation of this assumption makes the CCyB sterile, if not counterproductive; defeating the purpose of MaP.

inflow of liquidity that makes interbank funding cheaper, stimulating domestic lending in the periphery. If the spillover is quantitatively significant, and/or if the periphery is already experiencing a boom; there is a chance that the CCyB's stabilization capacity could be exceeded³⁰, and the regulator would no longer be able to stabilize credit. In such a scenario, the core's restrictive stance jeopardizes financial stability in the periphery.

How would this situation arise in practice? To determine this, we endogenize MaP by specifying national policy rules that seek to stabilize the credit-to-GDP ratio around its long-term trend, as is done in practice. Following the BCBS guidelines, national regulators are also encouraged to exercise a degree of judgment and factor in all other available information on systemic risk to determine what level of credit is appropriate for the economy at a given point in time. In addition, this element of discretion can vary according to policy preferences: the regulator may consider that moderate financial deepening is normal and benign, and thus set the target slightly above the trend. Alternatively, it can set its target below trend if it deems the financial sector unhealthily massive and in need of downsizing.

Let us note Λ and Υ the loan supply and output in level terms, and χ the credit-to-GDP ratio target chosen by the regulator³¹. The national MaP loss function is defined as:

$$LF_{MaP} = \left(\frac{\Lambda}{\Upsilon} - \chi \right)^2 \quad (2.21)$$

Which is minimized for $\frac{\Lambda}{\Upsilon} = \chi$. If we consider an “intermediate” value for the CCyB's steady state, for instance of 1%; the regulator can adjust its policy stance to influence the level of credit and bring the Credit-to-GDP ratio back to the target value χ . MaP rises during booms when $\frac{\Lambda}{\Upsilon} > \chi$ and is lowered in the downturn $\frac{\Lambda}{\Upsilon} < \chi$.

Noting respectively $L = \frac{\Lambda - \Lambda^*}{\Lambda^*}$ and $y = \frac{\Upsilon - \Upsilon^*}{\Upsilon^*}$ the log-deviations of credit and output from their steady state level (corresponding to the variables in the model), we can derive:

$$L = \tau + \chi' y \quad (2.22)$$

where $\chi' = \frac{\chi}{\frac{\Lambda^*}{\Upsilon^*}}$ and $\tau = \frac{\Upsilon^*}{\Lambda^*}(\chi - \frac{\Lambda^*}{\Upsilon^*})$ is a measure of the regulator's discretion given by the difference between the targeted level of credit-to-GDP ratio defined by the regulator and its steady state level.

Equation 2.22 shows that by targeting a certain level of Credit/GDP ($\chi = \frac{\Lambda^*}{\Upsilon^*}$), the regulator is looking to make credit grow at a stable pace with regards to output (given by χ') and adjusts by the discretion parameter τ . Disproportionate growth of credit relative to output implies that the economy is accumulating liabilities at a rate that is increasingly out of line with its capacity to generate the cash flows to honor them, and so a macroprudential intervention is justified. Applying this reasoning to our two-country framework, we get the optimal loan supply steady state deviations $(L_s^c)^{op} = \tau^c + \chi^c y^c$ and $(L_s^p)^{op} = \tau^p + \chi^p y^p$.

Solving $L_s^c = (L_s^c)^{op}$ and $L_s^p = (L_s^p)^{op}$ for MaP^c and MaP^p , respectively, we get the optimal national macroprudential rules:

³⁰Two countries have so far activated the CCyB in the Euro area, France and Ireland; both during the summer of 2018. While the French regulator set the CCyB at 0.25% given a credit gap of 3%, the Central Bank of Ireland set its own at 1% while with a credit cap of -100%. The CBI uses its own model-based credit indicator that accounts for how abhorrent the recent Irish credit boom was. This goes to show that the volatile periphery could need remarkably aggressive policy stances to achieve the same results.

³¹Since the determination of the optimal national loan supply is identical for both countries, we temporarily suspend country-specific notation to lighten the reading.

$$MaP^c = \kappa_{yc}^c \epsilon_d^c - \kappa_n^c i_n - \kappa_\tau^c \tau^c \quad (2.23)$$

$$MaP^p = \kappa_{yp}^p \epsilon_d^p + \kappa_{yc}^p \epsilon_d^c - \kappa_n^p i_n^c + \kappa_{MaP^c}^p MaP^c - \kappa_\tau^p \tau^p \quad (2.24)$$

Naturally, due to the spillover, the periphery regulator reacts to the policy set by its counterpart. Much like an emerging country central banker raises interest rates to prevent a sudden stop when the Federal Reserve tightens its policy stance; the periphery regulator raises the CCyB to counterbalance the wave of interbank liquidity. However, depending on the scenario, the spillover may or may not be malign:

- In the case of **asymmetric shocks**, for instance, the spillover is stabilizing. Let's consider the case of perfectly asymmetric demand shocks: the core experiences a boom, while the periphery is in recession ($\epsilon_d^c = -\epsilon_d^p$). In this case, the surplus interbank funding is a welcome amortizing mechanism to the ongoing credit crunch, making the regulator's task easier to achieve.
- However, in the case of **symmetric shocks** ($\epsilon_d^c = \epsilon_d^p$), the situation gets more complex. In the event of a synchronized boom, the core MaP spillover will exacerbate credit expansion in the periphery. As long as the CCyB does not reach its upper bound³², the regulator can absorb the spillover. The stronger the reaction of the core regulator, the stronger the credit boom in the periphery and therefore a more aggressive reaction is warranted from the periphery regulator to achieve the same results³³. Since procyclicality is inherently stronger in the periphery, the shock will exhaust the periphery's stabilization capacity before the core's. Beyond this point, the periphery will start accumulating unsustainable imbalances and grow closer to a systemic crisis; a situation that poses danger to the entire Euro area.

By construction, the national stabilization rules (2.23) and (2.24) achieve a perfect stabilization result for both countries, so long as MaP is not pushed to its limit. Nonetheless, if regulators in volatile economies find themselves overburdened, it is worth asking if there is a case for the core regulator to internalize the spillover.

2.5 The case for internalization under synchronized booms

Poutineau & Vermandel (2017) and Brzoza-Brzezina et al. (2015) conclude that a policy regime based on national stabilization rules similar to the ones in the previous section outperforms a supranational regime that stabilizes an area-wide credit aggregate. However, one can inquire if the way in which they model the supranational rule is consistent with the underlying logic of countercyclical MaP, and if this is the only possible form a supranational rule can take. To see the shortcomings of the area-wide credit aggregate rule, it is useful to reexamine why the MaP regulator seeks to stabilize national credit. The literature has shown, across countries and time periods, a robust positive relationship between, on one hand, the frequency and severity of financial crises, and on the other, excessive credit expansions³⁴. The Euro crisis was no exception to this phenomenon: systemic risk arose where credit grew precipitously and absented where growth was moderate. In figure 2.4, a noticeable correlation is visible at the country level

³²The common understanding is that the CCyB can be raised up to 2.5%, but regulators can go beyond. However, doing this would likely be a controversial and politically sensitive decision, given MaP's well documented vulnerability to inaction bias and that capital standards are significantly higher today. Even then, there is always some limit to how much regulatory capital they are willing to impose.

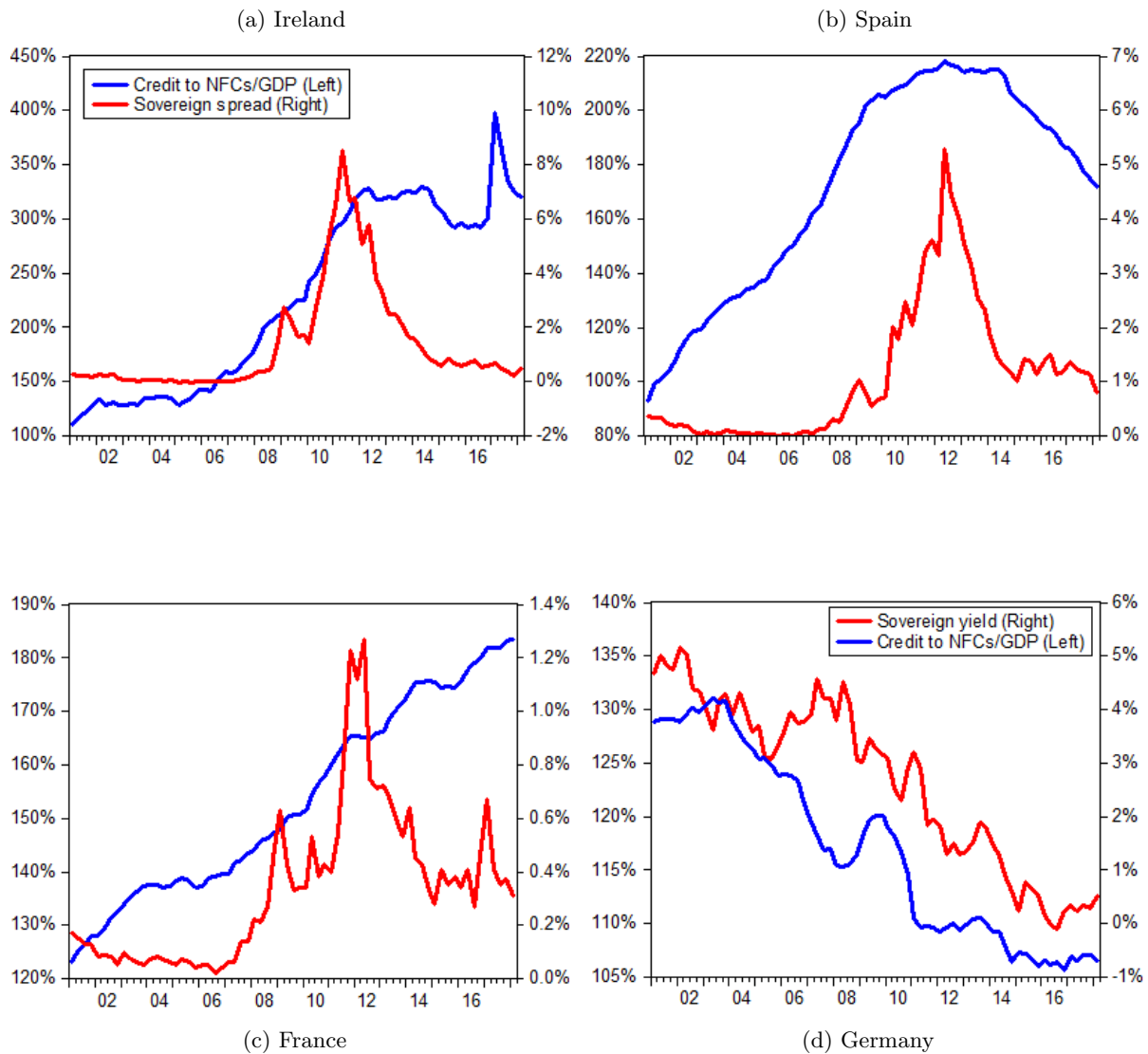
³³This is consistent with the findings of Rubio (2018a). In her model, the periphery needs to adjust the LTV markedly more aggressively than the core.

³⁴See, among others, Schularick & Taylor (2012), Drehmann et al. (2011) and Dell'Ariccia et al. (2016).

2.5. THE CASE FOR INTERNALIZATION UNDER SYNCHRONIZED BOOMS

between the sovereign bond spread (a proxy for systemic risk) and the credit-to-GDP ratio. It is therefore logical for national regulators to target national credit aggregates. However, is it appropriate to define a supranational rule by bluntly transposing this logic to the Euro area level? For this to make sense, there should be a relationship at this level between crisis probability/potential cost and credit growth that mirrors the one at the national level. Yet, the Euro crisis happened in a context of stable credit growth at the area level. While the national crises in the periphery were clearly preceded by domestic credit booms, the Euro crisis happened without the need for a Euro area credit boom (see the black line in figure 2.5). If anything, systemic risk at the area level appears to be most closely tracked by credit in the periphery.

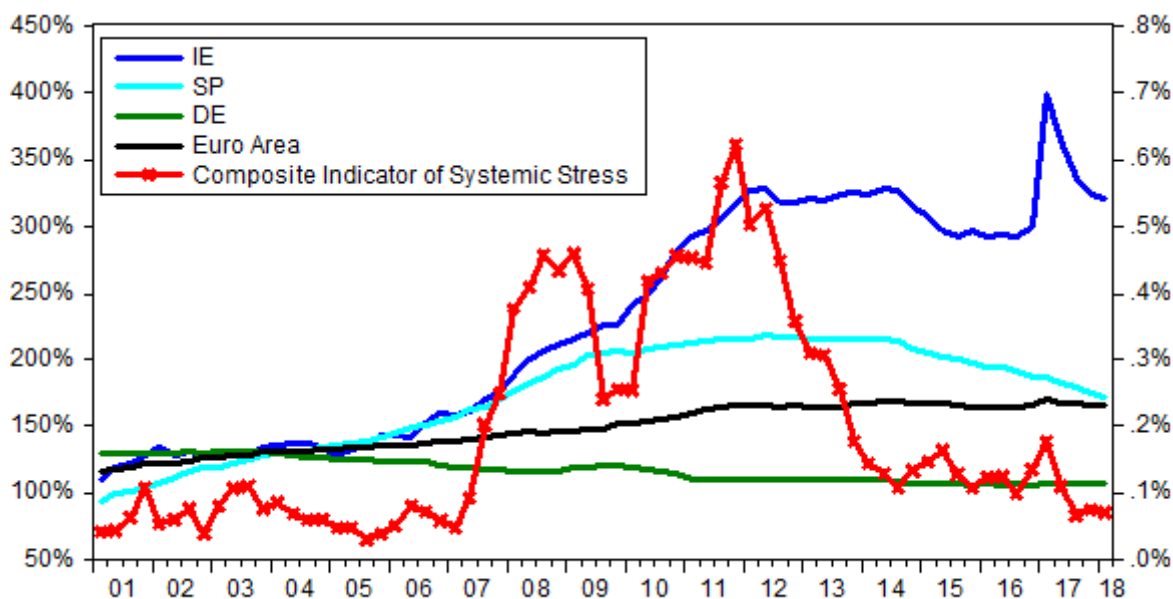
Figure 2.4: Credit growth and systemic risk at the country level



Data source: ECB, February 2019

Note: Sovereign spread is the yield differential of 10-year sovereign bonds with respect to Germany. By virtue of the bank-sovereign doom loop, sovereign spreads are a widely proxy for the general state of systemic risk. For Germany, we used the 10-year sovereign bond yield.

Figure 2.5: Euro area stress tracks credit growth in the periphery



Data source: ECB, February 2019. The CISS is “a composite indicator that measures multi-dimensional sovereign bond market stress in the euro area as a whole. It integrates measures of credit risk, volatility and liquidity at short-term and long-term bond maturities into a broad measure of sovereign market stress.” (Garcia-de Andoain & Kremer, 2018).

In fact, the aggregate area credit national rule works on the misguided assumption that a country’s contribution to the area’s systemic risk is proportional to its weight in the aggregate area credit cycle. This ignores the fact that, due to the EMU’s fragile design, there is a strong risk of contagion between member states, more so than between any other set of deeply integrated economies. Suppose that a mortgage bubble emerges and busts in the German state of Bremen, producing a severe balance-sheet recession that remains confined to this area. It would be wrong to assume that the stability of the national economy is at stake: as the smallest state terms of economic weight, the broader German financial system can absorb the losses and manage the collapse of local banks, not to mention that deposits are ensured on a national basis. In addition, the macroeconomic consequences can be absorbed by aggregate demand support policies financed by fiscal transfers from other states. Contrast this with the Euro area, where each country has to backstop its national banking system, some of which had significantly overgrown the state’s fiscal capacity when they needed to be bailed out. Due to the home bias in bank’s safe asset portfolios, a vicious feedback loop emerges between the health of bank balance sheets and the perceived creditworthiness of the state. This is why the crisis spread so fast among the periphery: investors, scared by the dire situation of Greece, bought into the “sovereign debt crisis” narrative and punished countries that were perceived as similar³⁵. At the peak of the crisis, there were preliminary signs that stress was spreading to France, a core country with high levels of public debt (figure 2.4, panel d). As evidenced by the extraordinary measures taken by the ECB to restore credibility in the common currency, what began as a localized credit boom in the periphery was becoming an existential threat to the EMU.

If we acknowledge that the risk of systemic crises in a member state depends not only on domestic credit developments but also on the state of other members; then a correct assessment of this risk must account for exposure to contagion. Let us illustrate this reasoning in terms

³⁵Spain and Ireland had low public debt ratios and were running budget surpluses before having to bail out their banks.

of probability. Let SN^c and SN^p be the states of nature in the core and the periphery, taking a value of 1 in the event of a systemic crisis and 0 otherwise. The objective of the regulators is to minimize the probability of these crisis events that we note $\alpha_{crisis}^c = P(SN^c = 1)$ and $\alpha_{crisis}^p = P(SN^p = 1)$. Placing ourselves from the core's perspective, α_{crisis}^c is composed of two elements: (1) the risk that an unsustainable domestic credit boom develops and results in a crisis (domestic crisis risk = $\alpha_{domestic}^c$) and (2) the risk of contagion as a second-order effect of a systemic crisis in a neighboring state (contagion crisis risk = $\alpha_{contagion}^c$). Domestic crisis risk is defined as a positive linear function of domestic lending: $\alpha_{domestic}^c = a^c L^c$. Contagion risk, on the other hand, can be defined as the probability that a crisis erupts in the core as a result of there being a crisis in the periphery, i.e. $\alpha_{contagion}^c = P(SN^c = 1 \cap SN^p = 1) = P(SN^c = 1 / SN^p = 1) P(SN^p = 1) = \rho \alpha_{crisis}^p$ ³⁶ where the scalar ρ is the contagion factor, the conditional probability that the core experiences a crisis given that the periphery is in crisis. Therefore, the core's risk of systemic crises can be written as:

$$\alpha_{crisis}^c = \alpha_{domestic}^c + \alpha_{contagion}^c = a^c L^c + \rho a^p L^p$$

In other words, national financial stability is dependent on domestic credit developments and, to a lesser but important extent, on credit developments in other member states. In reality, this is true for any pair of financially integrated economies; but the common currency makes the level of interdependence unparalleled in the EMU. Therefore, if a national regulator is conscious of this, and if its MaP policy stance can have destabilizing effects on other member states; then it cannot be indifferent to the situation of its neighbor even if only to ensure the long-term stability of its own national jurisdiction. This means that it is not necessary to adopt a supranational MaP mandate to justify rules that react to credit in neighboring members, it is only necessary to recognize that national systemic risks are interrelated. In a scenario of a strong synchronized boom where the periphery regulator's stabilization capacity has been overburdened (i.e. the symmetric shock scenario we discussed), the core regulator may rationally ask if it is worth adjusting its own policy stance so as to alleviate the destabilizing effect of the interbank spillover. The spillover may be seen here as a negative externality produced by the core's MaP; and so its effect can be internalized in the regulator's loss function. Formally, this core "internalization regime" would minimize the loss function:³⁷

$$LF_{MaP}^c = \frac{1}{2} \left(\frac{\Lambda^c}{\Upsilon^c} - \frac{\Lambda^{c*}}{\Upsilon^{c*}} \right)^2 + \frac{1}{2} \left(\frac{\Lambda^p}{\Upsilon^p} - \frac{\Lambda^{p*}}{\Upsilon^{p*}} \right)^2 \quad (2.25)$$

for $|\frac{\Lambda^c}{\Upsilon^c} - \frac{\Lambda^{c*}}{\Upsilon^{c*}}| < |\frac{\Lambda^p}{\Upsilon^p} - \frac{\Lambda^{p*}}{\Upsilon^{p*}}|$ and if the periphery's MaP reaches its upper bound ($MaP^p > a \leftrightarrow CCyB > 2.5\%$)³⁸.

Or, written in terms of our model's variables (log-deviations from the steady state):

$$LF_{MaP}^c = \frac{1}{2} \left(\frac{L^c}{y^c} - 1 \right)^2 + \frac{1}{2} \left(\frac{L^p}{y^p} - 1 \right)^2$$

for $|\frac{L^c}{y^c}| < |\frac{L^p}{y^p}|$

As before, we use this loss function to compute the core MaP reaction function under internalization:

³⁶To simplify, we do not consider contagion risk from the core to the periphery, i.e. $\alpha_{contagion}^p = 0 \leftrightarrow \alpha_{crisis}^p = \alpha_{domestic}^p$

³⁷There is no equivalent for the periphery, since at this point its MaP has become inoperative, a parameter of the model fixed at its upper bound.

³⁸Naturally, this option only comes into consideration if the situation in the periphery is worse than in the core and the periphery's MaP is overpowered.

$$MaP_I^c = \theta_{yc}\epsilon_d^c - \theta_{yp}\epsilon_d^c - \theta_n i_n + \theta_{MaP} MaP^p - \theta_{\tau^c} \tau^c + \theta_{\tau^c} \tau^c \quad (2.26)$$

In contrast to the national rules regime, it is now the core regulator that reacts to developments in the periphery: since a tighter MaP stance exacerbates the credit boom in the periphery, the regulator makes a downward adjustment to its MaP stance according to the strength of the periphery's demand shock. The resulting core policy stance should yield a better credit stabilization outcome in the periphery, but at the cost of worsening its domestic performance since any change involves deviating from the first-best choice as defined in the national regime. To some extent, this amounts to tolerating some financial instability at home to assist the neighbor in preventing an imminent systemic threat. The desirability of this “internalization regime” would therefore have to be assessed by computing the net loss or gain of these two countervailing effects.³⁹ We therefore compute, for each country, the net loss from internalization as the difference between the realized loan supply in each of the two regimes:

$$Loss^c = (L_s^c)^{Int} - (L_s^c)^{Nat} \quad (2.27)$$

$$Loss^p = (L_s^p)^{Int} - (L_s^p)^{Nat} \quad (2.28)$$

$$Loss^{EMU} = Loss^c + Loss^p \quad (2.29)$$

Relative to the national regime, The internalizing regime should allow for a reduced credit boom in the periphery ($Loss^p < 0$) at the expense of a now positive credit boom in the core ($Loss^c > 0$). For internalization to be beneficial on the whole ($Loss^{EMU} < 0$), it is necessary for the periphery credit boom to shrink by more than the now positive boom in the core⁴⁰. Therefore, the conclusion will inevitably be an empirical question to be assessed in real-time; it will depend on the strength of the substitution effect by core banks and on how much more volatile the financial cycle in the periphery is.

To illustrate, we calibrate the model using Euro area specific parameter values estimated in the literature⁴¹ and simulate a range of synchronized positive demand shocks ($\{\epsilon_d^c, \epsilon_d^p\} \in [0, 1]$). Figure 2.6, panels a, b and c depict, for the core, the periphery and the union (respectively), the loss incurred as the core transitions to an internalizing regime. The white line depicts the couples of shock values that bring the periphery MaP to its upper bound; from this point onward the core regulator chooses to internalize. By doing so, it incurs a positive loss (figure 2.6, panel a), but the periphery will see its loss decrease compared to the national regime case (fig 2.6, panel b). As shown on figure 2.6, panel c, the net effect is positive, meaning that increased credit growth in the core is more than compensated by smoothing in the periphery. In other words, beyond MaP^p 's upper bound, internalization reduces systemic risk in the periphery more than it increases systemic risk in the core; and so the risk of having a systemic crisis anywhere in the EMU is lesser than under the national regime. There is therefore a net aggregate gain to internalization in a context of strong and synchronized booms.

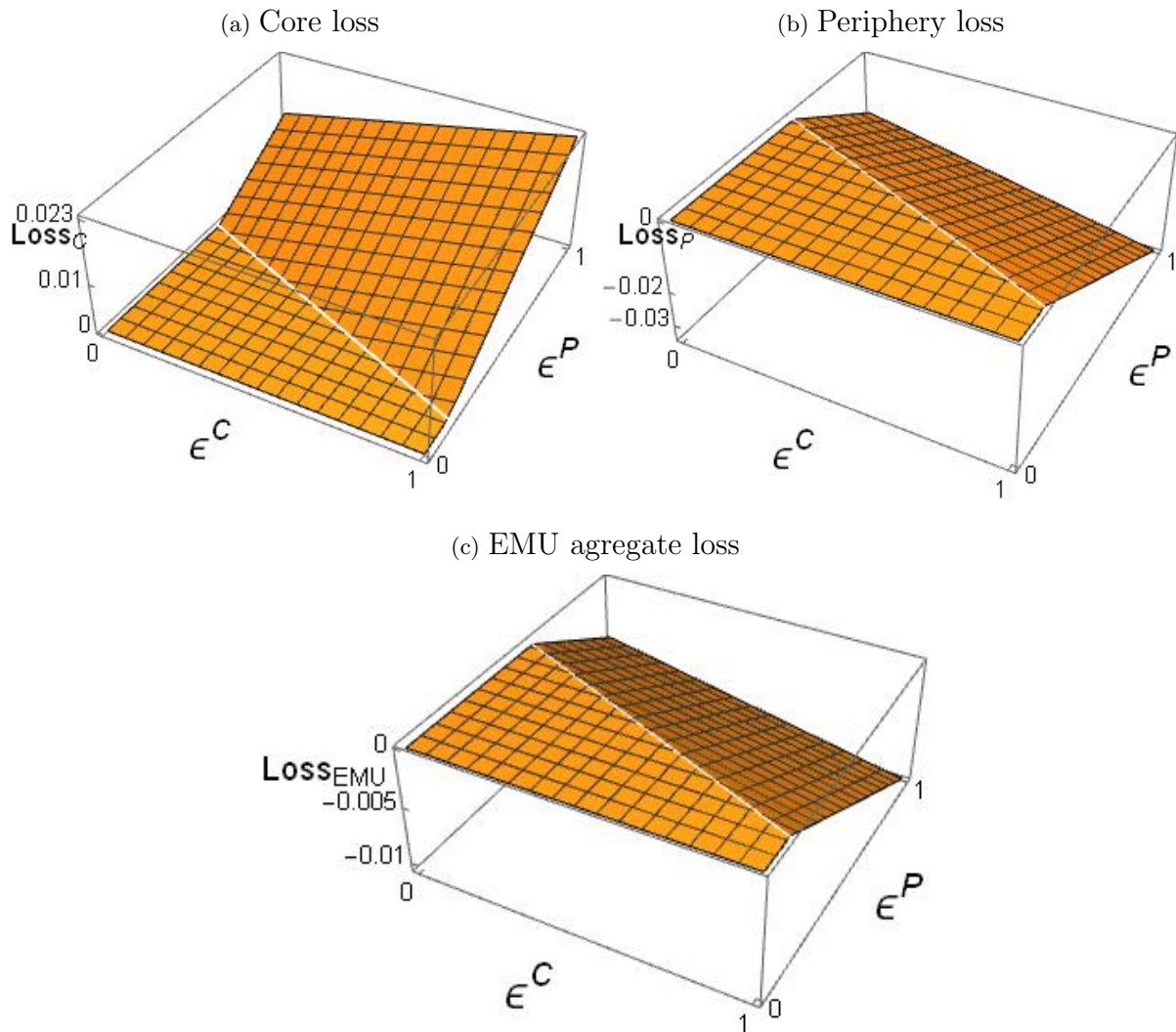
³⁹We should note that, since the objective is to prevent financial crisis in any of the two economies, national losses are not weighted by size. A crisis in the periphery is not less costly than a crisis in the core just because of the former's inferior economic weight. This implies that the periphery in our model represents a country or set of countries significant enough such that a systemic crisis would spread to the core.

⁴⁰We remind that the deviations from target credit are expressed in relative and not absolute terms, i.e. a 5% credit boom in the periphery is equivalent to a 5% credit boom in the core, even if the latter is sure to be several times larger in absolute size. The idea is to prevent either of the countries from reaching a crisis-inducing level of credit growth.

⁴¹Our calibration is based on the Euro area specific estimates of Bouvatier et al. (2014), Calza et al. (2006), Leroy (2014) and Smets (2000).

2.5. THE CASE FOR INTERNALIZATION UNDER SYNCHRONIZED BOOMS

Figure 2.6: Internalization: core loses, periphery gains, favorable aggregate net effect



2.6 Conclusion

Our simple modeling exercise suggests that countercyclical capital regulation can, under national stabilization regimes, produce potentially destabilizing spillover effects between members of a heterogeneous monetary union via interbank lending. If such effects were to materialize during the next expansion of the financial cycle, it is worth examining if and when alternative macroprudential regimes can perform better. This paper is not the first to tackle this kind of question, but the literature up to this point has sided with the status quo without properly accounting for the extraordinary interdependence of systemic risk between EMU member states. Instead of evaluating a supranational rule that stabilizes the area's credit cycle, we propose that the regulator in the core internalizes the spillover if and when his counterpart in the financially dependent periphery can no longer absorb it. In this sense, our result should not be interpreted as a refutation of the national regimes currently in place, as they still perform best in most states of nature. Rather, we do a scenario-building exercise that advises some degree of internalization if and when the theorized patterns materialize as more countries activate the CCyB. Of course, our result is contingent on the sign and strength of the spillover effect, the properties of which we have assumed on the basis of plausible behavior. The only thing empirical evidence tells us about macroprudential spillovers is that they are unpredictable and variable across countries and periods. Therefore, the best the policymaker can do is to be aware of the possible scenarios and the threats that they entail, as well as having some idea on how to respond.

More broadly, our policy recommendation should be further examined by considering elements outside of our stylized framework. While the CCyB is the most discussed macroprudential tool, mortgage market instruments such as dynamic limits on the loan-to-value ratio of new loans are also a pillar of countercyclical regulation. As such, they may allow for a wider stabilization margin to absorb any potential spillover. However, the institutional framework around these tools is distinctly less European: there is no harmonizing legislative framework in the image of CRD IV, ex-ante coordination protocols are less mapped out and authority over them remains strictly national. In fact, because of their very tangible distributive effects and imbrication with housing policy, in many countries the government retains significant influence over them; potentially creating political economy issues. In sum, while regulators have more power than suggested in our model, whether that power is large enough to undermine the conclusions of our thought experiment remains an open question. Another important institutional question is who makes the decision to internalize. As the only authority with a supranational financial stability mandate, the ECB is the natural candidate. National regulators could therefore continue to apply domestic mandates, with the ECB imposing a different policy stance if the area's stability calls for it. However, under the current legislation, the ECB has the power to demand a higher CCyB, but not a lower one. As such, responding to the interbank spillover scenario would require expanding the ECB's "top-up" to make it symmetrical; a reform that, to our preliminary judgment, presents little obvious drawbacks.

Chapter 3

Governance Frameworks of Macroprudential Policy in the Euro Area: how well do they guard against inaction bias?

“Given the early-stage status of macroprudential policy in advanced economies, much remains to be learned about the normative and positive economics of macroprudential policies. Still, a well-understood problem is inaction bias, by which policymakers move too late and too little to contain risks. If macroprudential policy is to play an effective role in building resilience and dampening the impact of shocks, macroprudential authorities must be willing to act with sufficient force and sufficient timeliness. This is all the more true for members of a monetary union, since monetary policy cannot be deployed to clean up in the wake of country-specific shocks.”

-Philip R. Lane, Governor of the Central Bank of Ireland¹

3.1 Introduction

Who carries out macroprudential policy in the Euro area? While the banking union has made the ECB a central player in the microprudential area through the Single Supervisory Mechanism (SSM), implementation of macroprudential instruments (countercyclical instruments in particular) remains in the hands of national regulators. The first thing one will notice upon examining the latter is the sheer diversity of governance frameworks prevailing among member states. Is this diversity justified by the heterogeneity of national financial systems? If one assumes that there is no “one-size-fits-all” governance framework and that therefore these must be constructed in accordance to national idiosyncrasies, such diversity can be seen as a benign manifestation that European policymakers are learning from their mistakes and accounting for national heterogeneity into policy design. However, one must also consider the possibility that the construction of regulatory frameworks can be guided by considerations that lie outside the realm of purely technocratic reasoning. Is it a coincidence that Germany and Austria, two countries where historical precedents of hyperinflation have led the central bank (CB) to develop a culture inextricably characterized by its narrow focus on price stability, have opted to make the prudential regulator (PR) the central actor of their governance frameworks?

With the lion’s share of the growing macroprudential literature focusing on questions of instrument efficacy and policy analysis, the question of how best to design the institutions that

¹Remarks at the IMF/Central Bank of Ireland/IMF Economic Review Euro At 20 Conference Dublin, June 26th 2018.

control macroprudential policy has probably not received the attention it warrants (Tucker, 2018) but has not been altogether ignored either. Egawa et al. (2015) uncover a pattern between a country's characteristics and its choice of institutional arrangement: populous, developed and financially complex countries tend to favor multi-agency arrangements while smaller countries with bank-centric financial systems concentrate powers within the central bank. On the surface, Euro area countries seem to conform to this pattern, but upon closer examination some singularities stand out. Ireland, for instance, is the prototypical example of a central-bank based regulatory system despite the preponderance of non-bank finance. France and Germany are similar economies with multi-agency arrangements, but in the former the central bank is *primus inter pares* while in the latter it is overshadowed by the prudential regulator. Leaving aside the question of whether the pattern uncovered by Egawa et al. (2015) is underpinned by a sound economic rationale, one might ask if the existence of a supranational level of supervision and regulation in the form of the SSM and the ESRB provides grounds for harmonizing national governance frameworks. On the one hand, the institutions that have historically performed the duties of supervision and regulation accumulate experience and know-how, so it would be logical for the new governance frameworks to be constructed as improvements in the continuation of the old. On the other, since the Euro area is expected to converge towards a single market of financial services where financial cycles progressively become more synchronized and banking groups less aligned along national borders, coordination between national regulators is paramount and will be increasingly so. The Eurosystem, which works as an organic apparatus for the implementation of monetary policy, seems a natural candidate overarching infrastructure for pan-European macroprudential policy.

Any assessment of the European governance framework presupposes some degree of foundational knowledge on a set of general desirable characteristics. However, despite there being awareness of its importance, the issue of governance has received far less attention in the MaP literature than instrument efficacy or policy spillovers; and pales in comparison to the body of work on monetary policy independence for example. Where such reflection has existed it has taken place in global policymaking circles, spearheaded in particular by researchers at the IMF² (Nier et al., 2011; Lim et al., 2013; Ueda & Valencia, 2014). Nier et al. (2011) opened the debate on governance by taking stock of post-crisis institutional models and proposing a typology to classify them, as well as an evaluation of their flaws and advantages and proposing mechanisms to correct them. While this paper cites several dimensions along which governance regimes can be distinguished, the most consequential choice seems to be the role attributed to the central bank and the subsequent research has had this as a focus. Lim et al. (2013) study the observed response time of macroprudential authorities to the shocks emanating from the GFC and find that giving a strong role to the central bank increases the likelihood of a timely response. Ueda & Valencia (2014) tackle the issue of independence mirroring the classic time inconsistency problem from monetary policy; they argue that while it is desirable that the regulator be independent, giving the central bank a macroprudential objective can be dangerous for price stability. Tucker (2018) introduces a counter-argument to independence, alleging that delegating MaP to unelected technocrats poses significant political economy challenges in liberal democracies. Egawa et al. (2015) and Masciandaro & Volpicella (2016) inquire into what influences a country's choice of institutional arrangement, with the former finding that populous, financially developed democracies have a preference for multi-agency regimes and the latter uncovering that central banks with less independence and already vested with microprudential duties were likelier to be given the macroprudential mandate. Finally, Lombardi & Siklos (2016) build a synthetic macroprudential "deployment capacity" index that numerically translates a set of institutional characteristics that can be used for cross-country comparisons

²See also the Financial Sector Assessment Program reports developed jointly with the Financial Stability Board.

The union’s macroeconomic policy has often failed when conducted in ignorance of the differences between member states. We are used to thinking of these differences as determined by heterogeneous fundamentals between the national economies, but they can also find their roots in the policymakers themselves. If we accept that the way institutions are designed influence how they conduct policy, it follows that accounting for how and how much Euro area national regulators differ from one another is necessary to produce pertinent policy assessments; especially in an area with great potential for spillovers. This is where the work of Lombardi & Siklos (2016) is of interest to us. Theirs is, to the best of our knowledge, the only effort to describe the institutional characteristics of national governance frameworks along several quantifiable dimensions that can then be condensed into a single index. More specifically, they evaluate factors such as the freedom to use macroprudential instruments, the institutions involved and the coordination mechanisms between them, the depth and reactivity of post-crisis reforms, compliance with the FSB’s/G20 recommendations, accountability and transparency mechanisms; all with a focus on the role of the central bank.

While their index encompasses a wealth of valuable information, it is not immediately clear how it should be interpreted: the authors present it as a macroprudential “deployment capacity” index, but the abundance and diversity of the data therein risks diluting its meaningfulness. The index is a weighted average of 8 attributes³, each one composed of its own set of characteristics which in summation total around 40. Many of the characteristics are accounted for so that the index will grow with the central bank’s involvement and power (number of instruments possessed by the CB, prominence of the CB in the coordination committee), so in this respect it could be read as a measure of the CB’s de facto role in the governance apparatus. But the data also includes a number of characteristics that fall outside this line of interpretation (presence of deposit insurance, organizational changes since the crisis, distance from FSB recommendations, etc...).

More problematic is the fact that at least one important characteristic is computed in a way that makes the index grow as the importance of the CB is diminished: scores in the coordination category increase with the number of members on the coordination board. This means that regimes in which authority is diluted among a multiplicity of actors (U.S., India) get a high score while those with an all-powerful CB (Czech Republic, Singapore) get a null score. In addition, the results of Lim et al. (2013) would suggest that reactivity is stronger in CB-centric regimes; so this also poses a problem for the index’s pertinence as a measure of “deployment capacity”. Although this only concerns one characteristic, it is the most influential one in the category with the highest weight⁴, so it is of particular importance.

The shortcomings of the Lombardi & Siklos (2016) index are symptomatic of how difficult it is to describe governance regimes in terms that are quantifiable, intuitive, robust to subjective appreciation and meaningful. Although the comprehensiveness of their data is impressive, their indicator suffers from an entropy issue: by compiling a large amount of information in ways that do not always fit within a coherent unifying concept, it is difficult to tell what the index exactly conveys. With the aim of providing a comparative evaluation of the macroprudential governance frameworks in the Euro area that can be used to assess heterogeneity in this domain, we take

³“Implementing Macroprudential Policy”, “Distance to FSB/G20 Macroprudential Recommendations”, “Response Time to FSB Recommendations”, “Coordination of Relevant Entities & Responsibility for Macroprudential Policy”, “Deposit Insurance”, “The Place of Macroprudential Policy in the Monetary Policy Transmission Mechanism”, “Transparency and Accountability”, “Organizational changes since 2011”.

⁴The “coordination” category has a 0.25 coefficient; the two that follow have coefficients of 0.2 and 0.15. There is a strong correlation between the “coordination” score and the number of board members (correlation coefficient= 0.82).

inspiration from Lombardi & Siklos (2016) but we tweak and simplify it for our purposes. We want our indicator to answer a clear, specific question: how vulnerable is a country's governance framework to inaction bias? To do so, we use a smaller set of characteristics and we emphasize the relationship between them and the underlying concept of inaction bias.

One might rightfully ask why choose inaction bias as our ultimate evaluation criterion. The benefits of successful MaP are deferred in time and unobservable by construction: one cannot tell when a crisis has not occurred. The costs, on the contrary, are immediate and tangible. Moreover, the benefits of an avoided crisis are vaguely spread out among the general population; the costs are very clearly imputed on specific agents (banks, risky borrowers). Since there is a likely trade-off between long-term financial stability and short-term growth, and since affected agents are likely to pressure against tighter regulation; the regulator is more likely to err on the side of late and tame intervention (if it intervenes at all). Inaction bias has been identified in the governance literature as the main political economy challenge of institutional design (IMF-FSB-BIS, 2016), and so protection against it seems like as good a criterion as any by which to measure the adequacy of national governance frameworks.

How, exactly, do we ascertain whether a national regulator is more or less vulnerable inaction bias? There are, broadly speaking, two possible reasons why a regulator might not intervene when it should (Nier et al., 2011; IMF-FSB-BIS, 2016): it either lacks the powers to enact the necessary measures, or it lacks sufficient incentives to act promptly and decisively. Therefore, we first turn our attention to the regulator's **power to act**. Having the power to act certainly means having a sufficiently rich arsenal of macroprudential instruments, but it also requires mechanisms to ensure the relevant actors cooperate efficiently. In addition, as with for monetary policy, it is desirable that the influence of electoral politics and industry lobbying be kept to a minimum, that the independence of decision-making and implementation are safeguarded. Secondly, we assess whether the governance framework ensures that the regulator will have enough **willingness to act**. Here, we will be examining how the financial stability objective is established in the regulator's statutory mandate and how it relates to the regulator's other objectives. Furthermore, the regulator's incentives will be largely shaped by how its performance is evaluated, how strongly the relevant actors are held responsible for these outcomes and the level of public understanding on how the regulator functions. Put otherwise, willingness to act is determined by the presence of mechanisms that ensure proper accountability, transparency and public communication. Furthermore, proactive policymaking should also be incentivized through expedient decision-making rules and protocols that avoid needlessly encumbering the process.

In section 3.2, we will describe how it is that we evaluate attributes like transparency or independence by detailing the observable characteristics that determine them. In section 3.3, we apply this scoreboard to 8 Euro area countries using public data to dress a comparative portrait of their governance frameworks. All data was collected from public official information published by the authorities themselves, legal documentation, and a series of assessment reports by the IMF and the FSB.

3.2 What defines a macroprudential governance framework's ex-ante vulnerability to inaction bias?

This section will be dedicated to explaining the rationale behind the criteria we have selected to judge the vulnerability to inaction bias. The two basic criteria we consider are the power to act and the willingness to act, each being composed of three subcriteria. While intuition would

3.2. WHAT DEFINES A MACROPRUDENTIAL GOVERNANCE FRAMEWORK'S EX-ANTE VULNERABILITY TO INACTION BIAS?

suggest that not all of the subcriteria have equivalent influence on inaction bias, we lack any sound theoretical or empirical ground to postulate which elements are more influential and by how much. We therefore assume equal importance for all subcriteria, and so under this configuration the main index can be equally computed as the unweighted average of the two main criteria or of its six subcriteria, normalized to 100. To enhance comparability and minimize interpretation, we attempt insofar as possible to evaluate each category based on characteristics that can be observed objectively (preferably yes/no questions or quantifiable values); but in many cases some degree of appreciation is unavoidable. Depending on these characteristics, each criterion will be assigned a score on a scale of 1 (low) to 3 (high). Below, we explain each subcriterion's relationship to inaction bias, and on what basis we evaluate its strengths and weaknesses.

3.2.1 Power to act

For the purposes of this index, we will consider that the regulator's power to act is high when (i) the institutional architecture ensures effective coordination between and within the relevant authorities, (ii) it disposes of enough macroprudential instruments, and (iii) the policymaking process is kept independent from political and industry influence.

3.2.1.1 Coordination mechanisms

How does better coordination enhance power to act?

When a complex objective is delegated to several large organizations, the ability to meet it will be greatly affected by the efficiency with which these organizations operate together. Even when the central bank concentrates all MaP functions, it will regularly need to coordinate its actions with the prudential regulator for the setting of balance-sheet instruments and the treasury/government in matters of resolution and instruments that involve a fiscal dimension. Whatever the type of architecture, the power to act will be dependent on the existence of functioning coordination mechanisms. The foremost function of these is ensuring a seamless and complete sharing of information between the agents involved. Agencies have access to different types of information, and the interpretation of this information can vary depending on the type of expertise in each organization. The quality of decisions is likely at its highest when all agents can exchange opinions on the sum of information available to each of them. Otherwise, coordination mechanisms also ensure that each agent knows and internalizes the other's field of activity when conducting their independent functions, thereby preventing jurisdictional gaps and redundancies.

The existence of effective formal coordination is especially necessary for frameworks where there is specialization along functional (Austria and Germany) or sectoral (Spain) lines. Multi-agency frameworks are confronted to what Freeman & Rossi (2012) refer to the problem of "shared regulatory space". As documented in the public choice theory literature, agencies and the bureaucrats that govern them are not (as assumed in standard theory) necessarily benevolent; meaning that their behavior might be driven by objectives other than the maximization of social welfare ⁵ (or, in this case, financial stability). More to the point, if agencies pursue to some extent secondary unilateral prerogatives that need not overlap with the common financial stability objective, this could create incentives for unproductive inter-agency competition. Agencies might be driven by a sense of self-preservation and/or expansion, both of which often demands defending their individual indispensability in the eyes of the legislature and the rest of the executive. As a consequence, each agency can have an incentive to overextend its regulatory

⁵See, for instance, Grossman & Helpman (1994).

perimeter where division of labor is sectoral; or to seek functions for which it does not have a comparative advantage. As argued by Tucker, these incentives might be especially pernicious in matters of information sharing (Tucker, 2016, p.55):

“The incentives not to share are obvious: knowledge is power; do not give legislative sponsors reason to be interested in the competition; and so on. But the incentives not to receive information can be equally powerful: avoid blame for things you do not have the power to control, keep the focus on the core mission, and so on. Separate agencies are, in short, beset with incentives to compete or withdraw rather than cooperate.”

How do we evaluate coordination mechanisms?

If these kinds of problems manifest, it can be useful for there to be a coordination body with binding powers that can settle differences between the agencies (BIS, 2018)⁶. Beyond the risk of emerging rivalry, a lack of coordination mechanisms might simply induce the relevant agencies into tunnel-vision around their respective fields of competence, making them ignore the holistic dimension of systemic risk. Finally, there is a risk of redundancy as agencies that are not sufficiently aware of each other’s activities might wastefully duplicate efforts and services. Coordination mechanisms in multi-agency frameworks should therefore favor systematic, spontaneous and continuous sharing of information, avoid jurisdictional gaps and overlaps, and incentivize cooperation when performing a task requires the participation of multiple authorities. The most prevalent form of coordination mechanism is the inter-agency committee, whose properties and role varies from country to country: it may act as a decision-making body with binding powers or merely serve an advisory purpose. Otherwise, coordination principles can be formally established through protocols such as Memoranda of Understanding (MoUs). In table 3.1, we can see a clear contrast in the role played by the multi-agency body in France, where it is central and all-encompassing, and in Spain under the incomplete arrangement, where it is more or less obsolete.

Although less imperative than in multi-agency models, internal coordination mechanisms can also enhance the conduct of policy in cases of central bank concentration as this organization is likely to grow in size and complexity. New macroprudential functions are generally inscribed within existing financial stability departments whose historical role is often that of monitoring macrofinancial developments and therefore become more policy-oriented. Such attribution is logical and well-founded, but it needs to be complemented with a modicum of analytical input from other departments whose insight could be valuable, i.e. those that deal with monetary and microprudential issues. This can be done through the creation of cross-departmental committees that advice the decision-making body, as is done in Belgium. Internal coordination mechanisms should therefore ensure that the involvement of different authorities is not detrimental to the cohesiveness of macroprudential policymaking for multi-agency setups, and federate the central bank’s resources towards the financial stability objective in central bank-centric arrangements.

⁶The BIS cites lack of binding powers as a factor undermining the effectiveness of coordination mechanisms: *“The jury is still out on the effectiveness of these arrangements. [...] Notably, many of the inter-agency committees set up after the GFC lack hard decision-making powers”* (BIS, 2018, p.71)

3.2. WHAT DEFINES A MACROPRUDENTIAL GOVERNANCE FRAMEWORK'S EX-ANTE VULNERABILITY TO INACTION BIAS?

Table 3.1: Coordination bodies in France and Spain

France	Spain
<ul style="list-style-type: none"> -Decision-making body with all the MaP powers -Established in high-ranking national legislation -Meets quarterly -Members share mandate over entire financial system 	<ul style="list-style-type: none"> -Consultative body with no hard MaP powers -Established through a MoU -Held its first meeting since 2013 in July 2018 -Members have individual sectoral mandates -Transition status: New MaP authority is in the process of being created

3.2.1.2 Completeness of instruments

Why does a complete toolkit enhance the power to act?

This subcriterion assesses whether the MaP toolkit available to the authorities is in line with global standards. All other things equal, a wider toolkit gives the regulator more levers to guide the actions of the financial industry in the direction of stability. Systemic risk is a complex phenomenon composed of many variables that can serve as operational targets. If policymakers adhere to the Tinbergen rule (one instrument per operational target), then increasing the number of instruments amounts to increasing the range of variables that the regulator can influence to achieve its objective. Also, regulators may be constrained in the extent to which they can use an instrument (ex: the LTV cap in Finland).

How do we evaluate the completeness of instruments?

We examine the set of instruments available to the regulators and the degree of control they have over them. The most important of these are the legally-binding instruments affecting either the balance-sheet constraints on lenders and restrictions on the granting of loans based on borrower characteristics. Lender-based instruments feature a distinctly supranational dimension: they were put into form by European legislators through the CRD IV package. The objective of these texts is to adapt the common Basel III framework to the European Union, and the result is a broadly homogeneous and harmonized toolkit that includes:

- A Counter-cyclical capital buffer applied to all banks according to procyclical risk
- A Systemic Risk Buffer applied to all banks according to the state of cross-sectional risk
- Additional buffers for Global Systemically Important Institutions/ Other Systemically Important Institutions
- Sectoral risk-weights for real estate exposures
- Flexibility package: The option to deviate from the EBA's single rule book on a predetermined set of dimensions
- Loss-given-default floors

While in general the national legislatures have transposed all CRD IV instruments into their national macroprudential frameworks, there have been scarce exceptions that introduce some

divergence between the national toolkits. For instance, Ireland has, for the time being, deemed it unnecessary to grant the central bank a systemic risk buffer. Nonetheless, the CRD IV instruments make it so that capital and liquidity regulation is broadly homogeneous around the euro area. The same cannot be said of borrower-based instruments. In some countries, these instruments are not under the direct control of the macroprudential authority (Belgium and the Netherlands). The degree of power the regulator has over them may be variable, as can be observed when comparing France and Finland (table 3.2). Therefore, our aim in this category will be to evaluate the relative completeness the macroprudential toolkit in each jurisdiction, as well as the degree to which the authorities are free or constrained in their implementation⁷.

Table 3.2: Different degrees of control over mortgage market instruments

France	Finland
“In order to mitigate potential risks to financial stability from the real-estate sector, the Haut Conseil de la Stabilité Financière will have the power to impose, on the proposal of the Governor, specific requirements for loan-to-value, loan-to-income and debt service-to-income ratios, and in general set credit standards for lending by entities or persons under the [PR’s] supervision” ⁸	“The loan amount [...] can be at maximum 90 per cent of the current value of the collateral securities at the time of granting of the loan. The Financial Supervisory Authority may decide to reduce the maximum credit amounts provided [...] above by a maximum of 10 percentage units in order to limit the exceptional increase of risk to financial stability” ⁹

3.2.1.3 Independence

Why would more independence translate into more power to act?

The question of how much independence should be accorded to the macroprudential authority has been one of the main drivers of the governance debate and is, unsurprisingly, quite controversial. The argument supporting independence is similar to the one for monetary policy: MaP is vulnerable to political short-termism and vested interests that can make the course of policy deviate from its ideal path as determined by technocratic, social-welfare oriented analysis (Alesina & Tabellini, 2004; Bianchi & Mendoza, 2018). Given that there is a trade-off between an economy’s capacity to create wealth through leverage on the short term and financial stability on the long term, failure to insulate the policymaking process from these influences is likely to result in an under-regulated system. By imposing precautionary constraints on the financial system, MaP slows down the flow of financing into the real sector and reduces the profits of the financial sector. Private agents are likely to prefer policy stances that privilege growth and profits, either because they are myopic about their contribution to systemic risk (such as households taking on risky mortgages) or because perverse incentives lead them to disregard these externalities even when they are conscious of them (i.e. too-big-to-fail banks anticipating a bail-out). In any case, it is likely that constituencies will exert pressure on elected officials to adopt a policy stance that provides easier growth but that is sub-optimal from a financial stability perspective. Therefore, like for monetary policy, there is a case for delegating a substantial amount of power to appointed technocrats and keeping elected officials at arm’s length from the day-to-day operations of MaP.

⁷Where a certain instrument is under the control of the government, such as mortgage market instruments in the Netherlands, we count them as part of the toolkit. However, this will be detrimental to the scores in the categories of Independence and coherence in the mandate’s allocation.

3.2. WHAT DEFINES A MACROPRUDENTIAL GOVERNANCE FRAMEWORK'S EX-ANTE VULNERABILITY TO INACTION BIAS?

Contrarily, others have argued that the case for independence is not as clear-cut as it is for monetary policy, especially when the macroprudential mandate is entrusted to the central bank. One reason for this is that MaP, whose instruments target specific classes of agents, is likely to have first-order distributional consequences that belong in the realm of elected politics (Tucker, 2018) and could hurt the regulator's legitimacy (Issing, 2018). For example, tightening limits on LTI ratios for mortgage lending amounts to restricting financial inclusion for households on the lower end of the income distribution, hence reducing their opportunity of upward social mobility through capital gains on property. Furthermore, due to the complexity and nebulousness of the financial stability objective and our imperfect knowledge of the effectiveness of MaP tools, agreeing on simple quantitative standards by which to hold the policymaker accountable is harder than for monetary policy (Issing, 2011; Tucker, 2018) as there is no simple benchmark like the 2% annual inflation rate. Finally, while there is a social consensus around the desirability of low and stable inflation, it is not clear that society's preferences on financial stability are either homogeneous or stable over time; and so it should follow that, in a constitutional democracy, elected officials should be able to update the macroprudential framework in response to shifts in public opinion.

All of these are certainly important considerations that deserve to be kept in mind, but they raise questions of political legitimacy rather than policy effectiveness. While the discussion on whether it is socially desirable for the macroprudential authority to be independent is complex and controversial, it is less debatable that a politically independent macroprudential authority is freer to pursue policies that strengthen financial stability in the likely event that they prove unpopular. Put otherwise, the disagreement over the desirability of independence does not emanate so much from a questioning of its operational benefits but rather a questioning of whether those benefits are worth the price of potentially subverting democratic values. The aim of our index is to inform on a macroprudential regime's vulnerability to inaction bias; and to the extent that stronger independence implies, *ceteris paribus*, more power to act; we work on the assumption that governance frameworks that favor independence reduce the probability of inaction. The political deadlock that paralyzed fiscal policy during the Euro crisis exemplifies the dangers of leaving macroeconomic stabilization decisions unprotected from political considerations. While academics increasingly came out in favor of countercyclical fiscal stimulus at the area level, politically-motivated hostility to cross-country fiscal transfers rendered this lever inoperative. The ECB, in vigor of its independence, was able to fill the void of fiscal stimulus through extraordinary monetary easing. It will not be able to do the same if a country fails to properly lean against the wind of its national financial cycle.

How do we evaluate the ex-ante protection of independence?

Potential threats to independence come in two types: political risk in the form a disproportionate influence of elected officials that may prioritize short-term growth (typically the ministry of finance (MoF)) and regulatory capture through the involvement of representatives of the financial industry. The Euro crisis provides illustrations for both these phenomena. For the Spanish crisis, Garicano (2012) argues that the Bank of Spain's complacency was influenced by the links between political parties and the governance of savings institutions:

"In the Spanish case, the supervisor, confronted with powerful and well connected ex-politicians decided to look the other way in the face of obvious building trouble. [...] Even more important was the role of these political connections in diluting the role of the supervisor after the crisis started, in what was meant to be the crisis resolution stage but which was in fact a crisis cover up stage. The mergers that were decided followed political and regional criteria, rather

than economic rationales. The Popular Party cajas (those controlled by Popular Party regional politicians) merged together, which meant that two of the most problematic cajas in the crisis (Bancaja from Valencia and Caja Madrid) ended up as part of the same undercapitalised (now nationalized) entity. The two Galician cajas also merged, because Galicia 'must have' a local credit institution, creating a monster that is also nationalised. Same with the medium-sized Catalan cajas, also now nationalised. In all of these instances, the regulator was mindful of the figures, and understood the costs of these politicised entities, but refused to impose its will in the face of concerted actions by the politicians."

In a dangerous mixture of prudential and industrial policy, the former Irish PR's was given the mission of both supervising and promoting the expansion of the Irish financial system¹⁰. The result was an ill-fated "principles-based" approach to regulation in which much trust was placed in the banking sector's capacity to effectively police itself. As is recounted in the report of the commission of investigation into the financial crisis in Ireland (Nyberg, 2011, p.62):

"The particular version of "principles-based regulation" embraced by the [Prudential Regulator] (and supported by other stakeholders) stressed the importance of sound bank governance and internal bank processes for ensuring appropriate prudential behaviour. This policy was intellectually supported by the efficient market paradigm and was consistent with the Government's "Better Regulation" policy. Thus, although the [PR] did engage with regulated banks and supervised their activities, interactions and communications usually addressed issues of governance or structure. The [PR] was unwilling to engage in a process of (what was possibly perceived to be) intrusive verification to establish whether institutions were in fact behaving in a prudent manner and managing risk appropriately. Instead the PR relied on management and boards to act in the best interests of their respective institutions. Given that the PR did not perform the required detailed scrutiny of lending practices it is very unlikely that it would, at any time, have formed an adequate understanding of bank exposures [...] It appears that concerns about a loss of market share by Irish banks to potentially less regulated foreign competitors may have inhibited forceful action by the [PR]"

Highlighting political risk is not the same as decrying any and all involvement of elected officials. The MoF is the ultimate guarantor of the economy's overall functioning and is in a privileged position to propose legislative reform if the need arises. Furthermore, financial stability policies need coordination with fiscal policy, for example for systemic risk levies or bank bailouts in crisis scenarios. So while the MoF should undoubtedly claim a seat at the macroprudential table, its singular exposure to the electoral cycle makes it less suitable than its peers to have a predominant role in the policymaking process. In particular, according to the MoF the possibility of unilaterally blocking macroprudential measures (as de jure right or de facto as a result of procedures) can be detrimental to independence. Similarly, whenever industry representatives are present in the decision-making bodies of certain authorities, it could be detrimental to concentrate key powers or functions in these, especially if such members enjoy voting rights (as in Germany). In any case, the idea is that elected officials should have a say in the macroprudential policymaking process, but that the framework should not allow for situations in which they could unilaterally hamper its course. While such a normative could be perceived by some as needlessly hawkish and legalistic, recent developments in western politics suggest it would be unwise to design institutions on the assumption that elected officials will perpetually respect and defer to the judgment of technocratic bureaucrats.

¹⁰The now defunct Irish Financial Services Regulatory Authority had a stated secondary objective of "*fostering of an international competitive banking industry in Ireland*". In retrospect, it was more successful in achieving this than its primary functions as a prudential regulator.

3.2.2 Willingness to act

For the purposes of this index, we will consider that willingness to act is strengthened when (i) the policymaking process, from initial decision to final implementation, is expeditious and unencumbered by bureaucratic contraptions, (ii) the regulator enjoys a coherent legal mandate that encourages strong and decisive action and (iii) process accountability is ensured by proper transparency and communication.

3.2.2.1 Expeditiousness of the policymaking process

In a policymaking process, the more opportunities there are for an agent or a set of agents to oppose a measure favored by its peers, by rejecting it outright or stalling its proper implementation; the smaller the probability that be carried out in time. As a result, encumbering the process by multiplying decision-making instances is likely to reduce the willingness to act. Timeliness is of particular importance to macroprudential policy, where comparatively significant implementation lags¹¹ make reaction time greatly determinant to its ability to effectively prevent crises¹². Due to their regulatory nature, the process of adjusting MaP instruments is inherently more cumbersome and time-consuming than, for example, adjusting the policy rate. It is therefore important that the policymaking process be designed to avoid introducing additional bureaucratic encumbrance that could further lengthen the regulator's reaction time. The results of Lim et al. (2013) indicate that central bank regimes are often more reactive, and Merrouche & Nier (2010) find that countries where the CB was in charge of supervision accumulated less financial imbalances prior to the crisis. This suggests a correlation between reactive policymaking and importance of the central bank.

If this is the case, independence is likely to be part of the explanation; but another intuitive reason could be simply that multi-agency architectures tend to introduce bureaucratic encumbrance in the policymaking process by multiplying the levels of decision-making. Take, for example, the case of Austria: first, the coordination committee has to vote on whether or not to emit a recommendation to the prudential regulator; then, the prudential regulator decides whether to comply with or reject the recommendation; finally, the MoF has to approve the PR's decision¹³. Contrast this with Ireland's system, where the once the governor decides on a measure it can go directly into implementation (see table 3.3). Therefore, thinking in terms of "decision-making expeditiousness", it should be possible to design multi-agency frameworks without needlessly complicating the policymaking process. The arrangement in France, for example, implicates a high number of members while maintaining a single decision-making instance. Whatever it is desirable that the policymaking process be as streamlined as possible to maximize the regime's power to act: the faster the authorities can make and implement their decisions, the more the regime is likely to be reactive and thus effective.

¹¹For example, banks have up to one year to comply with increases in the CCyB.

¹²Cerutti, Claessens, & Laeven (2017) find that the performance of mortgage market instruments improves significantly whenever they are implemented early in the boom phase of the cycle.

¹³In practice, since agencies often prefer to be seen as acting in unison; it is unlikely that a decision passed at one instance would be overturned or obstructed further down the line if the institution with the power to do so participated in the initial decision. However, what is possible is that the de facto power granted to a particular (set of) institution(s) at a later instance gives it implicit veto power in the initial instance. In Austria, it would be enough for a measure to be sufficiently opposed by either the PR or the MoF for its chances of passing to be affected; since the following instances make their consent necessary for complete enactment. Even absent disagreements, the additional protocol introduced by multiple instances could slow down the process.

Table 3.3: Decision-making expeditiousness in Ireland and Austria

Ireland	Austria
Unitary decision-making instance: CBI Board Decision-making related to CRD IV instruments (including CCyB) is even more expeditious because the board has delegated power to the person of the Governor.	1st instance: the multi-agency body decides on issuing a recommendation to the PR regarding the activation of a macroprudential instrument 2nd instance: The FMA decides whether to comply with the measure or refuse and justifying their reasons for it. 3rd instance: if the FMA activates a measure through the issuing of a regulation, it has to be authorized by the MoF

3.2.2.2 Strength and coherence of the legal mandate

How does the mandate influence the willingness to act?

European countries are states based on constitutionalism where the behavior and goals of government agencies are essentially preordained by the legislative texts that define them as long-lived institutions. Accordingly, all Euro area national regulators have the objective of guaranteeing financial stability inscribed in their statutory legislation. But, despite the harmonization brought by the Basel III and EU standards, there is always some degree of interpretation as to what ensuring financial stability entails in concrete, operational terms. As a result, there is variability in how MaP mandates are formulated and distributed among the actors that constitute a member state's governance framework. Studying this variability can provide information on a regulator's ex-ante discretionary policy preferences¹⁴.

How do we evaluate the mandate's ex-ante encouragement of reactivity?

We take a look at (A) whether the mandate is assigned to institutions best suited to deliver it, (B) how ambitious is the final objective (C) whether operational objectives are specified and (D) the language used to express the mandate.

A) Coherence in allocation and distribution of the MaP mandate.

If a country chooses a multi-agency framework, careful attention must be paid to (1) what is the distribution of responsibility among the institutions involved and (2) how the financial stability objective ranks relative to the institution's other objectives. The general idea is to avoid institutional separation accountability and control: situations in which the entity most responsible for the mandate has imperfect control over instruments and the institutions that own the instruments do not have financial stability as its unambiguously stated primary objective. For example, in frameworks with functional delegation, the risk is that each institution sees itself as responsible over a narrow task and less so over the global process, opening an avenue

¹⁴The underlying assumption is that regulators will do their best to execute their statutory mandate with fidelity. As we saw with the extraordinary measures taken by the ECB during the Euro crisis, authorities may deviate from their statutory constraints in response to extreme scenarios, but this is not something that we can account for ex-ante based on official information.

3.2. WHAT DEFINES A MACROPRUDENTIAL GOVERNANCE FRAMEWORK'S EX-ANTE VULNERABILITY TO INACTION BIAS?

for dilution of accountability. If specialization is sectoral and systemic risk materializes from the interaction between different types of financial entities, each regulator may see itself as less responsible for what happens outside its jurisdiction.

Save for ad-hoc bodies, the institutions were originally established to serve different primary objectives: microprudential supervision (PR), price stability (CB) , and implementation of the executive branch's overall economic agenda (MoF). For the potential conflicts between financial stability and the MoF's prerogatives, see the section on independence. As for the CB, the EMU entails delegation to the supranational instance. Therefore, a discussion is warranted on the role of the PR. In fact, such discussion stems from a realization at the core of MaP's *raison d'être*: that ensuring the stability of individual financial institutions is different from ensuring the stability of the financial system, and that situations may arise in which these two objectives are not complimentary. A fire sale is a classic example: banks are encouraged to liquidate compromised assets to remain compliant with microprudential standards, but the widespread simultaneous sell-off accelerates their depreciation and the associated losses, thus propitiating systemic risk. For this reason, the MaP mandate should be stronger frameworks that give a central role to the PR (usually by giving it instrument ownership), notably by specifying which objective is priority. There is, in our view, an argument for prioritizing systemic stability: An unhealthy institution will not always cause a financial crisis, but a financial crisis will create many unhealthy institutions. Otherwise, a composite body with a strong MaP mandate may be given binding decisionmaking powers over the PR.

B) Strength of the macroprudential mandate: Ensuring resilience and stabilizing credit?

Giving macroprudential authorities the mission of minimizing systemic risk and ensuring financial stability is as good a start as any, but without a deeper exploration of what this entails in concrete terms; it will be difficult to hold them accountable until a crisis materializes. Is the mandate limited to ensuring that the financial system is resilient enough to withstand systemic shocks, or does it go further encourage the regulator to actively lean against the expansions and contractions of the financial cycle? There is indeed some level of disagreement between policymakers on whether the stabilization of the financial cycle should be a primary objective (Tucker, 2018). Such reservations are visible, for instance, in the Basel III framework for the CCyB (BCBS, 2015, p.1):

“[The CCyB’s] primary objective is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. Due to its countercyclical nature, the countercyclical capital buffer regime may also help to lean against the build-up phase of the credit cycle in the first place”

Tucker, in what is probably the most elaborate reflection on the political economy of macroprudential policy to date, explicitly advocates against the credit stabilization objective (Tucker, 2018, p.31):

“It is clear that, notwithstanding the prevalence of papers devoted to assessing the “effectiveness of macroprudential instruments” in dampening credit growth or asset-price appreciation, the approach adopted by policy makers is not a regime for actively managing the credit cycle. I concur with that choice, insofar as I believe that a system designed to fine-tune credit and asset-price dynamics would be too ambitious.”

However, in the Euro area, it would appear that the validity of Tucker's statement that

policymakers do not see MaP tools as instruments of credit stabilization varies from country to country. The regulators in France and Ireland, the two countries that have thus far activated the CCyB, explicitly recognize the credit stabilization objective in the statutory legislation and in the strategy announcement, respectively. Furthermore, they provide a reminder of this in the press releases relative to the decisions:

Ireland¹⁵: *“In increasing the CCyB rate at this stage, the Central Bank is looking to protect the banking sector against potential losses associated with a build-up of cyclical systemic risk and thereby support a sustainable provision of credit to the real economy throughout the financial cycle. [...] The Central Bank views promoting banking sector resilience against cyclical systemic risk as the primary objective of the CCyB.[...] a significant acceleration in new lending would increase the cyclical risk that mortgage credit provision exceeds its long-run potential trend path.”*

France¹⁶: *“In line with the preventive nature of macroprudential policy and given the favorable macroeconomic context and the continued acceleration of the financial cycle, the High Council has approved the proposal [...] to raise the counter-cyclical capital buffer rate to a moderate level of 0.25%. [...] non-financial private sector indebtedness continued to grow and reached 130.2% of GDP in the fourth quarter of 2017. The dynamics experienced in recent years contrast with the one of the other economies in the euro area and has led France to a level of indebtedness that is now above the average of the euro area and above the level of our main partners [...]. According to its countercyclical nature, this capital buffer preemptively activated is designed for being used in case of a cycle reversal. Its subsequent release will enable banks to mobilize this additional capital reserve in such circumstances to maintain their credit supply.”*

Reasonable people may disagree on whether credit cycle management is a desirable property of the macroprudential regime, but some (if not most) regulators clearly consider it as such. As with independence, we do not aim to contribute to the debate on the relative merits of credit stabilization; but we can reasonably conjecture that, all other things equal, making the credit stabilization objective explicit in the regulator’s mandate should result in more proactive policymaking. All macroprudential mandates incorporate the resilience objective. This demands that the regulator set policy to ensure that the balance sheet precautions of financial entities are commensurate to the regulator’s estimations of prevailing systemic risks, and can therefore withstand their eventual materialization. If a credit stabilization objective is added to this resilience objective, then the total set of scenarios that justify intervention expands.

Credit stabilization takes into account the interactions between the real and financial spheres of the economy; it is concerned with the systemic risk that emanates from the medium-to-long term macroeconomic distortions induced by excessive aggregate credit growth. Usually, leverage-fueled imbalances in the economy go hand-in-hand with excessive systemic exposures in the financial sector, but inadequate levels of capital and liquidity are not a necessary condition for unsustainable credit expansion. If the regulator considers credit stabilization as part of its mandate, it will intervene to slow down the excessive provision of credit even if it estimates that the financial system is strong enough to absorb the associated potential losses. For these reasons, our index will interpret the inclusion of credit stabilization in the regulator’s legal mandate as resulting in a lower ex-ante probability of inaction.

(C) Specification of operational objectives

Beyond this, some legal mandates opt to include a specification of operational objectives that

¹⁵CBI Countercyclical Buffer Rate Announcement, 05/07/2018.

¹⁶HCSF Press release, 11/06/2018.

3.2. WHAT DEFINES A MACROPRUDENTIAL GOVERNANCE FRAMEWORK'S EX-ANTE VULNERABILITY TO INACTION BIAS?

decompose the financial stability objective into observable risks. By doing this, instruments can be associated to concrete operational targets, and performance can be assessed based on whether or not an instrument is correctly activated in response to specific risks. The ESRB¹⁷ has sought to promote a harmonized set of intermediate objectives through its recommendation power, but the way in which these have been integrated to the national framework varies. The intermediate objectives advised by the ESRB are as follows:

- to mitigate and prevent excessive credit growth and leverage (ex: CCyB, LTV);
- to mitigate and prevent excessive maturity mismatch and market illiquidity (ex: Basel III liquidity ratios)
- to limit direct and indirect exposure concentrations (ex: CRR flexibility package);
- to limit the systemic impact of misaligned incentives with a view to reducing moral hazard (ex: bail-in resolution);
- to strengthen the resilience of financial infrastructures (ex: ring-fencing);

All other things equal, including operational objectives in the statutory legislation should strengthen accountability. Furthermore, adopting the ESRB recommendation allows these objectives to be harmonized and comparable among member states, and should be protective against inaction bias¹⁸.

(D) Language

In an examination of how central banks define their financial stability objective, Villar (2017) takes interest in differences in how macroprudential mandates are phrased from country to country (Villar, 2017, p.9):

“Out of 24 central banks, 12 have a financial stability objective articulated as “promoting financial stability” or “reducing systemic risk”. Another six have somewhat narrower objectives, for instance ensuring the “soundness of the banking sector” and/or the well-functioning of the main financial infrastructure. One central bank is mandated to oversee the “normal functioning of internal and external payments” and another is constitutionally bound “to regulate credit in the financial system”.[...] In describing their macroprudential objective, these central banks make reference to “financial (or banking) system resilience” (Brazil, the Czech Republic, Hungary and Thailand), “decreasing systemic risk” or countering “the materialization of systemic risk” (China and Poland) or “microprudential regulation and supervision” (India).”

Thanks to the guidelines set by European institutions, variability in the phrasing of mandates is lesser among Euro area members, but it nonetheless merits consideration. Again, the underlying assumption is that policymaker's interpretation of the mandate will be relatively strict and letter-of-the-law. This need not be true, but discretionary deviations will depend on the personal lines of thought of the people in office and therefore cannot be accounted for from our position. Following Jeanneau (2014), we propose to examine the phrasing of the legal mandate in terms of “absolute” and “qualified” language: texts that mandate the regulator to “ensure”, “guarantee”, “maintain” or “safeguard” financial stability will score higher than those that ask it to “support”, “work towards” or “contribute to” it.

¹⁷ESRB recommendation of 4 April 2013 on the intermediate objectives and instruments of macroprudential policy (ESRB/2013/1).

¹⁸When operational objectives are specified outside of the legislation, we will treat them as part of the communication criterion as non-legal texts carry less institutional weight and can be modified at the discretion of government agencies without having to resort to parliament.

3.2.2.3 Transparency and Communication

Why do transparency and communication influence the willingness to act?

Independence is fundamental to guarantee enough power to act, but by protecting independence the designers of governance frameworks risk foregoing the disciplining mechanisms that align the regulator's incentives with the financial stability objective. For this reason, proper accountability mechanisms need to be instituted. In contrast to monetary policy, where the performance of the policymaker can be assessed relatively simply by looking at the inflation target; with MaP it is much more difficult to link the regulator's performance to outcomes: one cannot know when a crisis has been prevented. The solution, according to Garicano & Lastra (2010), is to continually observe the policymaking process to determine if the regulator's decisions and assessments are consistent with the best available knowledge on systemic risk and the transmission of instruments. Such an evaluation can only exist if the regulator communicates regularly on the state of systemic risk and the developments that motivate their measures or lack thereof. For this reason, authorities have in general matched their newly attributed powers by upgrading their communication and transparency efforts.

However, complete transparency could be dangerous as markets often overreact to bad news. While for monetary policy the central banker always has an incentive to communicate its assessment of the economy's health to influence the expectations of private agents; a tendency of financial market participants to overreact to downside systemic risk announcements could propitiate self-fulfilling panics. Therefore, the regulator also exercises judgment in its management of public information: it is prudent not to communicate on certain developments or deliberations if there is reason to think that their public knowledge could be significantly destabilizing. However, full confidentiality is not indispensable to deal with this problem. Meeting minutes, for example, can be redacted; and previously omitted details can be declassified at a later time once the regulator has contained the threat. Managing transparency and communication is therefore a careful balancing act and there is likely to be an "optimal" level of transparency. To ensure proper accountability and therefore enough willingness to act, this optimal level should be closer to the openness end of the spectrum.

Although we consider transparency and communication to be primarily factors of accountability and integrate it into the index in this capacity; these may also be seen as contributing to the regulator's power to act if there is a "forward guidance" element to MaP. If MaP intends to influence asset prices, then it should seek to announce a future path of policy as well as the scenarios that would lead to it changing; since this is information that affects the asset's future returns and therefore its current price. Anchoring expectations around MaP is likely to be significantly more difficult than it is for its monetary counterpart: the amount of uncertainty surrounding the regulator's reaction function, the efficacy of instruments and their second-order effects is of a different order of magnitude. Therefore, if there is to be a "macroprudential expectations channel", transparency and communication have to be very thorough, especially at the beginning.

How do we measure transparency and communication?

There are several channels the regulator can use to communicate with its immediate and ultimate principals, meaning the legislature and the public at large:

- Accountability to the legislature: It is standard practice for the regulator to periodically address a report to and be heard by the national legislature; mirroring what the central

bank does in its capacity as the monetary policymaker

- Periodic publications: the main instruments of public communication on the state of systemic risk are the periodical publications, first and foremost annual or bi-annual financial stability reviews. These are complemented by other, often sector-specialized publications; and the press releases that follow meetings generally contain some update on the relevant indicators and assessments. The regular periodicity here is important to anchor the conduct of policy and the flow of information around a predictable schedule.
- Punctual publications: Many regulators also issue punctual strategy documents in which they expose their general approach to policymaking; including among other things the specification of operational objectives ¹⁹, their associated instruments and the decision-making procedure. These documents stand at an intermediate space between the periodic updates and the statutory mandate: they signal the long-term orientation of policy but fall within the regulator's operational independence space, meaning that they may be revised at discretion ²⁰.
- Minute meetings/records: There is a literature studying the effect of publishing monetary policy meeting records, and it finds that it has had an overall positive effect²¹. In our sample, only Germany has opted out of publishing meeting records; but the level of detail and redaction of their content varies. Furthermore, though most countries prefer the authority to speak in a single voice, others have decided to reveal the opinions of board members (Ireland) or the official stance of the represented institutions (Finland) in an effort to strengthen individual accountability.

3.3 Results

In this section, we measure how 8 Euro area countries (Austria, Belgium, Finland, France, Germany, Ireland, Netherlands, Spain) perform when our index is applied to their governance framework. First, we think it is pertinent to briefly discuss the supranational governance framework that overlaps with the national regulators (section 3.3.1). Since this part of the governance framework is the same for all countries, it does not produce heterogeneity; it is, on the contrary, a harmonizing force. But it does introduce a procedural complexity that is not present elsewhere in the world, which could influence reactivity. After briefly recapitulating the scoring system (section 3.3.2), we present our results in the form of tables (3.6-3.13) documenting the relevant observations for each subcriterion and the corresponding scores (section 3.3.3). The IMF/FSB reports were an important guide: whenever they make a recommendation to reform a part of the framework, we take this as an indication of weakness in this department. The research effort included checking whether the recommended reforms had been instituted. As evidenced by the radar charts (figures 3.2-3.9), countries that share an overall score might do so for different reasons: Belgium ranks low due to the relatively limited influence of the National Bank of Belgium on the macroprudential toolkit, Spain suffers from the coincidence of sectoral specialization and poor coordination. Thus, the reader is encouraged to be mindful of the details.

3.3.1 Preamble: The European superstructure of financial regulation

Financial regulation in the Euro area is a shared competency between national and European institutions. This is especially true of microprudential regulation, where the Single Supervisory

¹⁹Note that operational objectives are included in the communication/transparency criterion when they are specified outside of the legal mandate, since this places them inside the regulator's sphere of discretion.

²⁰Speeches by the regulators are another important punctual public interaction that we have not studied in this version of the index.

²¹See Kedan & Stuart (2014) and the references therein.

Mechanism is the main authority overseeing the Area's most important banks. On the macroprudential side, national regulators remain the principal actors; but supranational institutions play a role of analysis, consultation and coordination (and hard powers for the ECB). Since the purpose of this paper is to examine heterogeneity in governance frameworks between member states, our discussion of this institutional superstructure will be brief; but since it conditions the policy-making process it deserves a mention. The creation of the banking union and the SSM gives the ECB a macroprudential mandate over banks in the Euro area. Importantly, this mandate is concretely supported by the "top-up" power: the ECB has the faculty of imposing stricter standards than those chosen by national regulators on instruments included in the CRD IV package. The European Systemic Risk Board, created shortly after the crisis, enjoys a broader mandate (over the whole of the EU and all financial system actors) but without corresponding hard powers. Its main function is to promote the coordination and sharing of information between national regulators, for example by overseeing the reciprocation of measures. The ESRB acts mainly through the issuance of warnings and recommendations subject to a comply-or-explain requirement. While lacking binding powers, the influence of the ESRB should not be underestimated, as illustrated by the fact that many of its recommendations have (to varying degrees) shaped the revamp of regulatory frameworks in the member states. Furthermore, it is very active in the field of systemic risk monitoring, analysis and communication; publishing an annual report, punctual thematic reports and regular research papers.

If one is to compare the European framework as a whole with what exists elsewhere in the world, it is of particular importance to consider how the implementation protocols between national and supranational institutions can affect the reactivity of MaP. For instance, The use of CRD IV instruments involves a notification and validation process that for some tools solicits much of the high-level EU bureaucracy and may take up to one month²². In addition, authorities are constrained by a "pecking order" principle: the idea that some instruments in CRD IV should not be used until others have failed to contain the relevant risks. As a point of comparison, in the United States, whose populous regulatory ecosystem is hardly a model of simplicity, agencies have ownership of their instruments and can implement them with much more ease and autonomy. As is the case for many EU institutions, the MaP framework's complexity is the price of a design that aims to achieve both cohesiveness and subsidiarity. So far, the framework has delivered (the ESRB's recommendations have been broadly applied); but it will not be truly tested until economies enter stronger financial expansions and until there are differences of opinion regarding the right policy stance in a given member state. This concerns in particular mortgage market instruments, over which nations have conserved full control but may be the most powerful element of the MaP arsenal (Cerutti, Claessens, & Laeven, 2017). If a national regulator falls to inaction bias or if spillovers scenarios emerge that require uncomfortable arbitrages between members, further streamlining and transfers of subsidiarity may be appropriate. Beyond reinforcing the ECB's top-up power, recurring proposals include bringing mortgage market instruments into a European framework similar to CRD IV and other expansions of the toolkit (Evrard et al., 2018) and giving hard decision-making powers to the ESRB (Couppey-Soubeyran & Dehmej, 2016).

3.3.2 Summary scoring grid

The overall index is an average of the score in the two main criteria, power to act and willingness to act. The score of a main criterion is the sum of the scores of the three subcriteria that compose it. The score of a subcriterion is determined by examining the observable characteristics, as described on tables 4 and 5. In accordance to these characteristics, three levels are possible:

²²For instance, measures allowed by the CRR flexibility package require consent from the European Commission or, in its defect, the Council of the EU. For a comprehensive explanation of CRD IV implementation protocols, see Bennani et al. (2014).

3.3. RESULTS

- Ranking at the high level means that the country's performance in this criterion is above-average or excellent; yielding 2 points.
- Ranking at the intermediate level means that the country's performance in this criterion is adequate, competent and satisfactory; yielding 1 point.
- Ranking at the low level means that the country's performance is lagging behind the standard set by its peers and possibly deficient; yielding no points.

Table 3.4: Power to act scoring grid

Subcriteria	Characteristics
Quality of coordination: Is there a seamless flow of information between the relevant agents? Are they aware of their peer's activities/prerogatives and assessments, do they make individual decisions by taking each other into account?	High) CB with internal and external coordination mechanisms/ Multi-Agency with good coordination body Inter.) CB without coordination body Low) MA with no or deficient coordination body
Completeness of instruments: Does the authority have all the tools to contain financial instability? What is the degree of control it has over them?	High) All CRD IV instruments + Mortgage Market instruments. Inter.) Absence of some standard instruments, but absence is not material (ex: this is what Ireland would have gotten before adding the systemic risk buffer) Low) Absence of material instruments
Independence: is the policymaking process vulnerable to political interference and/or regulatory capture?	High) The MoF (or other elected officials) does not hold a disproportionate influence over the decision-making process, it cannot shape it unilaterally. Industry influence is strongly controlled. Central Bank has a predominant role. Inter.) Some of the above are absent Low) Most of the above are absent

Table 3.5: Willingness to act scoring grid

Subcriteria	Characteristics
Bureaucratic expeditiousness: How many decision-making instances are there in the policy-making process.	High) One instance Inter.) Two instances Low) More than two instances
Strength and coherence of the legal mandate: does the statutory legislation encourage reactive policymaking?	High) Emphatic mandate, no separation of accountability and control, no objective priority ambiguity, final objective: both system resilience and credit stabilization Inter.) Some of the above are absent Low) A majority of the above are absent
Transparency and communication : does the regulator inform the public on how it operates?	High) The decision-making body publishes records of its meetings, macroprudential authority is accountable to the legislature. If not present in the mandate, operational objectives are detailed and mapped to instruments, stages of policymaking are announced. Inter.) Some of the above are absent Low) A majority of the above are absent

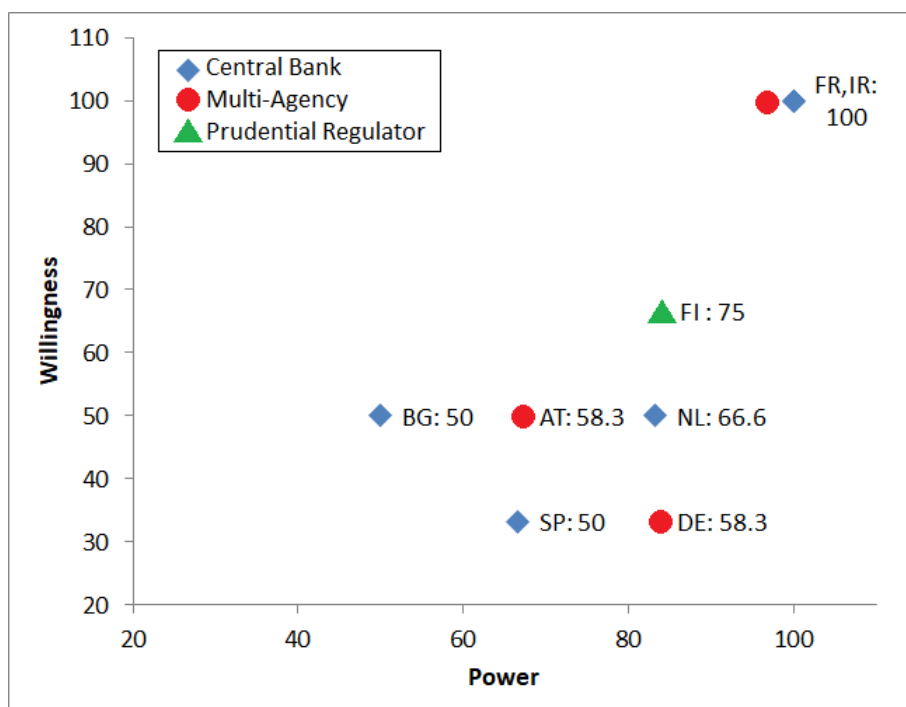
Terminology:

The term “institutional arrangement” is used to indicate whether MaP is integrated under the roof of one institution (the central bank or the prudential regulator) or spread across several (multi-agency). The term “governance framework” encompasses all the elements relevant to the governance of MaP, including but certainly not limited to the institutional arrangement. Institutions will be addressed by shorthand initials (CB: central bank, PR: prudential regulator, SR: securities regulator).

3.3.3 Country scores

Figure 3.1 below provides a visualization of the country scores obtained. Though obviously the sample size is too small for any evidence to be other than anecdotal, we notice that the institutional arrangement is not an indicator to the quality of the governance framework; good and bad frameworks can be built around any type of arrangement. The bottom of the spectrum (50) is shared by Belgium and Spain, two countries that suffer from specific vulnerabilities: the former from the implementation restraints placed on the central bank, the latter for the unfinished state of the governance framework. At the next level (58.3), Austria and, to a lesser extent, Germany feature two governance frameworks in which the central bank plays a relatively modest role. Austria could benefit from streamlining its decision-making process and reducing the role of the government, while Germany could better align the incentives of regulators by increasing transparency and strengthening the legal mandate. At 66.6, the Dutch framework resembles an improved version of the Belgian one, with a central bank that is freer to implement policy on its own terms; but it too suffers from having mortgage market instruments in the hands of the government. The Finnish framework concentrates powers and functions in the prudential regulator and delivers a well-rounded performance, validating a model that is unusual both in Europe and the world²³. Finally, France and Ireland both achieve full scores through very different frameworks. Following the severe failure of the pre-crisis multi-agency framework, Ireland radically revamped its framework around an all-encompassing and unconstrained central bank. France built its framework around the institutions that oversaw a resilient banking system during the GFC, but avoids the pitfalls of other multi-agency frameworks with design choices that favor quick and independent decision-making.

Figure 3.1: Country Score Map



Source: Author's assessment

²³See the sample in Lombardi & Siklos (2016)

3.3.3.1 Austria

Arrangement Type: Multi-agency.

CRD IV National Designated Authority: PR/SR: the Financial Markets Authority (FMA)

Macroprudential Authority: the Financial Market Stability Board (FMSB)

Other Relevant institutions: CB: the Oesterreichische Nationalbank (ONB), MoF

The Macroprudential framework in Austria can be best described as an inter-agency committee (the FMSB) centered on the prudential regulator (the FMA), with the committee setting the course of policy and the prudential regulator implementing it. The CB has been attributed a mostly analytical and informational role, and participating in hard policymaking insofar as it votes on the FMSB.

This framework therefore opts out of the independence benefits that would come with a stronger role for the CB. Given that the MoF has to give its final consent before administrative implementation can take place, mechanisms to ensure greater independence would be welcome. The framework's design also leaves it vulnerable to a macropru-micropru conflict. The primary entity accountable for financial stability (the FMSB) is not the owner of the macroprudential instruments, and the primary mandate of the entity that does own the instruments (the FMA) is microprudential. The PR's compliance with the committee's pronouncements is enforced through a "comply or explain" mechanism, so non-compliance is possible even if unlikely. Making compliance to the FMSB's recommendations mandatory would be an improvement. In the event of a difference of opinion between on the one hand the FMA and/or the MoF and, on the other, the rest of the FMSB, the setup appears to favor the first. Considering that the primary statutory mandates of these two institutions are not macroprudential mandates, potential conflicts with microprudential or political preoccupations could endanger the proper conduct of policy.

Figure 3.2: Austria (58.3) Power: 66.6, Will: 50

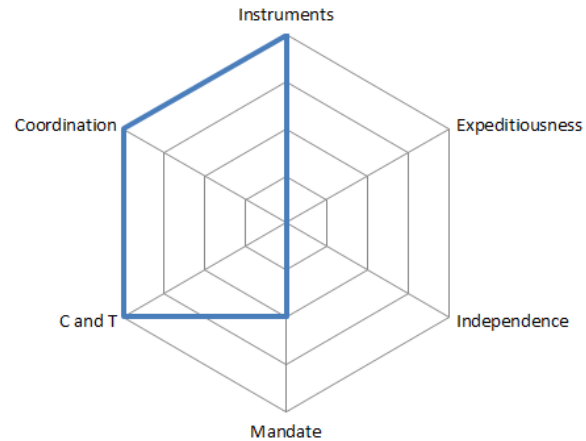


Table 3.6: Austria scoreboard

Criterion	Notes	Score
Coordination mechanisms	<p>Decision-making inter-agency committee (FMSB) with semi-hard recommendation powers (comply or explain)²⁴ that meets with quarterly frequency, comprised of:</p> <ul style="list-style-type: none"> • Two delegates from the MoF, one of whom acts as chairperson • One delegate from the FMA • One delegate from the ONB • Two delegates from the Fiscal Advisory Council <p>Voting Rule: simple majority, chair holds the casting vote.</p>	<p>(+) coordination body that includes all relevant agents and meets often.</p> <p>Score: high (2)</p>
Completeness of instruments	<p>The FMA has at its disposal:</p> <ul style="list-style-type: none"> • CRD IV instruments and designation powers. • Profit distribution policies contingent on non-compliance to capital requirements. • Mortgage market instruments: limits on loan-to-value ratios, debt-to-income ratios and debt service-to-income ratios and maturities of new immovable property loans. It will also be possible to establish criteria regarding the amortization of new immovable property loans. 	<p>(+) All the standard macroprudential instruments are present</p> <p>Score: high (2)</p>
Independence	<p>Despite the fact that control over instruments is assigned to the prudential regulator, all FMA macroprudential measures need final approval from the MoF to begin administrative implementation.</p>	<p>(-) On paper, the administrative procedure gives the MoF the possibility to block measures.</p>

²⁴ A formal recommendation is compulsory only for the use of the CRR flexibility package.

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Independence	Furthermore, the supervisory board of the FMA includes non-voting members representing industry interests, something about which the IMF has expressed qualified reservations ²⁵ .	(-) Industry presence in the PR's board, but in a non-voting capacity. Score: low (0) ²⁶
Power to act score		4/6
Expeditionessness of the policy-making process	1st instance: the FMSB decides on issuing a recommendation to the FMA regarding the activation of a macroprudential instrument. 2nd instance: The FMA decides whether to comply with the measure or refuse and justifying their reasons for it. 3rd instance: if the FMA activates a measure through the issuing of a regulation, it has to be authorized by the MoF.	(-) Three decision-making instances Score: low (0)
Mandate and Objectives	<i>“A Financial Market Stability Board shall be established by the Federal Ministry of Finance to increase financial market stability and to reduce systemic and procyclical risks.”²⁷</i> The financial stability mandate is attributed to the FMSB in the primary legislation of the FMA. However, there is no explicit provision signaling that the FMA is also accountable for the macroprudential mandate. The FMA's legislation specifies that it should <i>“consider the national economic interest in maintaining an efficient banking system and financial market stability”²⁸</i> , but it is unclear whether that constitutes a hard mandate and whether it is important over or subservient to the microprudential mandate.	(+) Mandate includes counter-cyclical objective

²⁵IMF (2013), p.30: *“The presence of the industry in the supervisory board might also lead to extra influence on the activities of the Supervisory Board and consequently the execution of supervisory activities. First of all, this is mitigated because these members are chosen by representatives of the MoF and OeNB in the Supervisory Board. Secondly, they do not have voting rights in any circumstances. And thirdly, the industry has a legitimate interest since especially topics related to the budgeting of the organization are discussed, in which the industry has an interest, given their expected contribution. However, notwithstanding these factors, the industry representation in the supervisory board could impede the operational independence of the FMA. Therefore, it is recommended to create a separate industry forum or panel, not linked to the FMA's supervisory board”.*

²⁶IMF (2013), p.30: *“The industry representation in the supervisory board could impede the operational independence of the FMA. Therefore, it is recommended to create a separate industry forum or panel, not linked to the FMA's supervisory board.”.* They also recommend to *“clarify ex ante that the MoF will always give its consent on a proposed FMA regulation, in case this regulation would fall within the scope of its mandate to set up such a regulation.”* (IMF, 2014, p.309).

²⁷Financial Market Authority Act, Article 13 (1).

²⁸Austrian Banking Act, Section XIV, Article 61(1) Note that this act is not the FMA's main statutory legislation.

3.3. RESULTS

Mandate and Objectives	It can therefore be argued that there is in this setup some disconnect between liability and control caused by the institutional division of labor. The fact that the institution entrusted with the macroprudential mandate is not the one that implements it, combined with the fact that the owner of the instruments is the micropru regulator, leaves the door open to ambiguity in the event of a macropru-micropru conflict. With micropru being the more salient and traditional function for the FMA, there is a chance it will be prioritized to some degree. Adding to this the MoF's authorization requisite, there are two institutions with large control over instruments whose non-macroprudential obligations might conflict with the financial stability mandate.	<p>(-) The wording of the mandate is not the firmest ("increase" financial stability, "reduce" risks)</p> <p>(-) risk of liability-control dichotomy or micropru-macropru conflict</p> <p>Score: intermediate (1)</p>
Communication and Transparency	<p>The CB drafts the FMSB's annual report which is submitted to the parliament. Furthermore, the CB publishes a biannual financial stability report.</p> <p>Meeting minutes do not appear to be publicly available, but each meeting is followed by a very detailed summary press release. The FMSB adopts the intermediary objectives specified by the ESRB. The FMSB evaluates compliance to intermediary objectives at least once a year and its overall strategy at least once every two years.</p>	<p>(+) accountability to the legislature</p> <p>(+) standard production of information</p> <p>(+) transparent press releases as good as minutes</p> <p>(+) specification of detailed intermediary objectives and operational principles.</p> <p>Score: high (2)</p>
Willingness to act score		3/6
Overall Score: 58.3		

Source: Author's assessment

3.3.3.2 Belgium

Arrangement Type

Central bank integration.

CRD IV National Designated Authority and Macroprudential Authority

CB: the National Bank of Belgium (NBB)

Other Relevant institutions

MoF: the Federal Public Service Finance,
SR: Financial Services and Markets Authority (FSMA)

In Belgium, the central bank is the macroprudential authority but its implementation capacity is noticeably constrainable by the government. The set of tools under its control lacks mortgage market instruments, and the CRD IV instruments that it does control cannot be implemented without the Council of Ministers. In early 2017, a proposal to raise capital charges for risky mortgage exposures provided under the CRR's flexibility package was rejected by the government. The proposal had to be amended to increase mortgage risk weights by a fixed factor and was not accepted until May 2018. Belgium provides a concrete example of how, even in countries traditionally characterized by a respect for the autonomy of technocratic agencies and even if the macroprudential authority has high willingness to act, giving too much influence to the government can slow down the reactivity of MaP. Given the distribution of powers, it would make more sense for decisions to be taken in a concentrated manner in a council composed of the central bank, the MoF and the securities regulator. Alternatively, the central bank's operational autonomy could be strengthened.

Figure 3.3: Belgium (50) Power: 50, Will: 50

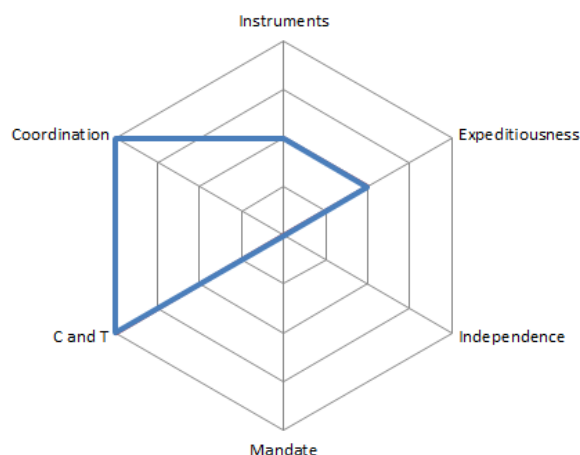


Table 3.7: Belgium scoreboard

Criterion	Notes	Score
Coordination mechanisms	Macroprudential decisions are made by the board of directors, which is mostly comprised of long term senior central bank staff with no outside members. Meetings are held weekly. The board of directors bases its macroprudential decisions on the information and analysis provided by two consultative bodies:	

3.3. RESULTS

Coordination mechanisms	<ul style="list-style-type: none"> • The Macro-Financial Committee which is responsible for preparing board meetings in its capacity as the macropru authority, recommends policy actions and submits public communication drafts. It analyzes risk from a macro perspective. • The Risk Team Macroprudential Policy, a technical committee which prepares the materials to be used on the board's meetings: risk assessment, potential measures and calibration. It focuses more on the risk contribution of individual institutions. <p>These bodies also foster communication and cooperation between the different departments of the central bank when it comes to macroprudential issues. Formal cooperation protocols are established between the NBB and the FSMA through a set of MoUs.</p>	<p>(+) Very robust internal organization</p> <p>(+) Formal cooperation protocols with conduct authority</p> <p>Score: high (2)</p>
Completeness of instruments	<p>The NBB has the power to set and implement CRD IV instruments. In addition, national law allows it to set restrictions on exposure limits, leverage ratio, collateral valuation standards, dividend restrictions, asset valuation rules, and disclosure requirements. However, measures must be approved by the council of ministers.</p> <p>Mortgage market instruments (LTVs and DTIs) are under the control of the government. The NBB has recommendation powers over them, subject to a "comply or explain" requirement. The Bank can also issue warnings and "comply or explain" recommendations to supervised entities.</p> <p>.</p>	<p>(+) All the fundamental instruments exist.</p> <p>(-) The MaP authority's degree of control over instruments is partial</p> <p>Score: (1)</p>
Independence	<p>Although the NBB is the owner of all macroprudential instruments, their implementation is done through a royal decree that requires ministerial approval. The MoF and, for certain instruments, other ministers can reject or delay the application of macroprudential measures. This has in fact already happened once²⁹.</p>	<p>(- -) The ministerial approval requirement significantly undermines the political independence of MaP</p> <p>Score: low (0)</p>
Power to act score		3/6

²⁹IMF (2018), p.77: "In early 2017, the NBB proposed an additional increase in capital charges linked to the riskiness of banks' mortgages (proxied by the loan's loan-to-value ratio), but the government rejected this measure. In November 2017, NBB proposed an alternative, but broadly equivalent measure, which would scale up by a fixed factor banks' mortgage risk weights." The measure was passed by royal decree in May 2018.

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Expediiousness of the policy-making process	<p>1st instance: the Governing Board of the NBB decides on a measure</p> <p>2nd instance: MoF (or the council of ministers in case of Art. 458 measures) approves the measure so that it is implemented through royal decree</p>	<p>(-+) Two decision-making instances</p> <p>Score: intermediate (1)</p>
Mandate and Objectives	<p><i>“The Bank shall contribute to the stability of the financial system, [defined as a] situation where the probability of discontinuity or disruption in the financial system is low or, if such disruptions should occur, where the consequences for the economy would be limited.”³⁰</i></p> <p>The Royal Decree of 3 March 2011 regarding the evolution of the supervisory architecture of the financial sector specifies that although Belgium has a “twin peaks” model, matters of (micro and macro) prudential regulation and financial stability are exclusively the remit of the NBB, while the FSMA is concern with conduct supervision.</p> <p>Distinction between macroprudential and microprudential functions could be better clarified, especially considering that they are housed under the same department³¹. This is mitigated by the presence of dedicated internal macroprudential bodies.</p> <p>Accountability-control dichotomy: As mentioned earlier, mortgage market tools are under the control of the federal government. We thus have a situation where control over instruments is decoupled from the institution with the financial stability mandate.</p>	<p>(-) Statutory mandate does not include an explicit counter-cyclical objective</p> <p>(-) Formulation of the mandate could be stronger (“contribute to the stability of the financial system”)</p> <p>(-) Accountability/control problem could emerge with mortgage market instruments.</p> <p>Score: low (0)</p>
Communication and Transparency	<p>The NBB is required to send an annual report to the legislature on all its financial stability activities. Furthermore, the governor may appear before a parliamentary committee on the legislature’s request or by his own initiative.</p>	<p>(+) accountability to the legislature</p> <p>(+) standard production of information. CCyB press releases are especially detailed</p>

³⁰Law establishing the organic statute of the National Bank of Belgium, Article 12(1).

³¹Prudential Policy and Financial Stability of Banks and Insurance department. There are other departments that also participate in microprudential policy.

3.3. RESULTS

Communication and Transparency	The NBB publishes an annual financial stability report and a press release accompanying every macroprudential decision, including recommendations which are made public. The board of directors does not publish minutes of its meetings, but the press releases pursuant to the CCyB decisions are very detailed. There is also a very thorough document on the general strategy for setting the CCyB ³²	(+) specification of detailed intermediary objectives and operational principles. (+) detailed press releases can be seen to act as records. Score: high (2)
Willingness to act score		3/6
Overall Score: 50		

Source: Author's assessment

3.3.3.3 Finland

Arrangement Type

Prudential regulator integration.

CRD IV National Designated Authority and Macroprudential Authority

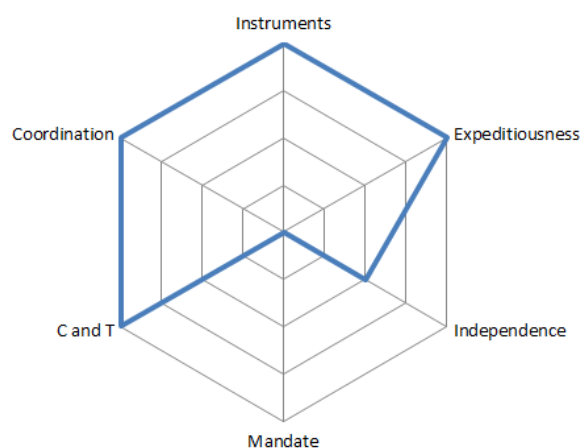
PR/SR: the Finnish Financial Supervisory Authority (FIN-FSA)

Other Relevant institutions

CB: the Bank of Finland (BoF), MoF, Ministry of Social Affairs and Health (MoSH).

The configuration in Finland is singular in our sample (and uncommon in the world more generally) as it houses functions, powers and mandate in the PR without having a stand-alone multi-agency body. It would appear then that the FIN-FSA performs a role similar to that of the CB in Ireland or the Netherlands. However, while most CB governing bodies are composed mainly of internal staff; the board of the FIN-FSA (and MaP decision-making body) is entirely composed of delegates from other institutions. In fact, it even excludes the FIN-FSA's director, who nonetheless retains agency by having the monopoly on proposing measures to the Board. As such, the FIN-FSA board can be interpreted as acting as a multi-agency platform. Otherwise, this framework is characterized by a high level of government representation in the decision-making entity, very strong accountability to the legislature through a parliamentary committee which is highly involved and a very high degree of transparency regarding the opinions of individual members.

Figure 3.4: Finland (75) Power: 83.6, Will: 66.6



³² "Setting the countercyclical buffer rate in Belgium: A policy strategy".

Table 3.8: Finland scoreboard

Criterion	Notes	Score
Coordination mechanisms	<p>The macroprudential decision-making body, the FSA's board, acts as a de-facto coordination committee by incorporating the relevant macroprudential actors. It meets quarterly and is composed of:</p> <ul style="list-style-type: none"> • A representative for the BoF (chair) • A representative of the MoF • A representative from the MoSH • two independent experts <p>In addition, staff from the two institutions responsible for risk assessment and monitoring, the FSA and the Bank of Finland, prepare the necessary documentation in the run-up to the meetings. The internal organization of the FSA could be improved, as the attribution of the financial stability mandate did not lead to an increase in staff³³. Changes implemented in September 2017 allocated macroprudential responsibilities to the Financial Analysis and Operational Risk department, but without modifying the number of staff.</p>	<p>(+) Decision-making body incorporates the relevant actors and meets quarterly.</p> <p>(-) As the recipient of the MaP mandate, the FSA's internal organization could be better geared towards this goal</p> <p>Score: intermediate (2)</p>
Completeness of instruments	<p>The FSA has at its disposal:</p> <ul style="list-style-type: none"> • The complete set of CRD IV instruments (a systemic risk buffer was recently instituted) • The power to set limits on loan-to-value ratios for mortgage lending. However, their capacity to set this instrument is somewhat limited: the current framework does not allow them to lower it below 80%. They may also modify the accepted collateral to be taken into account for the calculation of the LTV ratio. 	<p>(+) The FIN-FSA's set of instruments is satisfyingly complete.</p> <p>(-) Questions could be raised around the restrictions on the LTV instrument. Whether or not these are a problem will depend on the instrument's efficacy and relative importance.</p> <p>Score: high (2)</p>

³³The IMF (2017a) considers that the FSA currently lacks the dedicated manpower commensurate to its new macroprudential tasks. It advises that it should either be incremented or that the BoF, who benefits from a larger and more expert human capital in this area, be given a stronger formal macroprudential role. They also recommend that cooperation protocols between these two institutions be formalized, for instance through MoUs.

3.3. RESULTS

Independence	<p>Independence concerns could arise from the composition of the FIN-FSA's board. A majority of the representatives are directly or indirectly subject to the electoral cycle: 3 ministerial delegates plus 2 members appointed by the legislature in a six person committee³⁴</p> <p>Making the BoF the chair of the board is beneficial to independence and increases the institutional overlap between the two independent agencies.³⁵</p> <p>The preeminence of the FIN-FSA director is hard to gauge. On the one hand, he/she alone can propose a macroprudential measure. On the other, it does not hold voting power on the board, and it is not clear what is gained from this peculiar circumstance (see mandate section)³⁶.</p>	<p>(-) Many in the decision-making body are proposed by agents vulnerable to political influence.</p> <p>(+) Strong role of the BoF and the FSA benefit independence</p> <p>Score: intermediate (1)</p>
Power to act score		5/6
Expediency of the policy-making process	Only instance: the FIN-FSA board	<p>(+) Unitary decision-making</p> <p>Score: high (2)</p>
Mandate and Objectives	<p>Final objective: <i>"The activities of the Financial Supervisory Authority are aimed at ensuring financial stability and the necessary smooth operation of credit, insurance and pension institutions, and other supervised entities, so as to safeguard the interests of the insured and maintain confidence in the financial markets"</i>³⁷</p> <p>Tasks: <i>"In addition, the Financial Supervisory Authority shall prepare, together with the Ministry of Finance and the Bank of Finland, measures necessary to ensure the stability of the financial system as a whole and decide on such measures as separately provided for by law."</i>³⁸</p>	

³⁴The strong presence of the Ministry of Social Affairs and Health was a natural decision considering that it has historically overseen the insurance sector, but results in an unusually high level of governmental representation.

³⁵IMF (2017a): "Consideration should be given to formalize the practice that the FIN-FSA Board is chaired by a member proposed by the BoF."

³⁶IMF (2017a): "Benefits of redefining the composition of the FIN-FSA Board to include the FIN-FSA Director General as a voting member could be studied."

³⁷Act on the Financial Supervisory Authority, Chapter 1, Section 1.

³⁸Act on the Financial Supervisory Authority, Chapter 1, Section 3.

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Mandate and Objectives	The attribution of macroprudential instruments and designation of the FIN-FSA as the CRD IV macroprudential authority ³⁹ did not lead to a reform of the final objective as stated in the statutory mandate. The statutory objective statement reflects the FIN-FSA's original role as the microprudential supervisor, and the macroprudential function is tamely mentioned as one in a long list of tasks. The microprudential mandate appears to take pre-eminence.	<p>(-) No mention of cyclical objective.</p> <p>(-) In fact, it is difficult to distinguish from statutory legislation the difference between the macropru and micropru mandate.</p> <p>Score: low (0)</p>
Communication and Transparency	<p>The legislature has a committee exclusively dedicated to overseeing the activities of the FIN-FSA, the Parliamentary Supervisory Council. This body has much influence in the conduct of policy as it appoints the members of the FIN-FSA's board. The council also enjoys the faculty of suspending the director and members of the Board. It issues an annual report assessing the performances of the FIN-FSA and also of the BoF.</p> <p>The production of information is rich, with the FIN-FSA and the BoF jointly publishing semi-annual macroprudential reports, and the BoF a yearly Financial Stability Report. Regarding meetings, statements on decided measures are published as soon as possible. These are accompanied by the director's proposal and opinions by each of the other institutions. This is very beneficial for transparency as it informs on the individual preferences of agents. The FIN-FSA website's section on MaP briefly mentions the ESRB recommendation on intermediate objectives.</p>	<p>(++) Very strong accountability to the legislature</p> <p>(+) detailed and fast publication on meeting details including individual opinions as good, if not better, than minutes.</p> <p>(+) Robust production of information</p> <p>Score: high (2)</p>
Willingness to act score		4/6
Overall Score: 75		

Source: Author's assessment

³⁹This was in fact done by amending the Act on Credit Institutions (Chapter 1, section 3) to state the role of the FSA within the CRD IV framework.

3.3.3.4 France

Arrangement Type

Multi-agency.

CRD IV National Designated Authority and Macroprudential Authority

the Haut Conseil de la Stabilité Financière (HCSF)

Other relevant institutions

CB: the Banque de France (BdF), PR: the Autorité de Contrôle Prudentiel et de Résolution (ACPR), MoF: the Ministère de l’Economie et des Finances, SR: the Autorité des Marchés Financiers, the Autorité des Normes Comptables.

The French arrangement, based on a multi-agency council where the central bank plays a leading role, presents the desirable characteristics of multi-agency institutional design. The HCSF has very broad powers that apply to all the players of France’s financial ecosystem. Notably, the French framework succeeds in involving a large number of institutions while having just one decision-making instance and maintaining correspondence of accountability and control. The formulation of its mandate is very thorough, suggesting a strong incentive of credit-smoothing. Including external qualified experts whose intellectual background and career interests are distinct from those of the policymaking world can reduce the risk of group-think and keep the council up to date on the research front. The French setup is an example of how to integrate the government into the decision-making process while maintaining a satisfying level of political insulation by giving the most independent institution, the CB, a preeminent role in the decision-making procedure.

Figure 3.5: France (100) Power: 100, Will: 100

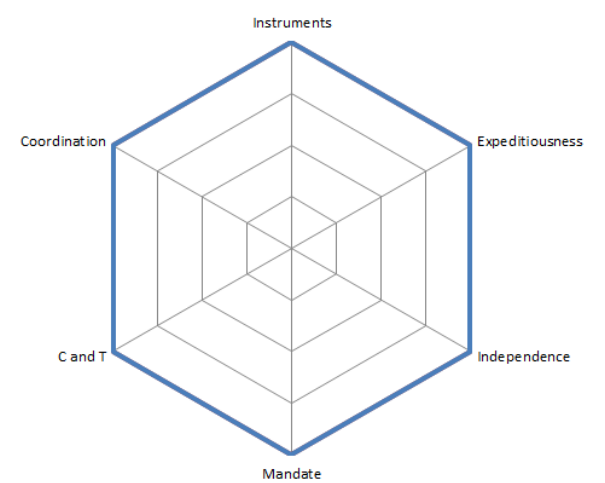


Table 3.9: France scoreboard

Criterion	Notes	Score
Coordination mechanisms	The HCSF itself is the main platform for coordination between members. Furthermore, cooperation and information sharing is enhanced by the fact that there is significant membership overlap between the governing bodies of the independent agencies. In its own capacity, the HCSF has access to the information owned by any of its members and may collect further information directly from entities overseen by them.	(+) Decision-making body acts as coordination platform and comprises all relevant actors

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Coordination mechanisms	<p>The BdF and the ACPR are responsible for analytical functions; coordination among them is ensured by their administrative proximity⁴⁰. Furthermore, a dedicated “financial stability pole” has been created to federate the resources and agendas of the relevant departments in the two institutions.</p>	<p>(+) Coordination between the CB and the PR for analytical tasks has been reinforced.</p> <p>Score: high (2)</p>
Completeness of instruments	<p>The HCSF has control over:</p> <ul style="list-style-type: none"> • CRD IV instruments • Constraints on credit underwriting standards, including but not limited to caps on LTV, DTI and DSTI ratios <p>Beyond the standard instruments, the HCSF also enjoys the faculty of setting constraints on insurance companies concerning profit distribution, disposal of assets, and collection of premiums among others.</p>	<p>(+) Extensive set of instruments that can be implemented freely</p> <p>Score: high (2)</p>
Independence	<p>The HCSF’s configuration favors independence by enhancing the role of independent agencies, and in particular of the Central Bank:</p> <ul style="list-style-type: none"> • First, independent agencies hold four of the eight votes; with three others allocated to the external specialists. • Second, legally-binding measures like CCyB adjustments can only go to vote upon proposal from the BdF governor. Furthermore, they need at least four votes to pass. The Governor may render the proposals public regardless of whether or not they pass.⁴¹ • Finally, the strong presence of external experts (thus far elite academic economists) is likely to favor the predominance of technocratic (rather than political) considerations. 	<p>(+) The HCSF’s composition favors the voice of independent agencies</p> <p>(+) presence of external experts benefits independence</p> <p>Score: high (2)</p>
Power to act score		6/6
Expeditionousness of the policy-making process	Only instance: the HCSF	<p>(+) Unitary decision-making</p> <p>Score: high (2)</p>

⁴⁰Institutionally, the ACPR is affiliated to BdF and is presided by the governor.

⁴¹FSB (2017), p.9: “The Governor can publish his proposals, allowing him to signal if he wished to take action but the HCSF did not follow through. To date, there have not been any instance where such proposals have been published.”

3.3. RESULTS

Mandate and Objectives	<p><i>“Without prejudice to the respective missions of the institutions represented by its members, the HCSF exercises the surveillance of the financial system in its entirety, with the aim of preserving financial stability and the capacity to ensure a sustainable contribution to economic growth”</i>⁴²</p> <p>The legislation also details the conditions for activation of countercyclical instruments, citing the <i>“prevention of excessive growth in asset prices of all nature or excessive leverage of economic agents”</i>⁴³. The statutory mandate of the HCSF is explicitly and exclusively geared to financial stability, which is taken as a very broad concept encompassing not only credit stabilization but also a sustainable relationship between finance and the real economy. The ESRB’s intermediate objectives are inscribed in the HCSF’s legislation⁴⁴</p>	<p>(+) Emphatic financial stability mandate that includes credit stabilization,</p> <p>(+) ESRB operational objectives inscribed in the legislation.</p> <p>Score: high (2)</p>
Communication and Transparency	<p>The HCSF is remarkably communicative on the details of its policymaking process⁴⁵:</p> <ul style="list-style-type: none"> • It has announced a policy strategy anchored around a precise mapping between specific vulnerabilities, intermediate objectives and instruments. • In addition, it has specified the underlying steps of its decision-making process, namely: (1) systemic risk evaluation (2) selection of appropriate instruments and their calibration (3) implementation (4) evaluation of the measure’s success and, if any, undesired side-effects. <p>A public annual report is submitted to the parliament. Furthermore, the chair may be summoned to parliamentary hearings or request to be heard by the parliament. The agencies represented in the HCSF produce a wealth of publications relative to financial stability⁴⁶. The HCSF publishes a press release detailing every meeting, and stand-alone press releases for decisions on binding instruments.</p>	<p>(+) Accountability to the legislature</p> <p>(+) detailed and fast publication on meeting details including individual opinions as good, if not better, than minutes.</p> <p>(+) Robust production of information</p> <p>Score: high (2)</p>
Willingness to act score		6/6
Overall Score: 100		

Source: Author’s assessment

⁴²Monetary and Financial Code, Article L631-2-1.

⁴³Monetary and Financial Code, Article L631-2-1 5°.

⁴⁴Monetary and Financial Code, Article L631-2-1 5°.

⁴⁵*“Strategy of the Haut Conseil de la Stabilité Financière”*.

⁴⁶BdF: yearly Financial Stability Review, biannual Risk Assessment of the French Financial System, AMF: annual Risk Outlook, ACPR: sectoral overviews.

3.3.3.5 Germany

Arrangement Type

Multi-agency.

CRD IV National Designated Authority:

PR/SR: the Federal Financial Supervisory Authority (BaFin)

Macroprudential Authority

Financial Stability Committee (G-FSC)

Other Relevant institutions:

CB: the Deutsche Bundesbank, MoF: the Federal Ministry of Finance.

The most salient characteristic of the German macroprudential framework is how each function of the policymaking process is assigned to the competent institution that is comparatively best suited to perform it. There is a microeconomic argument in favor of this approach as each institution, by the historical nature of its work, has more sunk costs and experience invested in a certain type of activity: the central bank in analyzing financial institutions from a holistic perspective, the prudential regulator in enforcing prudential tools, the macroprudential committee ensuring the coordination between the two. Notably, the Bundesbank's up to then discreet involvement in the supervisory process has been strengthened in the new framework.

However, the counterpart of this specialization is a risk of dilution of accountability: if each institution is liable for part of the process, the attribution of responsibility for a failure of the whole process can be incomplete as it is difficult to determine, ex-post, if a crisis is more due to a failure of monitoring or implementation. As a result, each institution can perceive itself as less accountable for financial stability than what a single institution performing all functions would. This is especially problematic for the prudential regulator since it has both a macroprudential and microprudential mandate and, absent a clear statutory preeminence of the former, can legitimately seek a compromise between the two objectives that need not be optimal for overall macroprudential stability. More generally, the mandate for financial stability is formulated in terms that are less authoritative than in other multi-agency frameworks. This issue could be solved by strengthening the coordination committee's mandate and making recommendation powers binding. On the independence front, the prudential regulator's freedom of implementation and budget independence provides a clear improvement over the very similar Austrian framework, but the strong representation of industry in its governing body can raise concerns regulatory capture vulnerability. Furthermore, the regime's transparency efforts come off as relatively modest. While absolute transparency can have a net destabilizing effect, minutes can be redacted or released with delay so the choice to scrape them altogether appears somewhat radical. Partial transparency is preferable to no transparency.

Figure 3.6: Germany (58.3) Power: 83.3, Will: 33.3

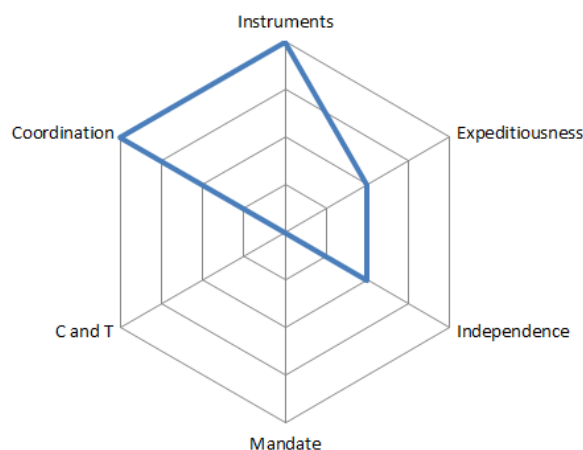


Table 3.10: Germany scoreboard

Criterion	Notes	Score
Coordination mechanisms	<p>The G-FSC acts as a coordination committee and discussion forum, and the formulation of its tasks indicate that this is its main function (see mandate section). It is composed of:</p> <ul style="list-style-type: none"> • Three representatives from the MoF, one of whom is chair • Three representatives of the Bundesbank • Three representatives of the BaFin <p>A “Coordination Committee for Financial Stability” was created in the Bundesbank to ensure internal interdepartmental coordination. In the BaFin, there is now a cross-sectoral “Risk Committee” that meets quarterly and encompasses the expertise of the different directorates, with the aim of informing the BaFin’s board. It includes two members of the Bundesbank in an observing capacity. Information sharing between the BaFin and the Bundesbank is further formalized by a memorandum of understanding.⁴⁷</p>	<p>(+) MaP authority acts as a coordination body, includes all the relevant actors.</p> <p>(+) several formal coordination mechanisms both within and between the BaFin and the Bundesbank.</p> <p>Score: high (2)</p>
Completeness of instruments	<p>The instruments at the disposal of the BaFin include:</p> <ul style="list-style-type: none"> • CRD IV instruments. • Leverage limits for open-ended investment funds. • Mortgage market instruments: LTV ratio caps and restrictions on amortization requirements. 	<p>(+) All standard instruments are present, plus some non-standard ones</p> <p>Score: high (2)</p>
Independence	<p>The Bundesbank has a prominent role on the G-FSC. It enjoys veto power over recommendations and, as the main entity tasked with analysis and monitoring, it is expected to be the main source of proposals for warnings and recommendations.</p>	<p>(+) Prominent role of the Bundesbank benefits independence</p>

⁴⁷ FSB (2014a), p.17: “A Memorandum of Understanding signed between Bundesbank and BaFin specifies data exchange, confidentiality arrangements, and information technology requirements that are relevant for his purpose.”

Independence	The BaFin's governing board (the 17-member administrative council) includes three industry representatives in a voting capacity. Considering that the BaFin holds ultimate control over instruments, this appears irregular: it is not standard for the owner of instruments to have strong industry representation in its governing board ⁴⁸ . the other hand, the board also includes three representatives from academia. According to the IMF, the MoF's strong influence over the organizational and budget allocation decisions of the BaFin could constitute a minor threat to independence. ⁴⁹	(+) Academic representation in the PR's board (-) Industry representation in the PR's board (-) MoF influence over the PR's management Score: intermediate (1)
Power to act score		5/6
Expediency of the policy-making process	Two decision-making instances: recommendation by the G-FSC, then compliance and implementation by the BaFin.	(-+) Two decision-making instances Score: intermediate (1)
Mandate and Objectives	<p>G-FSC The G-FSC's mandate is "<i>to strengthen cooperation on financial stability</i>"⁵⁰ The statutory legislation elaborates by specifying the G-FSC's tasks⁵¹</p> <ol style="list-style-type: none"> 1. To discuss the factors relevant to financial stability 2. To strengthen the cooperation of the institutions represented in the Committee in the event of a financial crisis 3. To deliberate on the handling of warnings and recommendations from the European Systemic Risk Board 4. Report annually to the Deutscher Bundestag 5. Issue warnings and recommendations 	

⁴⁸There is no mention of this in the IMF reports for Germany. This is curious considering the recommendation made to Austria (see the Independence section for Austria), where industry representation is weaker.

⁴⁹IMF (2016a), p.77: "*there is potential for indirect influence of government and industry in the execution of BaFin's supervisory objectives through the budget approval process and the mandatory approval of BaFin's internal organization and structure by the MoF.*"

⁵⁰Financial Stability Act, Section 2, (1).

⁵¹Financial Stability Act, Section 2, (2).

3.3. RESULTS

Mandate and Objectives	<p>The statutory mandate stipulates the G-FSC as an advisory and coordination body. In contrast to standard practice, it does not explicitly declare it as a guarantor of financial stability⁵². Outside the statutory legislation, the G-FSC provides further details on its strategy in its first report to the Bundestag: <i>“The G-FSC contributes to safeguarding the stability of the financial system as a whole. [...] The Committee considers stability of the financial system to be a situation in which economic functions, i.e. the allocation of financial resources and risks as well as the settlement of payment transactions, are performed efficiently – particularly in the face of unforeseen events, in stress situations and during periods of structural adjustment. In line with this, a lack of financial stability can prevail despite the absence of a crisis development, if an inefficient allocation of capital and risks fosters the build-up of systemic risks”</i>⁵³. The report also references the ESRB recommendation on intermediate objectives, and includes several allusions to procyclical risks.</p> <p>BaFin</p> <p><i>“BaFin shall counteract undesirable developments in the lending and financial services sector which may endanger the safety of the assets entrusted to institutions, impair the proper conduct of banking business or provision of financial services or entail major disadvantages for the economy as a whole.”</i>⁵⁴</p> <p><i>“[The] BaFin reviews the arrangements, strategies, processes and mechanisms implemented by an institution to comply with the prudential requirements, and evaluates[...]the risks that an institution poses to the financial system taking into account the identification and measurement of systemic risk[...].”</i>⁵⁵</p> <p>The statutory legislation of the BaFin stops short of giving it an explicit macroprudential mandate. Rather, it has been supplemented to express that the BaFin should consider systemic risks and their threat to the real economy in the pursuit of its mainly microprudential mandate.</p>	<p>(-) Statutory financial stability mandates are weakly defined.</p> <p>(-) No mention of credit stabilization</p> <p>(+) Macroprudential objective of the G-FSC and accounting of procyclicality strengthened outside of the legal framework</p>
------------------------	--	--

⁵²The FSB thinks the G-FSC’s mandate could be strengthened (FSB, 2014a, p.20): *“The G-FSC should consider further specifying its role on financial stability issues – such as in the development and implementation of prudential regulations and involvement in crisis management and resolution – to ensure clarity vis-à-vis its member institutions and to enhance accountability.”*

⁵³Strategy of the Financial Stability Committee in Germany, 2.1 (5).

⁵⁴Banking Act, Division 2, Section 6 (2).

⁵⁵Banking Act, Division 2, Section 6b (1).

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Mandate and Objectives	Separation of accountability and control: the BaFin holds control over the macroprudential instruments, but its mandate is mainly microprudential. The G-FSC has a (weakly defined) macroprudential mandate, and it has partial indirect control through its recommendation powers. The FSB has expressed reservations over the ambiguity surrounding the “comply or explain” mechanism ⁵⁶ .	(-) possible separation of accountability and control Score: intermediate (1)
Communication and Transparency	The G-FSC stands out among its Euro Area peers for its conservative approach to communication and transparency. Its discussions are kept confidential “to prevent negative impacts on the financial markets”, and makes sparse use of press releases ⁵⁷ . It is also a rare macroprudential authority not to have a dedicated website ⁵⁸ . The G-FSC addresses an annual report to the legislature, drafted by the Bundesbank. Furthermore, the Bundesbank produces on its own behalf a yearly financial stability review.	(+) Accountability to the legislature and standard production of information. (- -) Communication and transparency practices concerning meetings are very restrictive compared to peers. Score: low (0)
Willingness to act score		2/6
Overall Score: 58.3		

Source: Author's assessment

⁵⁶FSB (2014a), p.7: “...it would be useful to develop the framework underpinning the ‘comply or explain’ mechanism, such as the parameters and criteria that will be used to determine that a warning or recommendation has been complied with or that an explanation about non-compliance is acceptable (and on how to proceed if it is not).”

⁵⁷The G-FSC emitted press releases twice or thrice a year following its establishment, but has emitted none since 2015.

⁵⁸There is a subsection of the MoF's website dedicated to the G-FSC.

3.3.3.6 Ireland

Arrangement Type

Central bank integration.

CRD IV National Designated Authority and Macroprudential Authority

CB/PR/SR: the Central Bank of Ireland (CBI)

Other Relevant institutions

MoF: the Department of Finance

Post-crisis Ireland saw a major overhaul of its financial regulatory regime characterized by a concentration of functions under the roof of the Central Bank of Ireland . The resulting framework distinguishes itself for granting above-average power and autonomy to the MaP regulator. By concentrating all regulatory functions and responsibilities in a single institution and giving it wide freedom of action, there is no room for accountability to be diluted and therefore incentives are set up to encourage willingness to intervene. The independence of macroprudential policymaking at the CBI was evidenced during the tightening of LTV instruments in 2015, when the bank’s stance remained intransigent in the face of political and industry opposition, including from the MoF (IMF, 2016b). Activism on the mortgage market is especially necessary in Ireland where the real estate bubble was the quintessential factor of the recent crisis. The CBI is arguably the single institution with the strongest macroprudential powers over its jurisdiction in the Euro area. The remarkably low level of decision power dilution (especially for capital instruments) allows for great liberty and expedience in implementation. The CBI goes beyond standard practices to demonstrate its commitment to transparency and good communication with the general public. Meeting minutes are particularly detailed and lightly redacted, as evidenced for example in the acute criticisms addressed by the commission’s external members concerning cases of malpractice in the mortgage market in the November 2017 meeting.

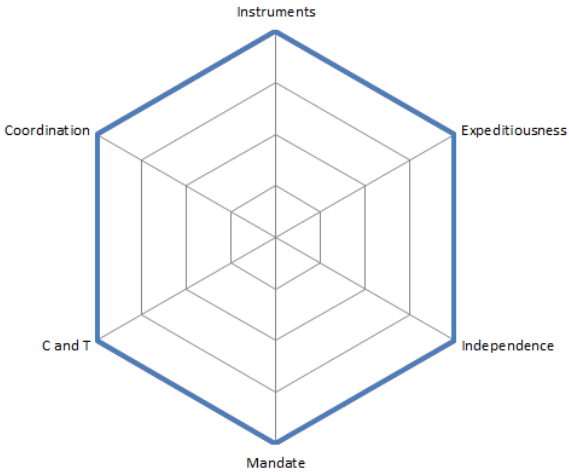


Table 3.11: Ireland scoreboard

Criterion	Notes	Score
Coordination mechanisms	The CBI has upgraded its organizational structure with dedicated internal bodies to support its macroprudential mandate:	

Coordination mechanisms	<ul style="list-style-type: none"> • The Macro-prudential Measures Committee regularly reviews matters relevant for the setting of the MaP policy stance and drafts recommendations for the Board and the Financial Stability Committee. It also specifies the work programs around which the Macro-Financial Division articulates its analytical functions and revises policy rules⁵⁹. It holds meetings every two weeks. • The Financial Stability Committee advises the board on all prudential policy matters, micro and macro. • The Financial Regulation Oversight Committee ensures coordination between the bank's regulatory policies and the rest of its activities. <p>In addition, a Financial Stability Group has been created to ensure external coordination with the MoF and the Treasury</p>	(+) Coordination in the Irish framework is supported by several internal and external bodies. Score: high (2)
Completeness of instruments	<p>The CBI is the sole owner of macroprudential instruments and has the full discretion to implement them. They include:</p> <ul style="list-style-type: none"> • CRD IV instruments, with the exception of the systemic risk buffer⁶⁰ • Mortgage market instruments: caps on LTV and LTI ratios. 	(+) All standard instruments are present. Absence of SRB unlikely to be material, and the path for its incorporation is readily available. Score: high (2)
Independence	<p>MaP enjoys extraordinary operational independence under the Irish framework. The board of the CBI, legal owner of the MaP instruments, has delegated decision power over CRD IV instruments to the Governor⁶¹. So, even though the MoF's representation on the board is relatively important (6 members out of 10), independence is protected; and the willingness to accept such delegation is a broader signal of deference to expertise.</p>	

⁵⁹See the "Terms of Reference for the Macro-Financial Committee" on the CBI's website.

⁶⁰Authorities have opted out of transposing the SRB into Irish law but hold the discretion to do so in the future at the initiative of the MoF.

⁶¹IMF (2016b), p.11 : "The functions and powers of the Central Bank of Ireland as the NDA for the purposes of the CRD IV and the CRR have been delegated to the Governor, with the power for the Governor to further delegate these statutory functions and powers. The designated authority powers include the powers over the capital buffers." "The functions and powers of the Central Bank of Ireland as the NDA for the purposes of the CRD IV and the CRR have been delegated to the Governor, with the power for the Governor to further delegate these statutory functions and powers. The designated authority powers include the powers over the capital buffers."

3.3. RESULTS

Independence	On mortgage market instruments, the CBI is required to consult with the MoF but retains ultimate discretion, and the CBI's independence and firmness has been proved in practice ⁶² .	(++) Extraordinary independence Score: high (2)
Power to act score		6/6
Expediiousness of the policy-making process	Unitary decision-making instance: CBI Board CRD IV decision-making is especially expeditious due to delegation to the Governor.	(+) Maximum expeditiousness Score: high (2)
Mandate and Objectives	The statutory legislation cites among the CBI's primary objectives to " <i>ensure the stability of the financial system overall</i> ", as well as the " <i>proper and effective regulation of financial service providers and markets, while ensuring that the best interests of consumers of financial services are protected</i> " ⁶³ . Furthermore, it states that the CBI shall " <i>have particular regard to the need to prevent potential serious damage to the financial system in the State and ensure the continued stability of that system</i> " in the execution of its functions as the conduct authority. In a document announcing the CBI's MaP strategy, it is stated that " <i>policy measures will be forward-looking and seek to reduce the potential for imbalances to accumulate</i> " and that preventing " <i>excessive credit growth and leverage</i> " is among its intermediate objectives ⁶⁴	(+) Emphatic macroprudential statutory mandate (+) Explicit credit smoothing objective outside of legislation Score: high (2)
Communication and Transparency	The CBI stands out among its Euro area peers for its widespread use of communication and commitment to transparency. The CBI releases four periodic publications relevant to financial stability: <ul style="list-style-type: none"> • The Macro-Financial Review (biannual), an overall financial stability report • The Systemic Risk Pack (biannual), a dashboard of indicators • The SME Market Report (annual), a report on corporate lending • The Household Credit Market Report (annual) 	

⁶²IMF (2016b), p.14: "*The Central Bank of Ireland's imposition of limits on LTV and LTI ratios provides evidence of how this independence can operate in practice. The Central Bank of Ireland did not change its decision despite financial industry and political pressure*"

⁶³Central Bank Act, Section 6A (2).

⁶⁴"A Macroprudential Policy Framework for Ireland", Section 2.

Communication and Transparency	The CBI submits an annual review to the MoF, plus an annual performance statement providing an overview of the measures taken over the previous year and those that are envisaged for the following one. An “ <i>internal peer review of regulatory performance</i> ” is required every four years at minimum. The Governor and other senior staff members can be summoned to appear before a parliamentary committee. The CBI is particularly thorough in the transparency of its analysis and decision-making by releasing minute meetings not only for the governing board but also for the advisory bodies. Furthermore, the content of said meetings denotes a high openness standard as evidenced by the decision not to exclude self-critical statements from the CBI’s senior officials ⁶⁵ . Finally, the CBI publishes detailed correspondence between senior staff and outside public officials on financial regulation matters of public interest.	(+) Standard measures of democratic accountability and production of information (+) Outstanding efforts to ensure transparency and communication Score: high (2)
Willingness to act score		6/6
Overall Score: 100		

Source: Author’s assessment

3.3.3.7 Netherlands

Arrangement Type

Multi-agency.

CRD IV National Designated Authority

CB/PR, the De Nederlandsche Bank (DNB)

Macroprudential Authority

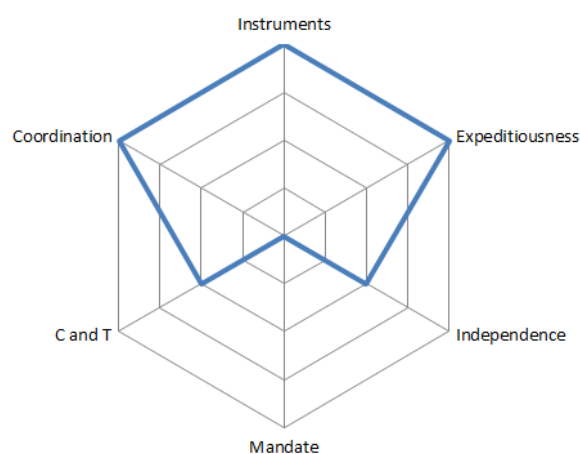
Financial Stability Committee (FSC)

Other Relevant institutions

SR: Authority for the Financial Markets (AFM), MoF, Ministry in charge of housing policy: Ministry of the Interior and Kingdom Relations (MOIKR)

Shortly after the crisis, the MoF decreed the creation of an ad-hoc inter-agency macroprudential body, the Financial Stability Committee (FSC). While this was done to expedite the reform process, establishing the body by bypassing the legislature resulted in it being essentially deprived of hard powers. It therefore fulfills a role of guidance and coordination rather than concrete decision-making, with the DNB emerging as the most prominent MaP authority after it was vested with CRD IV powers. As in Belgium, the government is heavily involved in MaP since mortgage market instruments are set by the MoF in collaboration with the ministry of the Interior; giving grounds for concern in terms of independence. Nonetheless, there is less

Figure 3.8: Netherlands (66.6) Power: 83.3, Will: 50



⁶⁵See, for example, the meeting of 17/10/2017, which includes accounts of members questioning the Bank’s handling of conduct issues in the mortgage market.

3.3. RESULTS

vulnerability here than in the Belgian case as the DNB is free to use CRD IV instruments at will. A plausible road for improvement in this framework would be to fortify the mandate of the FSC by establishing it into primary law, as recommended by the IMF, while strengthening its powers, notably by giving it direct control over mortgage market instruments

Table 3.12: Netherlands scoreboard

Criterion	Notes	Score
Coordination mechanisms	<p>The Financial Stability Committee (FSC) is an advisory coordination body, whose secretariat is housed at the DNB and meets at least twice a year. It has recommendation powers, but not subject to a comply-or-explain mechanism. An MoU has been instituted to formalize information sharing protocols between the three relevant authorities, and the FSC's meetings are prepared by a joint DNB/AFM technical team. The FSC strives for consensus, otherwise it votes on a 2/3 majority rule. It is composed of:</p> <ul style="list-style-type: none"> • Three members from the DNB: the president (chair), the director of supervision and the director of monetary affairs/financial stability • Two members from securities and conduct regulator (AFM) • Two members from the MoF (non-voting) <p>Furthermore, internal coordination has been enhanced within the DNB. A high-level Coordination Group on Financial Stability, chaired by the head of the Financial Stability Department, has been created to ensure a platform of regular dialogue with the microprudential-oriented Supervisory Council and Risk Management and Strategy Department.</p>	<p>(+) The dutch framework is supported by robust internal and external coordination mechanisms</p> <p>Score: high (2)</p>
Completeness of instruments	<p>The DNB has full control over:</p> <ul style="list-style-type: none"> • The standard set of CRD IV instruments • A leverage ratio for alternative investments funds <p>The MoF, along with the MOIKR, can set caps on LTV and DSTI ratios for mortgage lending.</p>	<p>(+) All standard instruments exist in the framework</p> <p>Score: high (2)</p>

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Independence	The DNB has full authority over CRD IV instruments. Decisions are made by the Governing Board, which is composed of five members appointed by royal decree for a seven-year mandate. Mortgage market instruments, on the other hand, fall under the jurisdiction of the MoF and the Ministry of the Interior and Kingdom Relations (MOIKR). The FSB has highlighted this as unusual and dangerous for independence, recommending grater involvement of independent agencies ⁶⁶ . The IMF appears less worried about the arrangement, as it does advise any changes ⁶⁷ .	(-) Mortgage market instruments are under the control of the government and therefore subject to the electoral cycle. Score: Intermediate (1)
Power to act score		5/6
Expeditionessness of the policy-making process	Unitary decision-making instance: DNB Board/ MoF-MOIKR. Though the policy stance is nominally guided by the FSC's recommendations, the DNB does not mention the FSC in the press releases relative to the few MaP decisions it has enacted, or in the notifications addressed to the European authorities. Decisions to raise the Systemic Risk Buffer in 2014 and to reciprocate Belgian MaP measures in 2015 were not preceded by an explicit public recommendation by the FSC. One can read this as indicative that the FSC's recommendations are taken as an informational input put are not, at least formally, systematically part of the decision-making procedure.	(+) Single decision-making units can act quickly if needed, and this seems to be the standard practice. Score: high (2)
Mandate and Objectives	DNB <i>"The Bank contributes to the pursuit of sound policies by the competent authorities relating to the prudential supervision of banks and the stability of the financial system." [It is among the Bank's tasks] "to promote the stability of the financial system"</i> ⁶⁸ . FSC <i>"There shall be a Financial Stability Committee which focuses on the stability of the financial system and the macro-economic developments relevant to it."</i> ⁶⁹	(-) Mandates for both institutions are expressed with qualified language. No mention of credit stabilization or procyclical risks.

⁶⁶See FSB (2014b), p.7: "[...]prudential tools such as LTV and LTI limits that are based on contractual arrangements between borrowers and regulated lenders should be independent from the political cycle, and should be set with micro- and macroprudential objectives in mind while being aware of their potential social and economic consequences. In that sense, keeping these tools under the control of the Dutch government, without formal input from prudential bodies, may be considered inconsistent with the spirit of the FSAP recommendation to "provide supervisors with powers to vary the designated macroprudential instrument in response to developments". In order to address this issue, the FSC should play a greater role in setting LTV and LTI limits in the Netherlands."

⁶⁷See FSB (2014b).

⁶⁸Bank Act 1998, Chap. II, Division 1, Section 3(2)

⁶⁹Order of the Minister of Finance of 2 November 2012 establishing the Financial Stability Committee.

3.3. RESULTS

Mandate and Objectives	<p>It is notable that the FSC's recommendation power is not enforced by a comply-and-explain mechanism, as this is usually the minimum level of power accorded to a multi-agency body. This, along with the fact that the FSC was established by ministerial decree and has not been enshrined in primary law, motivates recommendations from the FSB and the IMF to formally strengthen the role of the FSC.⁷⁰⁷¹</p> <p>Separation of accountability and control: The MoF/MOIKR lack an explicit financial stability mandate, but hold control over mortgage market instruments. The authorities vested with a financial stability mandate (the FSC and the DNB) lack any binding or semi-binding power over these agents.</p>	<p>(-) Modest power and status of the FSC</p> <p>(-) Potential separation of accountability and control</p> <p>Score: Low (0)</p>
Communication and Transparency	<p>The DNB publishes a financial stability report twice a year. The FSC addresses an annual report on macroprudential activity to the MoF, who subsequently addresses it to the Parliament. It regularly renders its warnings and recommendations public. Summaries of the FSC's meetings are published on its website. The DNB's board does not publish records of its meetings; which would, according to the IMF, be a welcome improvement⁷². No official document could be found detailing an operational strategy or intermediate objectives.</p>	<p>(+) FSC publishes meeting summaries and is accountable to parliament.</p> <p>(+) Standard production of information</p> <p>(-) Transparency could be improved at the DNB</p> <p>(-) Policymaking strategy could be made less opaque</p> <p>Score: Intermediate (1)</p>
Willingness to act score		3/6
Overall Score: 66.6		

Source: Author's assessment

⁷⁰FSB (2014b), p.9: "[...]the authorities should consider: (a) embedding the FSC's role and institutional standing in primary legislation to improve further its effectiveness and enhance its credibility; and (b) strengthening accountability for FSC recommendations via the establishment of a formal 'comply or explain' mechanism."

⁷¹IMF (2017b), p.5 : "[...]the FSC's legal status and powers need to be strengthened. It should be established in primary legislation to issue recommendations on a comply-or-explain basis."

⁷²IMF (2017b), p.5: "The DNB should also consider publishing a summary of the Governing Board meetings on macroprudential policy issues, which would enhance the transparency of policy making and promote public support."

3.3.3.8 Spain

Arrangement Type

Central bank integration (current), Multi-agency (future)

CRD IV National Designated Authority

CB/PR, the Banco de España (BdE)

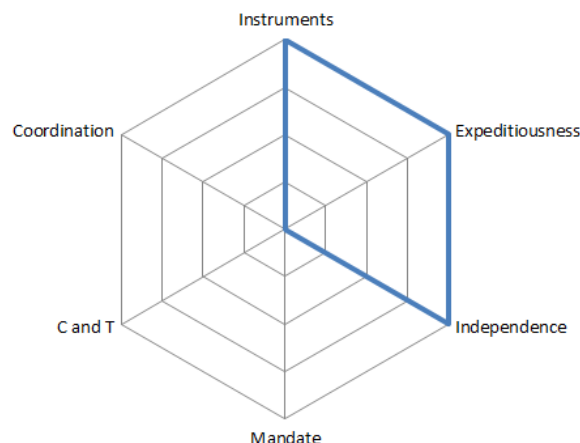
Macroprudential Authority

None (current), Autoridad Macroprudencial Consejo de Estabilidad Financiera (future)

Other Relevant institutions

SR: Comisión Nacional del Mercado de Valores (CNMV), MoF: Ministerio de Economía y Empresa, Insurance Regulator: Dirección General de Seguros y Fondos de Pension (DGSyFP)

Figure 3.9: Spain (50) Power: 66.6, Will: 33.3



The Spanish case presents certain particularities that demand the country's broader political and institutional context be taken into account. Recently, judicial authorities have revealed widespread and endemic corruption at the hands of the Popular Party that has been in office during much of the post-crisis era and the deregulatory reform period that sowed the seeds of the crisis⁷³. The post-crisis process to revamp the institutional regulatory framework had been remarkably slow: announcements had been made for the creation of a new multi-agency body to replace the obsolete Comité de Estabilidad Financiera (CESFI), but no material action was taken until 2018 when the new government took office. As a result, Spain remains the only Euro Area country without an official MaP authority. Furthermore, several former senior-level officials at the BdE and the securities regulator have been tied to the Bankia case⁷⁴. A 2018 congressional investigation on the crisis scrutinized the BdE for failing to take sufficient action⁷⁵. Considering all this, it is not out of the question that the country's singular lag in building an appropriate MaP framework is in part due to capture at the level of the regulators and the elected officials that hold them accountable. Such a possibility seems favored by the fact that the preliminary steps to initiate reform were only set in motion quickly after the change of cabinet: the MoF called a CESFI meeting in August 2018 (the first since 2013) to announce plans for the creation of a new multi-agency MaP authority, the Autoridad Macroprudencial Consejo de Estabilidad Financiera (AMCESFI), and the draft of a decree for its formal establishment is open to suggestions of the public as of December.

The Royal decree of December 14th 2018 has been the first formal step to revamp the Spanish MaP framework outside the attribution of CRD IV powers to the BdE. The changes that have come into effect, such as the creation of mortgage market instruments, have been taken into account in our index. The reforms that have been initiated but are incomplete have not been accounted for in the score, including the creation of the new authority. As many of this body's features are yet to be determined it is not factored into our evaluation; but once instituted the framework's most serious deficiency (sectoral specialization with no formal coordination) should

⁷³The scope of the investigations was such that the head of state and leader of the party was removed from office in the summer of 2018.

⁷⁴This includes the former director of the CNMV regulator and the former governor of the BdE (see the Prime Minister's Office press release, 16/2/2017) and the senior staff of the BdE's Directorate of Supervision, in office as recently as February 2017 (see BdE press release, 14/2/2017).

⁷⁵*Informe de la comisión de investigación sobre la crisis financiera de España y el programa de asistencia financiera, congreso de los diputados.*

be addressed.

Table 3.13: Spain scoreboard

Criterion	Notes	Score
Coordination mechanisms	Supervision and regulation is organized on a sectoral basis; with the BdE in charge of banks and savings institutions, the CNMV investment firms and the DGSyFP insurers. In light of this, the absence of any kind of functioning coordination platform is worrying.	(- -) Sectoral division of tasks without coordination mechanisms. Score: Low (0)
Completeness of instruments	<p>The toolkit at the hands of the BdE includes:</p> <ul style="list-style-type: none"> • The standard set of CRD IV instruments • Sector-specific capital buffers • Mortgage market instruments: limits on LTV and DSTI ratios <p>In addition, the CMNV can apply to investment firms a set of instruments similar to those in the CRD IV framework:</p> <ul style="list-style-type: none"> • A CCyB, systemic surcharges and a systemic risk buffer • liquidity requirements, leverage and exposure limits • Temporary restrictions on redemption and short-selling bans <p>Finally, the insurance regulator (DGSyFP) can set exposure limits on a sectoral or asset-class basis.</p>	(++) The MaP toolkit in Spain is extraordinarily rich Score: high (2)
Independence	The formal checks and balances in place to ensure the BdE's macroprudential independence are nominally solid. It has two top bodies: the governing council that sets the overall medium-term orientation of the Bank's policies and the executive committee who takes concrete MaP decisions according to the proposals from the financial stability department and the general guidelines of the governing council. Government representation in these bodies is very discreet, with only the head of the treasury sitting on the governing council.	

CHAPTER 3. GOVERNANCE FRAMEWORKS OF MACROPRUDENTIAL POLICY IN
THE EURO AREA: HOW WELL DO THEY GUARD AGAINST INACTION BIAS?

Independence	If investigations reveal some level of industry capture, one should be careful before blaming the institutional framework as can even the best design only work as long as the legislature and the judiciary properly oversee and scrutinize the performance of bureaucrats. Integration into the SSM should further strengthen independence and governance quality. The Securities regulator, who had some of its powers constrained by the MoF, has seen its independence strengthened ⁷⁶	(+) Institutional design strongly protects the BdE's independence (+) Independence of the SR has been strengthened Score: High (2)
Power to act score		4/6
Expediency of the policy-making process	Unitary decision-making: Due to the sectoral specialization, every institution decides and implements its instruments on its own.	(+) Unitary decision-making. Score: high (2)
Mandate and Objectives	<p><i>"[The Bank shall, in addition,] promote the smooth operation and the stability of the financial system and of the payments system."</i>⁷⁷</p> <p>As presently formulated, the financial stability objective does not appear as preeminent in the BdE's statutory legislation, and the IMF insists that it be strengthened⁷⁸.</p> <p>Given that the Securities and Insurance regulators have been attributed MaP tools that are unusual for institutions of their kind, they should be given an explicit financial stability mandate⁷⁹. Otherwise, they can be made into executors subordinate to the new multi-agency body.</p>	<p>(-) Mandate for the main MaP authority is relatively weak, no mention of credit stabilization</p> <p>(-) MaP instruments for Securities and Insurance regulators should be matched with a MaP mandate</p> <p>Score: Low (0)</p>

⁷⁶IMF (2017c), p.42: *"The Law 5/2015, of 27 April, on the promotion of business financing empowers the CNMV as the only authority responsible for the authorization and sanctioning of ISPs."*

⁷⁷1994 Law on the Autonomy of the Bank of Spain, Chapter II, Article 7.

⁷⁸IMF (2017c), p.19: *"BdE should be given a broader financial stability mandate to underpin its macroprudential oversight function. As a principle, macroprudential policy should be aimed at mitigating systemic risk to safeguard financial stability. The broader financial stability mandate would help reorient BdE's focus to carry out macrofinancial analysis, which is at the moment primarily for supporting the macroeconomic policy agenda, to guide the calibration of macroprudential policy. A clear mandate is also particularly important given that BdE has multiple responsibilities, such as prudential and conduct oversight for banks, that may give rise to conflicts of interest."*

⁷⁹IMF (2017c),p.29: *"The mandate of CNMV and DGSyFP should also be modified to support the proposed Systemic Risk Council in maintaining financial stability."*

3.3. RESULTS

Communication and Transparency	<p>The BdE releases a financial stability report twice a year, and the CNMV releases a financial stability note (a dashboard of indicators) every quarter. The IMF has expressed reservations regarding the orientation of the FSRs; recommending that its scope be extended, a stronger focus on systemic risks and a more forward-looking and analytical (as opposed to descriptive) logic⁸⁰. Rich press releases accompany MaP decisions.</p> <p>Furthermore, neither the BdE nor the CMNV publish meeting accounts. Unusually, the BdE is not accountable to the legislature for its supervisory functions.</p>	<p>(-) Quality of FSR could be improved</p> <p>(-) Accountability and transparency should be strengthened, especially in light of the institution's performance during and after the crisis</p> <p>Score: low (0)</p>
Willingness to act score		2/6
Overall Score: 50		

Source: Author's assessment

⁸⁰IMF (2017c), p.29: "BdE's Financial Stability Report tends to focus on describing the situation of the banking system.[...]However, going forward, a more risk-focused attitude is essential to ensure that 'whistle-blowing' would occur when a buildup of systemic risk takes place."; "Financial Stability Report could become a more effective communication tool that warns the public about systemic risk.[...]A brief discussion of policy actions to be taken to mitigate systemic risk could also be useful. This approach would enable the report to take a more critical view without creating unwarranted market reactions."

3.4 Conclusion

The decades long-process of European integration has made national financial systems in the EMU deeply interwoven, and with it the financial stability of member states. However, supervision and regulation, to the extent that they were not liberalized, remained for all relevant purposes a national competency up until the crisis. Since then, progress has been undeniable: microprudential oversight has been truly federalized under the SSM, the ESRB has been established as a coordination platform and the ECB has become the first supranational institution to wield MaP powers. The question, as it often is in Europe, is whether integration has gone far enough. The aforementioned supranational architecture is in fact an overlay on top of a diverse ensemble of national institutions who decide and implement the policy stance at the country level. Although all countries undertook important reforms in the direction of harmonization; national frameworks retain distinct idiosyncrasies resulting from different visions of what effective regulation looks like in general and for their country in particular. Such a state of affairs is defensible under the classical argument for subsidiarity: different financial systems call for different approaches to regulation, and national policymakers and politicians construct the framework best suited to enact it. However, as shown by the disappointing performance of the Irish and Spanish regulators before the crisis, it does not follow that a country will systematically make the best design choices. As such, idiosyncrasies could also be the product of local authorities holding on to inherited features unsupported by economic rationale. While there may be no “one-size-fits-all” governance framework, the reflection carried out at global instances has concluded on desirable characteristics. Chief among these is the protection to inaction bias, achieved by granting sufficient powers and encouraging the willingness to act.

In this paper, we have proposed a synthetic index for measuring and comparing how these parameters are affected by national idiosyncrasies. As with any primary qualitative assessment, a reasonable debate may be had on the set of characteristics considered and how they translate numerically into the index. We have therefore tried, whenever possible, to sustain our assessments with evaluation reports from the IMF and FSB. With these disclaimers in mind, we have complemented these reports with official information and computed the index for eight Euro area countries; and we extract the following insights:

- **National governance frameworks are heterogenous, and this is likely to matter.** At the very least, we can confidently assert that governance frameworks are divergent across several important dimensions, and that it would be surprising if this divergence does not translate into differences in vulnerability to inaction bias. Hence, this constitutes an element of intra-zone heterogeneity likely to influence systemic risk and macrofinancial outcomes.
- **Robust frameworks may be built with any type of arrangement.** Taking our results at face value, it is interesting that the two perfect scores come from countries where frameworks are on opposite ends of a spectrum. The most common and simple axis used to classify governance frameworks is the degree to which the MaP is housed under one roof or spread across different entities, with some studies showing that central bank integration benefits reactivity. While Ireland provides a textbook example of this, evaluating France using the same criteria yields a similar result despite it having the most populous multi-agency body in the sample. It will only be possible to grasp the reactivity of regulators once the financial cycle advances further; but our assessment is consistent with the limited experience so far: France and Ireland have been the first regulators to activate the CCyB, and the CBI has been aggressively tightening mortgage market measures for some years. Any kind of institutional arrangement can serve as a basis for a robust governance framework, as long as it follows sound design choices.

- **Housing MaP in the central bank does not, in and of itself, ensure a robust framework.** Conversely, scores on the lower end feature central bank integration arrangements. This includes Belgium, where the macroprudential autonomy of what would seem like a powerful central bank is undermined by what essentially amounts to government veto power. Spain is difficult to evaluate as its “work-in-progress” status yields a punishing score that is likely to improve as reforms are enacted, yet the BdE has been strongly criticized for its perceived passivity in the prevention and resolution of the crisis. Though central bank arrangements seem to correlate with reactivity at the global level (Lim et al., 2013), this is but one of the parameters to take into account. Compare, for instance, the power of the central bank in France and Belgium. The BdF is not the official authority and owns no instruments, but the HCSF cannot deploy them without prior proposal from the governor. Nominally, the NBB is the ultimate authority in its jurisdiction, yet it cannot set capital instruments without approval from the government and can only issue non-binding recommendations on mortgage market instruments. Properly evaluating institutional design is impossible without looking at the details.

It is unlikely that the six subcriteria we identify (and the observable characteristics that determine them) influence inaction bias to the same extent: whether coordination bodies or mandate formulation make a material difference are open questions. In the absence of sufficient experience or literature and in the spirit of limiting arbitrariness, we have opted for equal weights. Time will reveal the elements that are most determining, but calculating the index for emerging market economies where experience with MaP is deeper could provide valuable insights to refine the indicator and better map the relationship between institutional design and inaction bias. We hope that this study has furthered the conversation on macroprudential governance and called attention to the institutional financial heterogeneity that prevails in the EMU.

General Conclusion

There are high hopes and expectations for macroprudential policy in the EMU. Given the distortionary effects of the “one-size-fits-all” monetary policy and its subsequent impossibility to lean against the wind of heterogeneous financial cycles, the consensus is that macroprudential policy should be implemented at the country level to stabilize national financial cycles. This network of institutionally diverse national regulators, each with a mandate to secure financial stability within its jurisdiction, is the most important level of macroprudential decision-making; playing the lead role ahead of supranational institutions like the ECB and the ESRB. The aim of this thesis dissertation has been to advance the conversation by exploring the challenges that national heterogeneity can bring to this policy apparatus. We have focused on two types of heterogeneity that can condition the success of macroprudential policies: macrofinancial heterogeneity and institutional heterogeneity. From a macrofinancial perspective, the fact that the periphery indirectly depends on core banks for refinancing its economy through the interbank market means that macroprudential policy in the core can have destabilizing spillover effects. On the institutional front, countries have had great freedom in designing the governance framework for each jurisdiction, resulting in a high degree of diversity. Because institutional design choices influence a framework’s vulnerability to inaction bias, it follows that this institutional heterogeneity could translate into heterogeneity in the quality of policymaking.

Before diving into these issues, we have deemed it important to first reflect on the fundamental concepts and events that underlay the debate around EMU macroprudential policy, which is the object of chapter 1. In particular, not enough attention has been paid to how the concept of financial stability maps to the Euro area case. So far, the literature that has evaluated national and supranational policy rules has considered that a country’s contribution to the area’s systemic risk is proportional to its weight in the aggregate credit cycle, but the interdependence of systemic risk between member states implies that a crisis in a small country can have destabilizing effects disproportionate to its size. In this sense, Euro area countries would do well to place a high premium on the stability of their neighbors. Furthermore, we highlight the tension between a purely resilience-based objective and a credit stabilization objective for macroprudential policy, underlining how it has affected the design of the CCyB in a way that could give rise to the asset-side substitution behind the spillover effect we explore in chapter 2. By examining the causes and aftermath of the Euro crisis, we identify crucial macrofinancial and institutional vulnerabilities in the EMU. Going forward, keeping an eye on aggregate statistics and the internal dynamics of the Euro area will continue to be essential for identifying systemic threats. Recent trends point to developments in the shadow banking system as a focal point, especially if it continues to increase its participation in maturity transformation and financing through debt instruments. As the development of this sector is highly concentrated in a handful of countries (Luxembourg, the Netherlands and Ireland), it will be important to monitor the intra-area cross-border activity of these entities to determine if new core-periphery financing patterns are emerging, and if so what the proper macroprudential response would be.

The results of our simple modeling exercise in chapter 2 can be summarized as follows. In virtue of the relationship of financial dependence that emanates from the core and the periph-

ery's heterogeneous roles on the interbank market, the core's macroprudential policy affects the periphery's credit cycle. Being a structurally more volatile economy, the periphery regulator's stabilization capacity can be quickly exhausted when the CCyB reaches its upper bound. National stabilization rules completely stabilize credit booms created by asymmetric demand shocks, the same is true for symmetric demand shocks but only up to a certain point. If the symmetric shocks are strong enough to exhaust the periphery's stabilization capacity, then an alternative rule where the core regulator internalizes the effects of the spillover by including the periphery's credit cycle in its loss function delivers a better stabilization performance at the scale of the union. In practice, this internalization rule amounts to tolerating a stronger than ideal credit boom in the core to contain the credit boom in the periphery, since it results in a looser policy stance in the core. The net effect is positive because the aggregate deviation from target credit growth is smaller under the internalization rule, meaning that internalization reduces systemic risk in the periphery more than it increases it in the core. If we take these results at face value, they can raise questions about the asymmetric nature of the ECB's top-up power. As the only institution with a supranational financial stability mandate, it would naturally be incumbent upon the ECB to decide a policy stance that privileges EMU stability, and this can sometimes mean imposing a looser stance. Otherwise, the design of countercyclical capital instruments could be revised or complemented by other instruments, with the aim of creating a disincentive to interbank lending when the periphery is receiving too much of it.

Of course, since this result is based on a heavily stylized modeling framework, it would be necessary to have its robustness tested by extending the model to strengthen its conclusiveness. The first obvious extension would be to run a dynamic version of the model, as would be testing robustness to different choice of parameters. The introduction of microfoundations, especially on the real economy side, would provide several avenues for enriching the analysis conceptually. In its current form, the model considers the real economy as a homogeneous block that receives credit from the financial sector and creates output, but the sectoral allocation of credit is fundamental for financial stability. Hence, a differentiation between household and corporate credit would be useful, as well as the introduction of real estate assets. With a richer modeling of the demand side of the credit market, it would become possible to test the simultaneous use of the CCyB and mortgage market instruments as in Brzoza-Brzezina et al. (2013), as these could complement the CCyB and augment the credit stabilization capacity of the periphery.

The construction of our index of vulnerability to inaction bias in chapter 3 represents an initial contribution to the nascent and relevant field of macroprudential governance issues, and a first investigation the link between institutional heterogeneity and inaction bias in the EMU. It has, at the very least, descriptive value as it documents and classifies key institutional differences of 8 national governance frameworks. Building on this, we offer an analytical contribution by constructing an evaluation system that measures what these institutional differences imply for inaction bias. While much debate can be had on the choices made in constructing the index, regarding for instance the criteria considered, their relative importance or how we observe them; we have proposed a basic template on which to have such discussions. With this being said, we record potentially significant differences in how prepared the governance frameworks are for protecting the policymaking process against inaction bias. We find that the type of institutional arrangement is not necessarily indicative of the score, as we find robust and vulnerable frameworks based on the central bank, the prudential regulator and multi-agency bodies. Indeed, the lesson from this is that institutional heterogeneity might not be a problem in and of itself, as long as it is matched with cautious and coherent institutional design.

We have so far deliberately focused on a small set of countries with the purpose of investing care into the indicator's design; the next logical step is to compute the index for a larger sample

of countries, including but not limited to the rest of the EMU. For this objective, a possible complimentary source of information can be a series of background papers prepared for a BIS meeting of deputy central bank governors of emerging market countries in which the features of the institutional framework are systematically discussed (BIS, 2017). If the index can be computed for a large enough amount of countries, it will be possible to address the pressing question of whether or not the index actually correlates with more active policymaking, by estimating an econometric model with the index as an explanatory variable. In order to do this, however, it will also be necessary to define and propose a measure for policymaking proactivity that can be comparable among countries to be used as the dependent variable. Intuitively, this variable should describe a rapport between, on the one hand, the frequency/intensity/speed of implementation of macroprudential instruments; and on the other, the systemic risk signals produced by the economy as measured by early warning indicators. Of course this is also likely to pose its own kind of challenges: comparing macroprudential measures across countries is a well-known difficulty; and it is not clear that an equivalent positive credit gap poses the same amount of risk to two different countries. Whatever the case, an indicator of policymaking proactivity would also be useful for refining the index, by helping us identify the subcriteria that should be accorded higher weights, or other variables that we have ignored.

While the field of macroprudential policy research has seen overwhelming growth over the last decade, we should not lose sight of the fact that it is still in its infancy when compared to monetary or fiscal policy, which have been studied for decades if not centuries. Therefore, there are avenues for growth in many directions. For the EMU, the most pressing questions seem to revolve around the shadow banking sector, which has grown vigorously and is poised to play an ever-increasing role with the capital markets union on the horizon. In particular, it will be important to know to what extent there is a migration of systemic risk from the regulated banking sector to the shadow banking sector, and therefore a leakage of macroprudential policy. If these leakages are significant enough, it will also be important to design instruments equivalent to those that exist for banks, or instruments that cover risks specific to the shadow banking sector; and to furnish the corresponding research effort to understand them empirically and theoretically. Irrespective of the sector, the question of whether the macroprudential toolkit in vigor is sufficient will always be of pertinence. Most obviously, this begs the question of whether new instruments are needed, or if the design of existing instruments needs tweaking. Regarding the CCyB, for instance, a discussion could be had about its ideal size (is 2.5% reasonable?). Or, it could be argued that the design tensions we highlighted could be solved by creating a countercyclical leverage ratio that undertakes the credit stabilization objective, allowing capital regulation to be fully devoted to the resilience objective. Given the difference in systemic risk externalities of different types of assets and sectors, it is surprising that the only widely used sector-specific tools are lending standard restrictions for the mortgage market. Finally, most of the literature examining macroprudential and monetary policy has taken the interest rate instrument as the proxy for the latter; but unconventional monetary policy has been at least as important an element in the post-crisis world and does not appear to be going away any time soon. What is true of the interest rate instrument need not necessarily apply to something like targeted long-term refinancing operations, mechanisms that provide preferential refinancing conditional on the funds being used to lend to the real economy. If such tools were to become a structural part of the monetary transmission mechanism, then it would be possible to lean against the wind in a targeted way, providing grounds for reevaluating the case for a combination of macroprudential policy and LAW monetary policy. In any case, there are many open questions in the field of macroprudential policy research and it will likely remain a prosperous and highly relevant area of inquiry for the foreseeable future.

Synthèse en Français

La crise de la Zone Euro a mis en évidence les fragilités sous-jacentes de l'Union Economique et Monétaire (UEM). Dans le but de prévenir des futures crises, l'union s'est dotée d'une approche macroprudentielle à la régulation financière. Celle-ci vise à utiliser les instruments pruden- tiels, tels que les fonds propres réglementaires, dans le but de protéger le système financier dans sa globalité. La politique macroprudentielle porte sur ses épaules la responsabilité de maîtriser le risque systémique dans l'union, mais les hétérogénéités nationales qui la caractérisent entraînent des redoutables défis.

Cette thèse a comme but de contribuer au débat sur l'efficacité de la politique macropruden- tielle dans la zone euro caractérisée par des hétérogénéités financières et institutionnelles. Notre réflexion est divisée en trois chapitres dont l'objet et les résultats sont décrits par la suite.

Chapitre 1: Stabilité financière, politique macroprudentielle et la crise de la Zone Euro

Comment le concept de stabilité financière s'applique-t-il au cas particulier de la Zone Euro ? Quelles sont les leçons de la crise financière pour la conduite de la politique macroprudentielle ? Contrairement aux objectifs classiques de la politique macroéconomique (la stabilité des prix et le plein emploi), la stabilité financière est un phénomène complexe et multidimensionnel, impos- sible à réduire à un indicateur unique. En outre, un objectif de stabilité financière spécifique à l'union monétaire doit se définir en tenant compte de ses vulnérabilités particulières. Mais quelles sont, plus précisément, ces vulnérabilités ? Comment se sont-elles manifestées au cours de la crise récente, et quelles sont leurs implications pour la politique macroprudentielle ? Il est nécessaire de répondre à ce type de questions pour identifier les problèmes auquel le régulateur macroprudentiel pourrait être confronté.

Afin de construire un cadre conceptuel solide sur lequel fonder notre analyse de la politique macroprudentielle dans une union monétaire hétérogène, il est nécessaire de définir les notions fondamentales du sujet. Nous procédons à une revue critique de la littérature sur la stabilité fi- nancière, la politique macroprudentielle ainsi qu'un diagnostic des facteurs de crise dans la Zone Euro. Nous nous intéressons à la diversité des définitions qui ont été proposées pour le concept de stabilité financière. Loin d'être un simple exercice sémantique, nous identifions des contra- dictions susceptibles d'impacter la manière dont la politique macroprudentielle est appréhendée dans les modèles macroéconomiques. Nous dressons ensuite un état des lieux de la littérature sur la politique macroprudentielle, en nous intéressant particulièrement aux liens avec les poli- tiques monétaire et microprudentielle, le rôle du crédit comme variable cible de référence, et la modélisation du coussin de fonds propres contracyclique. Nous analysons la crise de la Zone Euro par des statistiques macrofinancières et mettons l'accent sur les asymétries entre le cœur et la périphérie, les évolutions du cadre institutionnel et les facteurs de vulnérabilité.

Ce travail préliminaire nous permet de définir la notion de stabilité financière dans le cas général et dans le cas particulier de la Zone Euro. Nous définissons la stabilité financière d'un

pays comme un état dans lequel (a) le système financier n'est pas en état de dysfonctionnement généralisé, (b) les agents non-financiers et l'économie réelle ne sont pas matériellement affectés par un tel dysfonctionnement et (c) l'économie n'est pas en train d'accumuler des déséquilibres macrofinanciers insoutenables. Par la suite nous définissons la stabilité financière à l'échelle de l'union comme un état dans lequel aucun pays membre (ou sous-ensemble de pays membres) subit une crise suffisamment forte pour menacer la stabilité du reste de l'UEM. En effet, la pratique d'assimiler le risque au niveau de l'union à la moyenne pondérée des risques systémiques nationaux (tel que le font implicitement les modèles dans la littérature) pourrait sous-estimer l'intérêt de règles qui ciblent la stabilité de l'union. Nous identifions une opposition entre deux visions de la politique macroprudentielle. Pour certains, elle devrait se contenter de renforcer la résilience du système. Mais pour d'autres, elle devrait permettre la stabilisation du cycle de crédit. C'est d'ailleurs cette opposition qui rendrait le coussin contracyclique vulnérable aux effets de report (cf. chapitre 2). Finalement, notre diagnostic des causes et des mécanismes de la crise de la Zone Euro justifie le choix de se focaliser sur l'hétérogénéité macrofinancière entre le cœur et la périphérie. De même, les lacunes institutionnelles impliquent que l'union reste vulnérable à la boucle entre la solvabilité des banques et la dette souveraine.

Chapitre 2 : Effets de report transfrontaliers de la politique macroprudentielle dans la Zone Euro

Comment calibrer le coussin de fonds propres contracyclique en présence d'effets de report transfrontaliers ? Les systèmes bancaires nationaux interagissent de manière asymétrique sur le marché monétaire : les banques du cœur ont un accès privilégié au refinancement de la BCE, tandis que ses homologues de la périphérie ont tendance à dépendre du marché interbancaire. Cela engendre une relation de dépendance financière qui rend le cycle de crédit et les conditions de financement dans la périphérie dépendantes des décisions d'octroi de prêt des banques du cœur. Puisque l'activation du coussin contracyclique a un impact sur les conditions dans lesquelles les banques du cœur prêtent sur le marché interbancaire, la politique macroprudentielle du cœur peut alors engendrer des effets indésirables sur la stabilité financière de la périphérie. Dans une telle configuration, les régulateurs devraient-ils s'en tenir à une approche strictement nationale de la stabilisation du cycle de crédit ? Ou devraient-ils intégrer les effets de report à l'échelle de l'union ?

Pour traiter ces problématiques, nous comparons la performance d'une règle nationale inspirée du statu quo contre une règle alternative avec internalisation dans un modèle d'équilibre général simple et statique, basé sur le modèle Néo-Keynésien à trois équations. Notre modèle comporte deux zones, le cœur et la périphérie, dont les économies réelles sont décrites avec une courbe IS qui relie la croissance au taux de crédit bancaire, et une courbe de Phillips qui fait dépendre l'inflation de la croissance. Le secteur bancaire est modélisé en nous inspirant du modèle IS-LM-CC de Bernanke & Blinder (1988). Ainsi, le taux d'emprunt auquel s'endettent les agents non-financiers dépend des conditions d'offre et demande sur le marché du crédit. Il en résulte une équation de frictions financières. Les deux économies sont connectées par le marché interbancaire où les banques du cœur mettent des fonds à disposition des banques de la périphérie pour financer leur offre de crédit. Dans chaque pays, un coussin de fonds propres contracyclique influence l'offre de crédit en ajustant le taux de fonds propres réglementaires et donc, le capital nécessaire pour l'octroi d'une unité marginale de crédit. Puisqu'une hausse du coussin contracyclique incite les banques du cœur à substituer l'octroi de crédit domestique par des prêts interbancaires, un effet de report surgit qui accélère le cycle financier de la périphérie en assouplissant les conditions de refinancement des banques. À partir de ce résultat, nous évaluons la performance de deux règles macroprudentielles : une règle de stabilisation nationale où chaque régulateur stabilise la croissance du crédit dans sa propre juridiction, et une règle

avec internalisation où le régulateur du cœur tient compte de l'effet de report sur la périphérie. Nous calibrons les paramètres du modèle selon les valeurs estimées dans la littérature pour la Zone Euro et effectuons une simulation statique sous des différentes combinaisons de chocs de demande.

Parmi les caractéristiques clés du modèle, on peut citer :

- La substitution d'actifs derrière l'effet de report : une hausse du coussin contracyclique pour les banques du cœur entraîne une hausse de l'offre de crédit des banques de la périphérie par l'augmentation de l'offre sur le marché interbancaire.
- La modélisation de la règle alternative : jusqu'à présent, la littérature a évalué les mérites de la règle nationale en la comparant à des règles "fédérales" ou "supranationales" qui stabilisent le crédit agrégé de la Zone Euro (Brzoza-Brzezina et al., 2015; Poutineau & Vermandel, 2017). En suivant notre définition de la stabilité financière, nous proposons une règle alternative où le régulateur du cœur internalise l'effet de report.
- Un critère d'évaluation : le coussin contracyclique permet à chaque régulateur de stabiliser la croissance du crédit autour d'une valeur cible considérée comme soutenable. La perte de chaque régulateur est calculée comme la différence entre la croissance du crédit à l'équilibre et sa valeur cible. La perte à l'échelle de l'union est alors la somme des pertes des régulateurs nationaux. Le critère d'évaluation des règles est donc la perte à l'échelle de l'union.

Dans le cas de chocs asymétriques de demande, les règles nationales délivrent invariablement la meilleure performance. Par contre, en présence de chocs symétriques, leur intensité va déterminer la règle optimale. Lorsque le coussin de la périphérie est poussé jusqu'à sa borne supérieure, le régulateur est alors incapable de contrecarrer le boom de crédit. Dans ce cas, la règle avec internalisation devient intéressante à l'échelle de l'union, mais au prix d'une moindre performance nationale dans le cœur. En effet, le régulateur du cœur tolère une croissance du crédit plus forte que souhaitée afin d'amortir le boom de crédit dans la périphérie. Cette règle d'internalisation produit un effet net positif au niveau de l'union. Dans un tel scénario, la question de rendre symétriques les pouvoirs macroprudentiels de la BCE mérite d'être posée.

Chapitre 3 : Gouvernance macroprudentielle dans la Zone Euro : quelle protection contre le biais d'inaction ?

Dans quelle mesure la structure de gouvernance de la politique macroprudentielle sont-elles différentes les unes des autres ? Quelles sont les conséquences de cette hétérogénéité en termes de vulnérabilité ? Si l'on part du principe que les caractéristiques institutionnelles des agents ont une incidence sur la qualité de la conduite de la politique macroprudentielle, alors des institutions hétérogènes peuvent être plus ou moins bien préparés à accomplir leur mission. Le biais d'inaction, c'est-à-dire la tendance des régulateurs à intervenir timidement et trop tard, est probablement le défi institutionnel le plus important pour la politique macroprudentielle. Il est donc souhaitable de construire un cadre de gouvernance qui protège contre ce biais. Mais quelle est la relation entre le biais d'inaction et les caractéristiques institutionnelles ? Comment ces caractéristiques varient-elles entre les régulateurs des Etats membres ? Est-il possible de mesurer la vulnérabilité d'un pays au biais d'inaction ?

En nous inspirant des travaux de Lombardi & Siklos (2016), nous proposons de construire un index synthétique qui résume des valeurs numériques associées aux évaluations qualitatives sur plusieurs caractéristiques institutionnelles. Une valeur élevée de cet index reflète un cadre de

gouvernance qui protège convenablement contre le biais d'inaction. Suivant les travaux de Nier et al. (2011), nous évaluons les cadres de gouvernance selon deux critères globaux : le pouvoir pour agir que le cadre accorde, et la volonté à agir que le cadre encourage. Ces deux critères globaux dépendent de différents sous-critères que l'on peut associer à des caractéristiques directement observables. Un défi important dans cette entreprise est de contrôler les appréciations subjectives de l'auteur. Pour ce faire, nous basons systématiquement nos appréciations sur les rapports d'évaluation du FMI et du FSB. Ces appréciations sont complétées par l'analyse des textes juridiques et des informations officielles des régulateurs. L'index, mesuré sur une échelle de 0 à 100, doit être interprété de façon ordinale : un pays avec une note de 50 doit être considéré comme plus vulnérable qu'un autre noté 100. Cependant le premier pays n'est pas fois plus vulnérable que le second. L'index a donc une vocation comparative mais pas absolue.

Nous réduisons les déterminants de la vulnérabilité au biais d'inaction à six éléments qui constituent les sous-critères de notre indice. Pour déterminer le pouvoir d'agir, nous examinons les mécanismes de coordination qui assurent le partage d'information et la cohérence de l'activité entre les institutions, le degré de complétude de la boîte à outils macroprudentielle, le contrôle du régulateur sur les instruments et le niveau d'indépendance dans la prise de décision. Concernant la volonté d'agir, le nombre d'instances décisionnelles bloquantes, le caractère proactif du mandat législatif et le niveau de transparence sont considérés. Le calcul de l'index pour 8 pays de la Zone Euro indique que le niveau de protection contre le biais d'inaction semble différer. Il apparaît que le choix de configuration institutionnelle (c'est-à-dire le choix de concentrer la politique macroprudentielle dans une seule institution ou la distribuer à travers une multiplicité) n'est pas nécessairement indicatif de la qualité du cadre de gouvernance. En effet, les deux pays avec la note plus élevée, la France et l'Irlande, adoptent des configurations institutionnelles diamétralement opposées. Le dispositif Irlandais présente le cas le plus radical d'intégration auprès de la banque centrale ; et il surperforme par rapport aux autres configurations en créant un régulateur avec peu de restrictions de pouvoir, tout en établissant des mécanismes stricts de responsabilité. Le dispositif Français évite les pièges d'autres configurations à agents multiples en dotant le régulateur d'une autorité conséquente. L'enseignement global est qu'il n'existe pas de cadre de gouvernance universel : des cadres robustes peuvent être construits à partir de modèles très différents.

References

- Abbassi, P., Bräuning, F., Fecht, F., & Peydró, J.-L. (2014). Cross-border liquidity, relationships and monetary policy: Evidence from the Euro area interbank crisis. *Discussion Papers*, 45/2014, Deutsche Bundesbank. Retrieved from <https://ideas.repec.org/p/zbw/bubdps/452014.html>
- Abiad, A. d., Detragiache, E., & Tressel, T. (2008). A New Database of Financial Reforms. *IMF Working Papers*, 08/266, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/08-266.html>
- Acemoglu, D., Ozdaglar, A., & Tahbaz-Salehi, A. (2015). Systemic Risk and Stability in Financial Networks. *American Economic Review*, 105(2), 564–608. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.20130456> doi: 10.1257/aer.20130456
- Acharya, V., Drechsler, I., & Schnabl, P. (2014). A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk. *Journal of Finance*, 69(6), 2689–2739. Retrieved from <http://doi.wiley.com/10.1111/jofi.12206> doi: 10.1111/jofi.12206
- Acharya, V., Eisert, T., Eufinger, C., & Hirsch, C. (2017). Whatever it takes: The real effects of unconventional monetary policy. *SAFE Working Paper Series*, 152, Research Center SAFE – Sustainable Architecture fo. Retrieved from <https://ideas.repec.org/p/zbw/safewp/152.html>
- Acharya, V., Engle, R., & Richardson, M. (2012). Capital Shortfall: A New Approach to Ranking and Regulating Systemic Risks. *American Economic Review*, 102(3), 59–64. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.102.3.59> doi: 10.1257/aer.102.3.59
- Adam, K., Kuang, P., & Marcet, A. (2011). House Price Booms and the Current Account. *NBER Working Papers*, 17224, National Bureau of Economic Research, Inc. Retrieved from <http://www.nber.org/papers/w17224.pdf> doi: 10.3386/w17224
- Adrian, T., & Brunnermeier, M. K. (2016). CoVaR. *American Economic Review*, 106(7), 1705–1741. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.20120555> doi: 10.1257/aer.20120555
- Adrian, T., & Liang, N. (2018). Monetary Policy, Financial Conditions, and Financial Stability. *International Journal of Central Banking*, 14(1), 73–131. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2018q0a3.html>
- Adrian, T., & Shin, H. S. (2010). Liquidity and leverage. *Journal of Financial Intermediation*, 19(3), 418–437. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1042957308000764> doi: 10.1016/J.JFI.2008.12.002
- Agénor, P.-R., Kharroubi, E., Gambacorta, L., Lombardo, G., & da Silva, L. A. P. (2017). The international dimensions of macroprudential policies. *BIS Working Papers*, 643, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/643.html>

- Aguiar, M., Amador, M., Farhi, E., & Gopinath, G. (2015). Coordination and Crisis in Monetary Unions. *The Quarterly Journal of Economics*, 130(4), 1727–1779. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.1093/qje/qjv022> doi: 10.1093/qje/qjv022
- Ahuja, A., & Nabar, M. S. (2011). Safeguarding Banks and Containing Property Booms; Cross-Country Evidence on Macroprudential Policies and Lessons From Hong Kong SAR. *IMF Working Papers*, 11/284, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/11-284.html>
- Aikman, D., Haldane, A. G., & Nelson, B. D. (2015). Curbing the Credit Cycle. *The Economic Journal*, 125(585), 1072–1109. Retrieved from <https://academic.oup.com/ej/article/125/585/1072-1109/5077364> doi: 10.1111/eoj.12113
- Aizenman, J., & Jinjark, Y. (2009). Current account patterns and national real estate markets. *Journal of Urban Economics*, 66(2), 75–89. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0094119009000308> doi: 10.1016/J.JUE.2009.05.002
- Aldasoro, I., Borio, C., & Drehmann, M. (2018). Early warning indicators of banking crises: expanding the family. *BIS Quarterly Review*. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1803e.html>
- Alesina, A., Barbiero, O., Favero, C., Giavazzi, F., & Paradisi, M. (2015). Austerity in 2009–13. *Economic Policy*, 30(83), 383–437. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1093/epolic/eiv006> doi: 10.1093/epolic/eiv006
- Alesina, A., & Tabellini, G. (2004). Bureaucrats or Politicians? *NBER Working Papers*, 10241, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/10241.html>
- Alessi, L., & Detken, C. (2011). Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity. *European Journal of Political Economy*, 27(3), 520–533. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0176268011000048> doi: 10.1016/J.EJPOLECO.2011.01.003
- Alexander, K. (2006). Corporate governance and banks: The role of regulation in reducing the principal-agent problem. *Journal of Banking Regulation*, 7(1-2), 17–40. Retrieved from <http://link.springer.com/10.1057/palgrave.jbr.2340003> doi: 10.1057/palgrave.jbr.2340003
- Allen, W., & Wood, G. (2006). Defining and achieving financial stability. *Journal of Financial Stability*, 2(2), 152–172. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308906000209> doi: 10.1016/J.JFS.2005.10.001
- Alpanda, S., & Zubairy, S. (2017). Addressing household indebtedness: Monetary, fiscal or macroprudential policy? *European Economic Review*, 92, 47–73. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0014292116302161> doi: 10.1016/J.EUROECOREV.2016.11.004
- Altavilla, C., Giannone, D., & Lenza, M. (2016). The Financial and Macroeconomic Effects of the OMT Announcements. *International Journal of Central Banking*, 12(3), 29–57. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2016q3a1.html>
- Altavilla, C., Pagano, M., & Simonelli, S. (2017). Bank Exposures and Sovereign Stress Transmission*. *Review of Finance*, 21(6), 2103–2139. Retrieved from <http://academic.oup.com/rof/article/21/6/2103/4084283> doi: 10.1093/rof/rfx038

REFERENCES

- Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2014). Does Monetary Policy Affect Bank Risk? *International Journal of Central Banking*, 10(1), 95–136. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2014q1a3.html>
- Angelini, P., Neri, S., & Panetta, F. (2014). The Interaction between Capital Requirements and Monetary Policy. *Journal of Money, Credit and Banking*, 46(6), 1073–1112. Retrieved from <http://doi.wiley.com/10.1111/jmcb.12134> doi: 10.1111/jmcb.12134
- Angeloni, I., & Faia, E. (2013). Capital regulation and monetary policy with fragile banks. *Journal of Monetary Economics*, 60(3), 311–324. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S0304393213000044> doi: 10.1016/J.JMONECO.2013.01.003
- Anundsen, A. K., Gerdrup, K., Hansen, F., & Kragh-Sørensen, K. (2016). Bubbles and Crises: The Role of House Prices and Credit. *Journal of Applied Econometrics*, 31(7), 1291–1311. Retrieved from <http://doi.wiley.com/10.1002/jae.2503> doi: 10.1002/jae.2503
- Anundsen, A. K., & Jansen, E. S. (2013). Self-reinforcing effects between housing prices and credit: an extended version. *Discussion Papers*, 756, Statistics Norway, Research Department. Retrieved from <https://ideas.repec.org/p/ssb/disrap/756.html>
- Assenmacher-Wesche, K., & Gerlach, S. (2010). Monetary policy and financial imbalances: facts and fiction. *Economic Policy*, 25(63), 437–482. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1111/j.1468-0327.2010.00249.x> doi: 10.1111/j.1468-0327.2010.00249.x
- Avalos, F., & Mamatzakis, E. C. (2018). Euro area unconventional monetary policy and bank resilience. *BIS Working Papers*, 754, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/754.html>
- Avery, C., & Zemsky, P. (1998). Multidimensional Uncertainty and Herd Behavior in Financial Markets. *American Economic Review*, 88(4), 724–748. Retrieved from <https://ideas.repec.org/a/aea/aecrev/v88y1998i4p724-48.html>
- Baldwin, R., Beck, T., Bénassy-Quéré, A., Blanchard, O., Corsetti, G., De Grauwe, P., . . . Weder Di Maura, B. (2015). Rebooting the Eurozone: Step 1-agreeing a crisis narrative Introduction and summary. *Policy Insight*, 85, November 2015. Retrieved from www.cepr.org
- Battistini, N., Pagano, M., & Simonelli, S. (2014). Systemic risk, sovereign yields and bank exposures in the euro crisis. *Economic Policy*, 29(78), 203–251. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1111/1468-0327.12029> doi: 10.1111/1468-0327.12029
- Bayoumi, T., & Eichengreen, B. (1992). Shocking Aspects of European Monetary Unification. *NBER Working Papers*, 3949, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/3949.html>
- BCBS. (2010). Report and recommendations of the Cross-border Bank Resolution Group. *Guidelines*, Basel Committee on Banking Supervision. Retrieved from <https://www.bis.org/publ/bcbs169.htm>
- BCBS. (2015). Frequently asked questions on the Basel III Countercyclical Capital Buffer. , Basel Committee on Banking supervision. Retrieved from <https://www.bis.org/bcbs/publ/d339.htm>

- BCBS. (2018). Towards a sectoral application of the countercyclical capital buffer: A literature review. *Working Paper, 32*, Basel Committee on Banking Supervision. Retrieved from <https://www.bis.org/bcbs/publ/wp32.htm>
- Beau, D., Clerc, L., & Mojon, B. (2012). Macro-Prudential Policy and the Conduct of Monetary Policy. *Occasional Papers, 8*, Banque de France. Retrieved from <https://econpapers.repec.org/paper/bfrbanfra/390.htm>
- Beck, T. (2017). The European banking union at three. *VOX, CEPR Policy Portal article*, 04 July 2017. Retrieved from <https://voxeu.org/article/european-banking-union-three>
- Behn, M., Detken, C., Peltonen, T. A., & Schudel, W. (2013). Setting countercyclical capital buffers based on early warning models: would it work? *Working Paper Series, 1604*, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20131604.html>
- Beirne, J., & Fratzscher, M. (2013). The pricing of sovereign risk and contagion during the European sovereign debt crisis. *Journal of International Money and Finance, 34*, 60–82. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560612001830> doi: 10.1016/J.JIMONFIN.2012.11.004
- Belke, A., Domnick, C., & Gros, D. (2017). Business Cycle Synchronization in the EMU: Core vs. Periphery. *Open Economies Review, 28*(5), 863–892. Retrieved from <http://link.springer.com/10.1007/s11079-017-9465-9> doi: 10.1007/s11079-017-9465-9
- Belke, A., & Klose, J. (2017). Equilibrium Real Interest Rates and Secular Stagnation: An Empirical Analysis for Euro Area Member Countries. *Journal of Common Market Studies, 55*(6), 1221–1238. Retrieved from <http://doi.wiley.com/10.1111/jcms.12552> doi: 10.1111/jcms.12552
- Bennani, T., Després, M., Dujardin, M., Duprey, T., & Kelber, A. (2014). Macroprudential framework:key questions applied to the French case. *Occasional Papers, 9*, Banque de France. Retrieved from <https://econpapers.repec.org/paper/bfropaper/9.htm>
- Benoit, S., Colliard, J.-E., Hurlin, C., & Pérignon, C. (2017). Where the Risks Lie: A Survey on Systemic Risk*. *Review of Finance, 21*(1), 109–152. Retrieved from <https://academic.oup.com/rof/article/21/1/109/2670094> doi: 10.1093/rof/rfw026
- Beranger, A., & Scialom, L. (2015). Banking union: Mind the gaps. *International Economics, 144*, 95–115. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S2110701715000633> doi: 10.1016/J.INTECO.2015.08.001
- Berger, H., Dell’Ariccia, G., & Obstfeld, M. (2018). Revisiting the Economic Case for Fiscal Union in the Euro Area. *IMF Departmental Papers / Policy Papers, 18/03*, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfdep/18-03.html>
- Bernanke, B. (2005). The global saving glut and the U.S. current account deficit. *Speech, 77*, Board of Governors of the Federal Reserve System. Retrieved from <https://ideas.repec.org/p/fip/fedgsq/77.html>
- Bernanke, B., & Blinder, A. (1988). Credit, Money, and Aggregate Demand. *American Economic Review, 78*(2), 435–439. Retrieved from <https://ideas.repec.org/a/aea/aecrev/v78y1988i2p435-39.html>
- Bernanke, B., & Gertler, M. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives, 9*(4), 27–48. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/jep.9.4.27> doi: 10.1257/jep.9.4.27

- Bernanke, B., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of Macroeconomics*, 1, 1341–1393. Retrieved from <https://www.sciencedirect.com/science/article/pii/S157400489910034X> doi: 10.1016/S1574-0048(99)10034-X
- Bianchi, J., & Mendoza, E. G. (2018). Optimal Time-Consistent Macroprudential Policy. *Journal of Political Economy*, 126(2), 588–634. Retrieved from <https://www.journals.uchicago.edu/doi/10.1086/696280> doi: 10.1086/696280
- Bielecki, M., Brzoza-Brzezina, M., Kolasa, M., & Makarski, K. (2019). Could the Boom-Bust in the Eurozone Periphery Have Been Prevented? *JCMS: Journal of Common Market Studies*, 57(2), 336–352. Retrieved from <http://doi.wiley.com/10.1111/jcms.12795> doi: 10.1111/jcms.12795
- BIS. (2017). Macroprudential frameworks, implementation and relationship with other policies. *BIS Papers*, 94, Bank for International Settlements. Retrieved from <https://www.bis.org/publ/bppdf/bispap94.htm>
- BIS. (2018). Moving forward with macroprudential frameworks. *Annual Economic Report*, 63–89, Bank for International Settlements. Retrieved from <https://www.bis.org/publ/arpdf/ar2018e4.htm>
- Blanchard, O. (2007). Current Account Deficits in Rich Countries. *NBER Working Papers*, 12925, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/12925.html>
- Blanchard, O. (2016). Do DSGE Models Have a Future? *Policy Briefs*, PB16-11, Peterson Institute for International Economics. Retrieved from <https://ideas.repec.org/p/iie/pbrief/pb16-11.html>
- Blanchard, O., Dell’Ariccia, G., & Mauro, P. (2013). Rethinking Macro Policy II; Getting Granular. *IMF Staff Discussion Notes*, 13/03, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfsdn/13-03.html>
- Blanchard, O., & Kahn, C. M. (1980). The Solution of Linear Difference Models under Rational Expectations. *Econometrica*, 48(5), 1305–1311. Retrieved from <https://ideas.repec.org/a/ecm/emetrp/v48y1980i5p1305-11.html>
- Blanchard, O., & Katz, L. F. (1992). Regional Evolutions. *Brookings Papers on Economic Activity*, 23(1), 1–76. Retrieved from <https://ideas.repec.org/a/bin/bpeajo/v23y1992i1992-1p1-76.html>
- Bofinger, P., Debes, S., Gareis, J., & Mayer, E. (2013). Monetary policy transmission in a model with animal spirits and house price booms and busts. *Journal of Economic Dynamics and Control*, 37(12), 2862–2881. Retrieved from <https://www.sciencedirect.com/science/article/pii/S016518891300170X> doi: 10.1016/J.JEDC.2013.08.002
- Bordo, M., Eichengreen, B., Klingebiel, D., & Martinez-Peria, M. S. (2001). Is the crisis problem growing more severe? *Economic Policy*, 16(32), 52–82. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1111/1468-0327.00070> doi: 10.1111/1468-0327.00070
- Bordo, M., & Jeanne, O. (2002). Monetary Policy and Asset Prices: Does ‘Benign Neglect’ Make Sense? *International Finance*, 5(2), 139–164. Retrieved from <https://ideas.repec.org/a/bla/intfin/v5y2002i2p139-64.html>

- Borio, C. (2003). Towards a macroprudential framework for financial supervision and regulation? *BIS Working Papers*, 128, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/128.html>
- Borio, C. (2008). The financial turmoil of 2007-?: a preliminary assessment and some policy considerations. *BIS Working Papers*, 251, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/251.html>
- Borio, C. (2009). Implementing the macroprudential approach to financial regulation and supervision. *Financial Stability Review*(13), 31–41, Banque de France. Retrieved from <https://ideas.repec.org/a/bfr/fisrev/2009134.html>
- Borio, C. (2011). Rediscovering the macroeconomic roots of financial stability policy: journey, challenges and a way forward. *BIS Working Papers*, 354, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/354.html>
- Borio, C. (2014a). The financial cycle and macroeconomics: What have we learnt? *Journal of Banking & Finance*, 45, 182–198. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0378426613003063> doi: 10.1016/j.jbankfin.2013.07.031
- Borio, C. (2014b). The international monetary and financial system: its Achilles heel and what to do about it. *BIS Working Papers*, 456, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/456.html>
- Borio, C., & Disyatat, P. (2009). Unconventional monetary policies: an appraisal. *BIS Working Papers*, 292, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/292.html>
- Borio, C., & Disyatat, P. (2011). Global imbalances and the financial crisis: Link or no link? *BIS Working Papers*, 346, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/346.html>
- Borio, C., Disyatat, P., Juselius, M., & Rungcharoenkitkul, P. (2018). Monetary policy in the grip of a pincer movement. *BIS Working Papers*, 706, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/706.html>
- Borio, C., & Drehmann, M. (2009a). Assessing the risk of banking crises - revisited. *BIS Quarterly Review*, Bank for International Settlements, March. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/0903e.html>
- Borio, C., & Drehmann, M. (2009b). Towards an operational framework for financial stability: "fuzzy" measurement and its consequences. *BIS Working Papers*, 284, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/284.html>
- Borio, C., Drehmann, M., & Tsatsaronis, K. (2012). Characterising the financial cycle: don't lose sight of the medium term! *BIS Working Papers*, 380, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/380.html>
- Borio, C., English, W., & Filardo, A. (2003). A tale of two perspectives: old or new challenges for monetary policy? *BIS Papers chapters*, 19, 1–59. Retrieved from <https://ideas.repec.org/h/bis/bisbpc/19-01.html>
- Borio, C., Furfine, C., & Lowe, P. (2001). Procyclicality of the financial system and financial stability: issues and policy options. *BIS Papers chapters*, in: *Bank for International Settlements (ed.), Marrying the macro- and micro-prudential dimensions of financial stability*, 1, 1–57, Bank for International Settlements. Retrieved from <https://ideas.repec.org/h/bis/bisbpc/01-01.html>

REFERENCES

- Borio, C., & Lowe, P. (2002). Asset prices, financial and monetary stability: exploring the nexus. *BIS Working Papers*, 114, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/114.html>
- Borio, C., McCauley, R., & McGuire, P. (2011). Global credit and domestic credit booms. *BIS Quarterly Review*, Bank for International Settlements, September. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1109f.html>
- Borio, C., & Shim, I. (2007). What can (macro-)prudential policy do to support monetary policy? *BIS Working Papers*, 242, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/242.html#author-abstract>
- Borio, C., & White, W. R. (2004). Whither monetary and financial stability? the implications of evolving policy regimes. *BIS Working Papers*, 147, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/147.html>
- Borio, C., & Zhu, H. (2012). Capital regulation, risk-taking and monetary policy: A missing link in the transmission mechanism? *Journal of Financial Stability*, 8(4), 236–251. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308911000611> doi: 10.1016/J.JFS.2011.12.003
- Bouvatier, V., López-Villavicencio, A., & Mignon, V. (2014). Short-run dynamics in bank credit: Assessing nonlinearities in cyclicity. *Economic Modelling*, 37, 127–136. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0264999313004549> doi: 10.1016/j.econmod.2013.10.027
- Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77(3), 483–527. Retrieved from <https://ideas.repec.org/a/eee/jfinec/v77y2005i3p483-527.html>
- Brissimis, S. N., & Vlassopoulos, T. (2009). The Interaction between Mortgage Financing and Housing Prices in Greece. *The Journal of Real Estate Finance and Economics*, 39(2), 146–164. Retrieved from <http://link.springer.com/10.1007/s11146-008-9109-3> doi: 10.1007/s11146-008-9109-3
- Brunnermeier, M., Gorton, G., & Krishnamurthy, A. (2013). Liquidity Mismatch Measurement. *NBER Chapters*, in: *Risk Topography: Systemic Risk and Macro Modeling*, 99–112, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/h/nbr/nberch/12514.html>
- Brunnermeier, M., Langfield, S., Pagano, M., Reis, R., Van Nieuwerburgh, S., & Vayanos, D. (2017). ESBies: safety in the tranches. *Economic Policy*, 32(90), 175–219. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1093/epolic/eix004> doi: 10.1093/epolic/eix004
- Bruno, V., & Shin, H. S. (2015). Cross-Border Banking and Global Liquidity. *The Review of Economic Studies*, 82(2), 535–564. Retrieved from <https://academic.oup.com/restud/article-lookup/doi/10.1093/restud/rdu042> doi: 10.1093/restud/rdu042
- Brzoza-Brzezina, M., Kolasa, M., & Makarski, K. (2013). Macroprudential policy instruments and economic imbalances in the euro area. *Working Paper Series*, 1589, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20131589.html>
- Brzoza-Brzezina, M., Kolasa, M., & Makarski, K. (2015). Macroprudential policy and imbalances in the euro area. *Journal of International Money and Finance*, 51, 137–154. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0261560614001636> doi: 10.1016/j.jimonfin.2014.10.004

- Buch, C. M., & Goldberg, L. S. (2017). Cross-Border Prudential Policy Spillovers: How Much? How Important? Evidence from the International Banking Research Network. *International Journal of Central Banking*, 13(2), 505–558. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2017q1a1.html>
- Budnik, K., & Kleibl, J. (2018). Macroprudential regulation in the European Union in 1995–2014: introducing a new data set on policy actions of a macroprudential nature. *Working Paper Series*, 2123, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20182123.html>
- Bussière, M., Schmidt, J., & Vinas, F. (2017). International Banking and Cross-Border Effects of Regulation: Lessons from France. *International Journal of Central Banking*, 13(2), 163–193. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2017q1a6.html>
- Cai, J., Eidam, F., Saunders, A., & Steffen, S. (2018). Syndication, interconnectedness, and systemic risk. *Journal of Financial Stability*, 34, 105–120. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308917303698> doi: 10.1016/J.JFS.2017.12.005
- Calderon, C., & Kubota, M. (2012). Gross inflows gone wild : gross capital inflows, credit booms and crises. *Policy Research Working Paper Series*, 6270, The World Bank. Retrieved from <https://ideas.repec.org/p/wbk/wbrwps/6270.html>
- Calza, A., Manrique, M., & Sousa, J. (2006). Credit in the euro area: An empirical investigation using aggregate data. *The Quarterly Review of Economics and Finance*, 46(2), 211–226. Retrieved from <https://ideas.repec.org/a/eee/quaeco/v46y2006i2p211-226.html>
- Caruana, J., & Cohen, B. H. (2014). Five questions and six answers about macroprudential policy. *Financial Stability Review*(18), 15–24. Retrieved from <https://ideas.repec.org/a/bfr/fisrev/20141802.html>
- Catão, L. A., & Milesi-Ferretti, G. M. (2014). External liabilities and crises. *Journal of International Economics*, 94(1), 18–32. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199614000713> doi: 10.1016/J.JINTECO.2014.05.003
- Cerutti, E., Claessens, S., & Laeven, L. (2017). The use and effectiveness of macroprudential policies: New evidence. *Journal of Financial Stability*, 28, 203–224. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308915001035> doi: 10.1016/J.JFS.2015.10.004
- Cerutti, E., Claessens, S., & Rose, A. (2017). How Important is the Global Financial Cycle? Evidence from Capital Flows. *IMF Working Papers*, 17/193, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/17-193.html>
- Chang, R., & Velasco, A. (2001). A Model of Financial Crises in Emerging Markets. *The Quarterly Journal of Economics*, 116(2), 489–517. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.1162/00335530151144087> doi: 10.1162/00335530151144087
- Ciccarelli, M., Maddaloni, A., & Peydró, J.-L. (2013). Heterogeneous transmission mechanism: monetary policy and financial fragility in the eurozone. *Economic Policy*, 28(75), 459–512. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1111/1468-0327.12015> doi: 10.1111/1468-0327.12015
- Cizel, J., Frost, J., Houben, A. C. F. J., Wierds, P., Cizel, J., Frost, J., ... Wierds, P. (2016). Effective macroprudential policy: Cross-sector substitution from price and quantity measures. *DNB Working Papers*, 498, Netherlands Central Bank, Research Department. Retrieved from <https://econpapers.repec.org/paper/dnbdnbwpp/498.htm>

REFERENCES

- Claessens, S., Ghosh, S. R., & Mihet, R. (2013). Macro-prudential policies to mitigate financial system vulnerabilities. *Journal of International Money and Finance*, 39, 153–185. Retrieved from <https://www.sciencedirect.com/science/article/pii/S026156061300096X> doi: 10.1016/J.JIMONFIN.2013.06.023
- Clement, P. (2010). The term “macroprudential”: origins and evolution. *BIS Quarterly Review*, Bank for International Settlements, March. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1003h.html#{#}author-abstract>
- Coeurdacier, N., & Martin, P. (2009). The geography of asset trade and the euro: Insiders and outsiders. *Journal of the Japanese and International Economies*, 23(2), 90–113. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0889158308000579> doi: 10.1016/J.JJIE.2008.11.001
- Collard, F., Dellas, H., Diba, B., & Loisel, O. (2017). Optimal Monetary and Prudential Policies. *American Economic Journal: Macroeconomics*, 9(1), 40–87. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/mac.20140139> doi: 10.1257/mac.20140139
- Corsetti, G., Kuester, K., Meier, A., & Müller, G. J. (2013). Sovereign Risk, Fiscal Policy, and Macroeconomic Stability. *Economic Journal*, 99–132. Retrieved from <https://ideas.repec.org/a/ecj/econj1/vy2013ipf99-f132.html>
- Coupey-Soubeyran, J., & Dehmej, S. (2016). Pour une combinaison politique monétaire / politique macroprudentielle au service de la stabilité économique et financière de la zone euro. *Revue d'économie politique*, 126(1), 3–31. Retrieved from https://ideas.repec.org/a/cai/repdal/redp_{_}261_{_}0003.html
- Crockett, A. (1996). The theory and practice of financial stability. *De Economist*, 144(4), 531–568. Retrieved from <http://link.springer.com/10.1007/BF01371939> doi: 10.1007/BF01371939
- Crowe, C., & Meade, E. E. (2008). Central bank independence and transparency: Evolution and effectiveness. *European Journal of Political Economy*, 24(4), 763–777. Retrieved from <https://ideas.repec.org/a/eee/poleco/v24y2008i4p763-777.html>
- Cúrdia, V., & Woodford, M. (2011). The central-bank balance sheet as an instrument of monetary policy. *Journal of Monetary Economics*, 58(1), 54–79. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S0304393210001224> doi: 10.1016/J.JMONECO.2010.09.011
- Damar, H. E., & Mordel, A. (2017). International Banking and Cross-Border Effects of Regulation: Lessons from Canada. *International Journal of Central Banking*, 13(2), 35–64. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2017q1a2.html>
- Darracq-Pariès, M., Kok, C., & Rancoita, E. (2019). Macroprudential policy in a monetary union with cross-border banking. *Working Paper Series*, 2260, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20192260.html>
- Darracq-Pariès, M., & De Santis, R. A. (2015). A non-standard monetary policy shock: The ECB's 3-year LTROs and the shift in credit supply. *Journal of International Money and Finance*, 54, 1–34. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560615000261> doi: 10.1016/J.JIMONFIN.2015.02.011
- Darracq-Pariès, M., Sørensen, C. K., & Rodriguez-Palenzuela, D. (2011). Macroeconomic propagation under different regulatory regimes: Evidence from an estimated DSGE model for the euro area. *International Journal of Central Banking*, 7(4), 49–112. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2011q4a3.html>

- De Grauwe, P., & Mongelli, F. (2005). Endogeneities of Optimum Currency Areas: What brings Countries Sharing a Single Currency Closer together? *Working Paper Series*, 468, European Central Bank. Retrieved from <https://econpapers.repec.org/paper/avewpaper/292005.htm>
- De Groen, W. P., & Gros, D. (2015). Estimating the Bridge Financing Needs of the Single Resolution Fund: How expensive is it to resolve a bank? *CEPS Special Reports*, 122. Retrieved from www.ceps.eu
- De Larosiere, J., Balcerowicz, L., Issing, O., Masera, R., McCarthy, C., Nyberg, L., ... Ruding, O. (2009). *Report of the high-level group on financial supervision in the EU*. (Tech. Rep.).
- De Nicrolo, G., Favara, G., & Ratnovski, L. (2012). Externalities and Macroprudential Policy. *IMF Staff Discussion Notes*, 12/05, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfsdn/12-05.html>
- De Santis, R. A., & Stein, M. (2016). Correlation changes between the risk-free rate and sovereign yields of euro area countries. *Working Paper Series*, 1979, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20161979.html>
- Decressin, J., & Fatas, A. (1995). Regional labor market dynamics in Europe. *European Economic Review*, 39(9), 1627–1655. Retrieved from <https://ideas.repec.org/a/eee/eecrev/v39y1995i9p1627-1655.html>
- Dehmej, S., & Gambacorta, L. (2017). Macroprudential Policy in a Monetary Union. *Document de travail*, 2017-4. Retrieved from <https://ideas.repec.org/p/ris/bkamdt/2017-004.html>
- Delis, M. D., & Kouretas, G. P. (2011). Interest rates and bank risk-taking. *Journal of Banking & Finance*, 35(4), 840–855. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426610003961> doi: 10.1016/J.JBANKFIN.2010.09.032
- Dell’Ariccia, G. (2010). Monetary Policy and Bank Risk-Taking. *IMF Staff Position Notes*. Retrieved from <https://ideas.repec.org/p/imf/imfspn/2010-09.html>
- Dell’Ariccia, G., Igan, D., Laeven, L., & Tong, H. (2016). Credit booms and macrofinancial stability. *Economic Policy*, 31(86), 299–355. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1093/epolic/eiw002> doi: 10.1093/epolic/eiw002
- Dell’Ariccia, G., Ivan, D., & Laeven, L. (2012). Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market. *Journal of Money, Credit and Banking*, 44(2-3), 367–384. Retrieved from <http://doi.wiley.com/10.1111/j.1538-4616.2011.00491.x> doi: 10.1111/j.1538-4616.2011.00491.x
- Dell’ariccia, G., Laeven, L., & Suarez, G. A. (2017). Bank Leverage and Monetary Policy’s Risk-Taking Channel: Evidence from the United States. *Journal of Finance*, 72(2), 613–654. Retrieved from <http://doi.wiley.com/10.1111/jofi.12467> doi: 10.1111/jofi.12467
- Demirguc-Kunt, A., & Detragiache, E. (1998). Financial Liberalization and Financial Fragility. *IMF Working Papers*, 98/83, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/98-83.html>
- Dia, E., & VanHoose, D. (2017). Banking in macroeconomic theory and policy. *Journal of Macroeconomics*, 54, 149–160. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0164070417303075> doi: 10.1016/J.JMACRO.2017.07.009

REFERENCES

- Diamond, D. W., & Dybvig, P. H. (1983). Bank Runs, Deposit Insurance, and Liquidity. *Journal of Political Economy*, 91(3), 401–419. Retrieved from <https://www.journals.uchicago.edu/doi/10.1086/261155> doi: 10.1086/261155
- Dickerson, A. P., Gibson, H. D., & Tsakalotos, E. (1998). Business Cycle Correspondence in the European Union. *Empirica*, 25(1), 49–75. Retrieved from <http://link.springer.com/10.1023/A:1006888704954> doi: 10.1023/A:1006888704954
- Dincer, N. N., & Eichengreen, B. (2014). Central Bank Transparency and Independence: Updates and New Measures. *International Journal of Central Banking*, 10(1), 189–259. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2014q1a6.html>
- Disyatat, P. (2010). The bank lending channel revisited. *BIS Working Papers*, 297, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/297.html>
- Drehmann, M., Borio, C., & Tsatsaronis, K. (2011). Anchoring Countercyclical Capital Buffers: The role of Credit Aggregates. *International Journal of Central Banking*, 7(4), 189–240. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2011q4a8.html>
- Drehmann, M., & Tarashev, N. (2011). Systemic importance: some simple indicators. *BIS Quarterly Review*, Bank for International Settlements, March. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1103e.html{#}author-abstract>
- Drehmann, M., & Tsatsaronis, K. (2014). The credit-to-GDP gap and countercyclical capital buffers: questions and answers. *BIS Quarterly Review*, Bank for International Settlements, March. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1403g.html>
- Ebrahimi Kahou, M., & Lehar, A. (2017). Macroprudential policy: A review. *Journal of Financial Stability*, 29, 92–105. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S1572308916302297> doi: 10.1016/j.jfs.2016.12.005
- Egawa, E., Otani, A., & Sakiyama, T. (2015). What Determines Institutional Arrangements for Macroprudential Policy? *IMES Discussion Paper Series*, 15-E-03, Institute for Monetary and Economic Studies, Bank. Retrieved from <https://ideas.repec.org/p/ime/imedps/15-e-03.html>
- Eichengreen, B., & Adalet, M. (2005). Current Account Reversals: Always a Problem? *NBER Working Papers*, 11634, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/11634.html>
- Eichengreen, B., Jung, N., Moch, S., & Mody, A. (2014). The Eurozone Crisis: Phoenix Miracle or Lost Decade? *Journal of Macroeconomics*, 39, 288–308. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0164070413001274> doi: 10.1016/J.JMACRO.2013.08.005
- Ersal-Kiziler, E., & Nguyen, H. (2016). Euro currency risk and the geography of debt flows to peripheral EMU. *Journal of International Money and Finance*, 68, 1–20. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560616300596> doi: 10.1016/J.JIMONFIN.2016.06.013
- ESRB. (2014). Flagship Report on Macro-prudential Policy in the Banking Sector No Title. , European Systemic Risk Board.
- ESRB. (2018a). EU Shadow Banking Monitor. , 3, September 2018, European Systemic Risk Board.

- ESRB. (2018b). EU Shadow Banking Monitor. , 3, September 2018, European Systemic Risk Board.
- European Commission. (2005). Financial Services Policy 2005-2010. *White Paper, SEC(2005)*, Commission of the European Communities.
- Evrard, J., Jahn, N., Melo, A. S., & Zsámboki, B. (2018). Targeted review of the macroprudential framework. *Macroprudential Bulletin*, 5, European Central Bank. Retrieved from <https://ideas.repec.org/a/ecb/ecmbu/201800053.html>
- Fahr, S., & Żochowski, D. (2015). A Framework for Analysing and Assessing Cross-Border Spillovers from Macroprudential Policies. *Financial Stability Review*, 1, European Central Bank. Retrieved from <https://ideas.repec.org/a/ecb/fsrart/201500011.html>
- Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25(2), 383–417. Retrieved from <https://ideas.repec.org/a/bla/jfinan/v25y1970i2p383-417.html>
- Farhi, E., & Tirole, J. (2018). Deadly Embrace: Sovereign and Financial Balance Sheets Doom Loops. *The Review of Economic Studies*, 85(3), 1781–1823. Retrieved from <https://academic.oup.com/restud/article/85/3/1781/4563322> doi: 10.1093/restud/rdx059
- Farhi, E., & Werning, I. (2016). A Theory of Macroprudential Policies in the Presence of Nominal Rigidities. *Econometrica*, 84, 1645–1704. Retrieved from <https://ideas.repec.org/a/wly/emetrp/v84y2016ip1645-1704.html>
- Farhi, E., & Werning, I. (2017). Fiscal Unions. *American Economic Review*, 107(12), 3788–3834. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.20130817> doi: 10.1257/aer.20130817
- Favilukis, J., Kohn, D., Ludvigson, S., & Van Nieuwerburgh, S. (2012). International Capital Flows and House Prices: Theory and Evidence. *NBER Working Papers*, 17751, National Bureau of Economic Research, Inc. Retrieved from <http://www.nber.org/papers/w17751.pdf> doi: 10.3386/w17751
- Fergusson, R. (2002). Should financial stability be an explicit central bank objective? *Challenges to Central Banking from Globalized Financial Systems*, Conference at the IMF in Washington, D.C., Septemb.
- Fernández-Villaverde, J., Garicano, L., & Santos, T. (2013). Political Credit Cycles: The Case of the Eurozone. *Journal of Economic Perspectives*, 27(3), 145–166. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/jep.27.3.145> doi: 10.1257/jep.27.3.145
- Filardo, A., & Rungcharoenkitkul, P. (2016). A quantitative case for leaning against the wind. *BIS Working Papers*, 594, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/594.html>
- Fisher, I. (1933). The Debt- Deflation Theory of Great Depressions. *Econometrica*, 1(4), 337–57.
- Foot, M. (2003). What is financial stability and how do we get it? *The Roy Bridge Memorial Lecture*, United Kingdom Financial Services Authority, April.
- Forbes, K., Reinhardt, D., & Wieladek, T. (2017). The spillovers, interactions, and (un)intended consequences of monetary and regulatory policies. *Journal of Monetary Economics*, 85, 1–22. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0304393216301106> doi: 10.1016/j.jmoneco.2016.10.008

REFERENCES

- Francis, W. B., & Osborne, M. (2012). Capital requirements and bank behavior in the UK: Are there lessons for international capital standards? *Journal of Banking & Finance*, 36(3), 803–816. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426611002652> doi: 10.1016/J.JBANKFIN.2011.09.011
- Frankel, J. A., & Rose, A. K. (1998). The Endogeneity of the Optimum Currency Area Criteria. *Economic Journal*, 108(449), 1009–1025. Retrieved from <https://ideas.repec.org/a/ecj/econjl/v108y1998i449p1009-25.html>
- Freeman, J., & Rossi, J. (2012). Agency coordination in shared regulatory space. *Harvard Law Review*, 125(5), 1131. Retrieved from https://heinonline.org/hol-cgi-bin/get_{-}pdf.cgi?handle=hein.journals/hlr125{&}section=58
- Freund, C., & Warnock, F. (2005). Current Account Deficits in Industrial Countries: The Bigger They are, the Harder They Fall? *NBER Working Papers*, 11823, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/11823.html>
- FSB. (2014a). Peer Review of Germany. *Review Report*, 9 April 20, Financial Stability Board. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- FSB. (2014b). Peer Review of the Netherlands. *Review Report*, 11 November, Financial Stability Board. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- FSB. (2017). Peer Review of France. *Review Report*, 20 July 20, Financial Stability Board. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- Fund, I. M. (2010). European Financial Linkages; A New Look At Imbalances. *IMF Working Papers*, 10/295, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/10-295.html>
- Furceri, D., & Zdzienicka, A. (2015). The Euro Area Crisis: Need for a Supranational Fiscal Risk Sharing Mechanism? *Open Economies Review*, 26(4), 683–710. Retrieved from <http://link.springer.com/10.1007/s11079-015-9347-y> doi: 10.1007/s11079-015-9347-y
- Gabrieli, S., Labonne, C., Gabrieli, S., & Labonne, C. (2018). Bad Sovereign or Bad Balance Sheets? Euro Interbank Market Fragmentation and Monetary Policy, 2011-2015. *Working papers*, 687, Banque de France. Retrieved from <https://econpapers.repec.org/paper/bfrbanfra/687.htm>
- Galati, G., & Moessner, R. (2018). What Do We Know About the Effects of Macroprudential Policy? *Economica*, 85(340), 735–770. Retrieved from <http://doi.wiley.com/10.1111/ecca.12229> doi: 10.1111/ecca.12229
- Gali, J. (2008). *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework*. Princeton: Princeton University Press.
- Gambacorta, L. (2009). Monetary policy and the risk-taking channel. *BIS Quarterly Review*, Bank for International Settlements, December. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/0912f.html{#}author-abstract>
- Gambacorta, L., & Signoretti, F. M. (2014). Should monetary policy lean against the wind?: An analysis based on a DSGE model with banking. *Journal of Economic Dynamics and*

- Control*, 43, 146–174. Retrieved from <https://www.sciencedirect.com/science/article/pii/S016518891400027X> doi: 10.1016/J.JEDC.2014.01.016
- Garcia-de Andoain, C., Heider, F., Hoerova, M., & Manganelli, S. (2016). Lending-of-last-resort is as lending-of-last-resort does: Central bank liquidity provision and interbank market functioning in the euro area. *Journal of Financial Intermediation*, 28, 32–47. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1042957316000103> doi: 10.1016/j.jfi.2016.01.003
- Garcia-de Andoain, C., Hoffmann, P., & Manganelli, S. (2014). Fragmentation in the Euro overnight unsecured money market. *Economics Letters*, 125(2), 298–302. Retrieved from <https://www.sciencedirect.com/science/article/pii/S016517651400353X> doi: 10.1016/J.ECONLET.2014.09.017
- Garcia-de Andoain, C., & Kremer, M. (2018). Beyond spreads: measuring sovereign market stress in the euro area. *Working Paper Series*. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20182185.html>
- García-Posada, M., & Marchetti, M. (2016). The bank lending channel of unconventional monetary policy: The impact of the VLTROs on credit supply in Spain. *Economic Modelling*, 58, 427–441. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0264999316301274> doi: 10.1016/J.ECONMOD.2016.05.002
- Garicano, L. (2012). *Five lessons from the Spanish cajas debacle for a new euro-wide supervisor* — VOX, CEPR Policy Portal. Retrieved 2019-04-02, from <https://voxeu.org/article/five-lessons-spanish-cajas-debacle-new-euro-wide-supervisor>
- Garicano, L., & Lastra, R. M. (2010). Towards a New Architecture for Financial Stability: Seven Principles. *Journal of International Economic Law*, 13(3), 597–621. Retrieved from <https://academic.oup.com/jiel/article-lookup/doi/10.1093/jiel/jgq041> doi: 10.1093/jiel/jgq041
- Gauthier, C., Lehar, A., & Souissi, M. (2012). Macroprudential capital requirements and systemic risk. *Journal of Financial Intermediation*, 21(4), 594–618. Retrieved from <https://www.sciencedirect.com/science/article/pii/S104295731200006X> doi: 10.1016/J.JFI.2012.01.005
- Gerali, A., Neri, S., Sessa, L., & Signoretti, F. M. (2010). Credit and banking in a DSGE model of the Euro area. *Journal of Money, Credit and Banking*, 42(SUPPL. 1), 107–141. Retrieved from <http://doi.wiley.com/10.1111/j.1538-4616.2010.00331.x> doi: 10.1111/j.1538-4616.2010.00331.x
- Gerdrup, K. R., Hansen, F., Krogh, T., & Maih, J. (2017). Leaning Against the Wind When Credit Bites Back. *International Journal of Central Banking*, 13(3), 287–320. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2017q3a8.html>
- Gertler, M., & Gilchrist, S. (1994). Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms. *The Quarterly Journal of Economics*, 109(2), 309–340. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.2307/2118465> doi: 10.2307/2118465
- Giavazzi, F., & Spaventa, L. (2010). Why the current account may matter in a monetary union: Lessons from the financial crisis in the Euro area. *CEPR Discussion Papers*, 8008. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/8008.html>

REFERENCES

- Giesecke, K., & Kim, B. (2011). Systemic Risk: What Defaults Are Telling Us. *Management Science*, 57(8), 1387–1405. Retrieved from <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.1110.1375> doi: 10.1287/mnsc.1110.1375
- Goldstein, I. (2005). Strategic Complementarities and the Twin Crises. *The Economic Journal*, 115(503), 368–390. Retrieved from <https://academic.oup.com/ej/article/115/503/368-390/5085675> doi: 10.1111/j.1468-0297.2005.00993.x
- Goodhart, C. (2007). Whatever became of the Monetary Aggregates? *FMG Special Papers*, 172, Financial Markets Group. Retrieved from <https://ideas.repec.org/p/fmg/fmgsp/sp172.html>
- Goodhart, C., & Hofmann, B. (2008). House prices, money, credit, and the macroeconomy. *Oxford Review of Economic Policy*, 24(1), 180–205. Retrieved from <https://academic.oup.com/oxrep/article-lookup/doi/10.1093/oxrep/grn009> doi: 10.1093/oxrep/grn009
- Goodhart, C., & Schoenmaker, D. (2009). Fiscal Burden Sharing in Cross-Border Banking Crises. *International Journal of Central Banking*, 5(1), 141–165. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2009q1a5.html>
- Gopinath, G., Kalemli-Ozcan, S., Karabarbounis, L., & Villegas-Sanchez, C. (2017). Capital allocation and productivity in south europe. *Quarterly Journal of Economics*, 132(4), 1915–1967. Retrieved from <http://academic.oup.com/qje/article/132/4/1915/3871448> doi: 10.1093/qje/qjx024
- Gouriéroux, C., Héam, J.-C., & Monfort, A. (2012). Bilateral exposures and systemic solvency risk. *Canadian Journal of Economics*, 45(4), 1273–1309. Retrieved from <https://ideas.repec.org/a/cje/issued/v45y2012i4p1273-1309.html>
- Gourinchas, P.-O., & Obstfeld, M. (2012). Stories of the Twentieth Century for the Twenty-First. *American Economic Journal: Macroeconomics*, 4(1), 226–265. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/mac.4.1.226> doi: 10.1257/mac.4.1.226
- Greenwood, R., Landier, A., & Thesmar, D. (2015). Vulnerable banks. *Journal of Financial Economics*, 115(3), 471–485. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0304405X14002529> doi: 10.1016/J.JFINECO.2014.11.006
- Grilli, V., Masciandaro, D., & Tabellini, G. (1992). Erratum: Political and Monetary Institutions and Public Financial Policies in the Industrial Countries. *Economic Policy*, 7(14), 265. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.2307/1344517> doi: 10.2307/1344517
- Gros, D., & Baldwin, R. (2015). What caused the eurozone crisis? *CEPS Papers*, 11129, Centre for European Policy Studies. Retrieved from <https://ideas.repec.org/p/eps/cepswp/11129.html>
- Gros, D., & Schoenmaker, D. (2014). European deposit insurance and resolution in the banking union. *Journal of Common Market Studies*, 52(3), 529–546. Retrieved from <http://doi.wiley.com/10.1111/jcms.12124> doi: 10.1111/jcms.12124
- Grossman, G. M., & Helpman, E. (1994). Protection for Sale. *American Economic Review*, 84(4), 833–850. Retrieved from <https://ideas.repec.org/a/aea/aecrev/v84y1994i4p833-50.html>
- Gurley, J., & Shaw, E. (1955). Financial Aspects of Economic Development. *American Economic Review*, 45(4), 515–538.

- Gurley, J., & Shaw, E. S. (1956). Financial Intermediaries and the Saving-Investment Process. *The Journal of Finance*, 11(2), 257–276. Retrieved from <http://doi.wiley.com/10.1111/j.1540-6261.1956.tb00707.x> doi: 10.2307/2976705
- Guttentag, J., & Herring, R. (1984). Credit Rationing and Financial Disorder. *Journal of Finance*, 39(5), 1359–1382. Retrieved from <https://ideas.repec.org/a/bla/jfinan/v39y1984i5p1359-82.html>
- Haldane, A. G., Hoggarth, G., Saporta, V., & Sinclair, P. (2005). Financial Stability and Bank Solvency. *World Scientific Book Chapters, in: Systemic Financial Crises Resolving Large Bank Insolvencies, chapter 7*, 83–113, World Scientific Publishing Co. Pte. Ltd. Retrieved from http://www.worldscientific.com/doi/abs/10.1142/9789812569479_{_}0007 doi: 10.1142/9789812569479_0007
- Hale, G., & Obstfeld, M. (2016). The euro and the geography of international debt flows. *Journal of the European Economic Association*, 14(1), 115–144. Retrieved from <https://academic.oup.com/jeea/article-lookup/doi/10.1111/jeea.12160> doi: 10.1111/jeea.12160
- Hatzius, J., Hooper, P., Mishkin, F. S., Schoenholtz, K. L., & Watson, M. W. (2010). Financial Conditions Indexes: A Fresh Look after the Financial Crisis. *NBER Working Papers*, 16150, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/16150.html>
- Hayek, F. A. (1933). *Monetary Theory and the Trade Cycle*. , Translated by N. Kaldor and HM Croome. London, Tor.
- Heid, F., Porath, D., & Stolz, S. (2004). Does capital regulation matter for bank behaviour? Evidence for German savings banks. *Discussion Paper Series 2: Banking and Financial Studies, 2004/03*, Deutsche Bundesbank. Retrieved from <https://ideas.repec.org/p/zbw/bubdp2/4252.html>
- Heider, F., Saidi, F., & Schepens, G. (2018). Life below zero: bank lending under negative policy rates. *Working Paper Series*, 2173, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20182173.html>
- Heimberger, P., & Kapeller, J. (2017). The performativity of potential output: pro-cyclicality and path dependency in coordinating European fiscal policies. *Review of International Political Economy*, 24(5), 904–928. Retrieved from <https://www.tandfonline.com/doi/full/10.1080/09692290.2017.1363797> doi: 10.1080/09692290.2017.1363797
- Hjortsoe, I. (2016). Imbalances and fiscal policy in a monetary union. *Journal of International Economics*, 102, 225–241. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199616300800> doi: 10.1016/J.JINTECO.2016.07.002
- Hobza, A., & Zeugner, S. (2014). Current accounts and financial flows in the euro area. *Journal of International Money and Finance*, 48, 291–313. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560614000965> doi: 10.1016/J.JIMONFIN.2014.05.019
- Hoffmann, M., Maslov, E., Sørensen, B. E., & Stewen, I. (2018). Are Banking and Capital Markets Union Complements? Evidence from Channels of Risk Sharing in the Eurozone. *CEPR Discussion Papers*(13254), C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/13254.html>
- Hofmann, B. (2001). The determinants of private sector credit in industrialised countries: do property prices matter? *BIS Working Papers*, 108, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/108.html{#}author-abstract>

REFERENCES

- Hofmann, B., & Peersman, G. (2017). Is there a debt service channel of monetary transmission? *BIS Quarterly Review*, Bank for International Settlements, December. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1712e.html>
- Hope, D. (2016). Estimating the effect of the EMU on current account balances: A synthetic control approach. *European Journal of Political Economy*, 44, 20–40. Retrieved from <https://www.sciencedirect.com/science/article/pii/S017626801630012X> doi: 10.1016/J.EJPOLECO.2016.05.002
- Hoshi, T., & Kashyap, A. (2015). Will the U.S. and Europe Avoid a Lost Decade? Lessons from Japan's Postcrisis Experience. *IMF Economic Review*, 63(1), 110–163. Retrieved from <https://econpapers.repec.org/article/palimfecr/v{ }3a63{ }3ay{ }3a2015{ }3ai{ }3a1{ }3ap{ }3a110-163.htm>
- Hott, C. (2011). Lending behavior and real estate prices. *Journal of Banking & Finance*, 35(9), 2429–2442. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426611000574> doi: 10.1016/J.JBANKFIN.2011.02.001
- Howarth, D., & Quaglia, L. (2014). The Steep Road to European Banking Union: Constructing the Single Resolution Mechanism. *Journal of Common Market Studies*, 52(SUPPL.1), 125–140. Retrieved from <http://doi.wiley.com/10.1111/jcms.12178> doi: 10.1111/jcms.12178
- Hume, M., & Sentance, A. (2009). The global credit boom: Challenges for macroeconomics and policy. *Journal of International Money and Finance*, 28(8), 1426–1461. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560609000989> doi: 10.1016/J.JIMONFIN.2009.08.009
- Iacoviello, M. (2005). House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle. *American Economic Review*, 95(3), 739–764. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/0002828054201477> doi: 10.1257/0002828054201477
- IMF. (2011). Macroprudential Policy; What Instruments and How to Use them? Lessons From Country Experiences. *IMF Working Papers*, 11/238, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/11-238.html>
- IMF. (2013). Austria : Financial Sector Stability Assessment. *IMF Country Report*, 13/283, September 2013, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2014). Austria: Publication of Financial Sector Assessment Program Documentation—Detailed Assessment of Basel Core Principles for Effective Banking Supervision. *IMF Country Report*, 14/13, International Monetary Fund.
- IMF. (2016a). Germany: Financial System Stability Assessment. *IMF Country Report*, 16/189, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2016b). Ireland: Financial Sector Assessment Program Technical Note- Macroprudential Policy Framework. *IMF Country Report*, 16/316, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2017a). Finland: Financial Sector Assessment Program Technical Note- Macroprudential Policy Framework. *IMF Country Report*, 17/5, International Monetary Fund.

- Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2017b). Kingdom of the Netherlands: Financial Sector Assessment Program Technical Note- Macprudential Policy Framework. *IMF Country Report, 17/93*, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2017c). Spain: Financial Sector Assessment Program Technical Note-Institutional Arrangements for Financial Sector Oversight. *IMF Country Report, 17/93*, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2018). Belgium: Financial Sector Stability Assessment. *IMF Country Report, 18/67*, International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Austria-Financial-Sector-Stability-Assessment-40933>
- IMF. (2019). World Economic Outlook Update: A Weakening Global Expansion. , International Monetary Fund, January 2019.
- IMF-FSB-BIS. (2011). Macroprudential policy tools and frameworks. *Progress Report to G20*. Retrieved from <https://www.bis.org/publ/othp17.htm>
- IMF-FSB-BIS. (2016). Elements of effective macroprudential policies - lessons from international experience. *Report prepared for the G20 Leader's Summit in Hangzhou*, 31 August 2016. Retrieved from <https://www.bis.org/publ/othp26.htm>
- In 't Veld, J., Pataracchia, B., Ratto, M., & Roeger, W. (2014). International capital flows and the boom-bust cycle in Spain. *Journal of International Money and Finance*, 48, 314–335. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560614000989> doi: 10.1016/J.JIMONFIN.2014.05.021
- Issing, O. (2011). Lessons for Monetary Policy; What Should the Consensus Be? *IMF Working Papers, 11/97*. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/11-97.html>
- Issing, O. (2018). *The uncertain future of central bank independence*. Retrieved 2019-04-02, from <https://voxeu.org/article/uncertain-future-central-bank-independence>
- Jacques, K. T. (2008). Capital shocks, bank asset allocation, and the revised Basel Accord. *Review of Financial Economics*, 17(2), 79–91. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1058330007000249> doi: 10.1016/J.RFE.2007.03.003
- Jakab, Z. M., & Kumhof, M. (2015). Banks are not intermediaries of loanable funds – and why this matters. *Bank of England working papers, 529*, Bank of England. Retrieved from <https://econpapers.repec.org/paper/boeboeewp/0529.htm>
- Jeanne, O. (2014). Macroprudential Policies in a Global Perspective. *NBER Working Papers, 19967*, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/19967.html>
- Jeanne, O., & Korinek, A. (2010). Managing Credit Booms and Busts: A Pigouvian Taxation Approach. *NBER Working Papers, 16377*, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/16377.html>
- Jeanneau, S. (2014). Financial Stability Objectives and Arrangements – What's New? *BIS Papers, 76*, Bank for International Settlements. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2474021

REFERENCES

- Jiménez, G., Ongena, S., Peydró, J., & Saurina, J. (2014). Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk-Taking? *Econometrica*, 82(2), 463–505. Retrieved from <http://doi.wiley.com/10.3982/ECTA10104> doi: 10.3982/ECTA10104
- Jiménez, G., Ongena, S., Peydró, J.-L., & Saurina, J. (2012). Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications. *American Economic Review*, 102(5), 2301–2326. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.102.5.2301> doi: 10.1257/aer.102.5.2301
- Jiménez, G., Ongena, S., Peydró, J.-L., & Saurina, J. (2017). Macroprudential Policy, Countercyclical Bank Capital Buffers, and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments. *Journal of Political Economy*, 125(6), 2126–2177. Retrieved from <https://www.journals.uchicago.edu/doi/10.1086/694289> doi: 10.1086/694289
- Jobst, A. A. (2014). Measuring systemic risk-adjusted liquidity (SRL)—A model approach. *Journal of Banking & Finance*, 45, 270–287. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426614001393> doi: 10.1016/J.JBANKFIN.2014.04.013
- Jokipii, T., & Milne, A. (2011). Bank capital buffer and risk adjustment decisions. *Journal of Financial Stability*, 7(3), 165–178. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308910000203> doi: 10.1016/J.JFS.2010.02.002
- Jokipii, T., & Monnin, P. (2013). The impact of banking sector stability on the real economy. *Journal of International Money and Finance*, 32, 1–16. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560612000496> doi: 10.1016/J.JIMONFIN.2012.02.008
- Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review*, 95(1), 161–182. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/0002828053828518> doi: 10.1257/0002828053828518
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2011). Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons. *IMF Economic Review*, 59(2), 340–378. Retrieved from <https://ideas.repec.org/a/pal/imfecr/v59y2011i2p340-378.html>
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2013). When Credit Bites Back. *Journal of Money, Credit and Banking*, 45(s2), 3–28. Retrieved from <https://ideas.repec.org/a/mcb/jmoncb/v45y2013is2p3-28.html>
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2015a). Betting the house. *Journal of International Economics*, 96, S2–S18. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199614001561> doi: 10.1016/J.JINTECO.2014.12.011
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2015b). Leveraged bubbles. *Journal of Monetary Economics*, 76, S1–S20. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S0304393215000987> doi: 10.1016/J.JMONECO.2015.08.005
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2016a). The great mortgaging: housing finance, crises and business cycles. *Economic Policy*, 31(85), 107–152. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1093/epolic/eiv017> doi: 10.1093/epolic/eiv017
- Jordà, Ò., Schularick, M., & Taylor, A. M. (2016b). Sovereigns versus banks: Credit, crises, and consequences. *Journal of the European Economic Association*, 14(1), 45–79. Retrieved from <https://academic.oup.com/jeea/article-lookup/doi/10.1111/jeea.12144> doi: 10.1111/jeea.12144

- Kaminsky, G. L., & Reinhart, C. M. (1999). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems. *American Economic Review*, 89(3), 473–500. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.89.3.473> doi: 10.1257/aer.89.3.473
- Kang, H., Vitek, F., Bhattacharya, R., Jeasakul, P., Muñoz, S., Wang, N., & Zandvakil, R. (2017). Macroprudential Policy Spillovers; A Quantitative Analysis. *IMF Working Papers*, 17/170, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/17-170.html>
- Kannan, P., Rabanal, P., & Scott Alasdair, M. (2012). Monetary and Macroprudential Policy Rules in a Model with House Price Booms. *The B.E. Journal of Macroeconomics*, 12(1), 1–44. Retrieved from <https://ideas.repec.org/a/bpj/bejmac/v12y2012i1n16.html>
- Kara, G. I. (2016). Systemic risk, international regulation, and the limits of coordination. *Journal of International Economics*, 99, 192–222. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199615001695> doi: 10.1016/J.JINTECO.2015.11.007
- Kedan, D., & Stuart, R. (2014). Central Bank Communications: A Comparative Study. *Quarterly Bulletin Articles*, 89–104. Retrieved from <https://ideas.repec.org/a/cbi/qtbart/y2014m04p89-104.html>
- Keynes, J. M. (1924). *Tract on Monetary Reform*. London: Macmillan.
- Kindleberger, C. P. (1978). *Manias, panics and crashes : a history of financial crises*. Macmillan. Retrieved from <https://books.google.fr/books?id=nOZHAAAAYAAJ&q=manias+panics+and+crashes&dq=manias+panics+and+crashes&hl=en&sa=X&ved=0ahUKEwjSno7N00vgAhUixYUKHePyD00Q6AEIPTAD>
- Kiyotaki, N., & Moore, J. (1997). Credit Cycles. *Journal of Political Economy*, 105(2), 211–248. Retrieved from <https://www.journals.uchicago.edu/doi/10.1086/262072> doi: 10.1086/262072
- Klein, M. A. (1971). A Theory of the Banking Firm. *Journal of Money, Credit and Banking*, 3(2), 205. Retrieved from <https://www.jstor.org/stable/1991279?origin=crossref> doi: 10.2307/1991279
- Kockerols, T., & Kok, C. (2019). Leaning against the wind: macroprudential policy and the financial cycle. *Working Paper Series*, 2223, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20192223.html>
- Koetter, M., & Poghosyan, T. (2010). Real estate prices and bank stability. *Journal of Banking & Finance*, 34(6), 1129–1138. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426609003070> doi: 10.1016/J.JBANKFIN.2009.11.010
- Kokores, I. (2015). Lean-Against-the-Wind Monetary Policy: The Post-Crisis Shift in the Literature. *SPOUDAI Journal of Economics and Business*, 65(3-4), 66–99. Retrieved from https://econpapers.repec.org/article/spdjournl/v{}_3a65{}_3ay{}_3a2015{}_3ai{}_3a3-4{}_3ap{}_3a66-99.htm
- Koo, R. (2009). *The Holy Grail of macroeconomics : lessons from Japan's great recession*. John Wiley & Sons. Retrieved from <https://www.wiley.com/en-us/The+Holy+Grail+of+Macroeconomics%7D3A+Lessons+from+Japan%7D27s+Great+Recession%7D2C+Revised+Edition-p-9780470824948>
- Korinek, A. (2018). Thoughts on DSGE Macroeconomics: matching the moment, but missing the point? In M. Guzman (Ed.), *Toward a just society: Joseph stiglitz and twenty-first century economics* (pp. 159–173). New York: Chichester, West Sussex: Columbia University Press.

REFERENCES

- Korinek, A., & Sandri, D. (2016). Capital controls or macroprudential regulation? *Journal of International Economics*, 99, S27–S42. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0022199616300058> doi: 10.1016/j.jinteco.2016.02.001
- Krugman, P. (1987). The narrow moving band, the Dutch disease, and the competitive consequences of Mrs. Thatcher: Notes on trade in the presence of dynamic scale economies. *Journal of Development Economics*, 27(1-2), 41–55. Retrieved from <https://www.sciencedirect.com/science/article/pii/0304387887900058> doi: 10.1016/0304-3878(87)90005-8
- Kumhof, M., Rancière, R., & Winant, P. (2015). Inequality, Leverage, and Crises. *American Economic Review*, 105(3), 1217–1245. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.20110683> doi: 10.1257/aer.20110683
- Kunovac, D., Mandler, M., & Scharnagl, M. (2018). *Financial cycles in euro area economies: A cross-country perspective*. Retrieved from <https://ideas.repec.org/p/zbw/bubdps/042018.html>
- Kuttner, K., & Shim, I. (2012). Taming the Real Estate Beast: The Effects of Monetary and Macroprudential Policies on Housing Prices and Credit. *RBA Annual Conference Volume*, in: Alexandra Heath & Frank Packer & Callan Windsor (ed.), Property Markets and Financial Stability Reserve B. Retrieved from <https://ideas.repec.org/h/rba/rbaacv/acv2012-14.html>
- Kuttner, K., & Shim, I. (2016). Can non-interest rate policies stabilize housing markets? Evidence from a panel of 57 economies. *Journal of Financial Stability*, 26, 31–44. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308916300705> doi: 10.1016/J.JFS.2016.07.014
- Kydland, F. E., & Prescott, E. C. (1982). Time to Build and Aggregate Fluctuations. *Econometrica*, 50(6), 1345–1370. Retrieved from <https://ideas.repec.org/a/ecm/emetrp/v50y1982i6p1345-70.html>
- Lambertini, L., Mendicino, C., & Teresa Punzi, M. (2013). Leaning against boom–bust cycles in credit and housing prices. *Journal of Economic Dynamics and Control*, 37(8), 1500–1522. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165188913000638> doi: 10.1016/J.JEDC.2013.03.008
- Lamers, M., Mergaerts, F., Meuleman, E., & Vennet, R. V. (2016). The trade-off between monetary policy and bank stability. *Working Paper Research*, 308, National Bank of Belgium. Retrieved from <https://ideas.repec.org/p/nbb/reswpp/201610-308.html>
- Lane, P. (2006). Global Bond Portfolios and EMU. *International Journal of Central Banking*, 2(2). Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2006q2a1.html>
- Lane, P. (2011). The Irish Crisis. *CEPR Discussion Papers*, 8287, C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/8287.html>
- Lane, P. (2012). The European Sovereign Debt Crisis. *Journal of Economic Perspectives*, 26(3), 49–68. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/jep.26.3.49> doi: 10.1257/jep.26.3.49
- Lane, P. (2013). Capital Flows in the Euro Area. *CEPR Discussion Papers*, 9493, C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/9493.html>
- Lane, P., & McQuade, P. (2014). Domestic Credit Growth and International Capital Flows*. *The Scandinavian Journal of Economics*, 116(1), 218–252. Retrieved from <http://doi.wiley.com/10.1111/sjoe.12038> doi: 10.1111/sjoe.12038

- Lane, P., & Milesi-Ferretti, G. M. (2001). The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. *Journal of International Economics*, 55(2), 263–294. Retrieved from <https://ideas.repec.org/a/eee/inecon/v55y2001i2p263-294.html>
- Lane, P., & Milesi-Ferretti, G. M. (2007). Europe and global imbalances. *Economic Policy*, 22(51), 520–573. Retrieved from <https://academic.oup.com/economicpolicy/article-lookup/doi/10.1111/j.1468-0327.2007.00184.x> doi: 10.1111/j.1468-0327.2007.00184.x
- Lane, P., & Milesi-Ferretti, G. M. (2011). The Cross-Country Incidence of the Global Crisis. *IMF Economic Review*, 59(1), 77–110. Retrieved from <https://ideas.repec.org/a/pal/imfecr/v59y2011i1p77-110.html>
- Lane, P., & Milesi-Ferretti, G. M. (2012). External adjustment and the global crisis. *Journal of International Economics*, 88(2), 252–265. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199611001772> doi: 10.1016/J.JINTECO.2011.12.013
- Lane, P., & Pels, B. (2012). Current Account Imbalances in Europe. *CEPR Discussion Papers*, 8958, C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/8958.html>
- Lehar, A. (2005). Measuring systemic risk: A risk management approach. *Journal of Banking & Finance*, 29(10), 2577–2603. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426604002456> doi: 10.1016/J.JBANKFIN.2004.09.007
- Leroy, A. (2014). Competition and the bank lending channel in Eurozone. *Journal of International Financial Markets, Institutions and Money*, 31, 296–314. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1042443114000511> doi: 10.1016/J.INTFIN.2014.04.003
- Ligthart, N., Mody, A., & Kang, D. W. (2015). The European Central Bank: Building a shelter in a storm. *CFS Working Paper Series*, 527, Center for Financial Studies (CFS). Retrieved from <https://ideas.repec.org/p/zbw/cfsowp/527.html>
- Lim, C. H., Krznar, I., Lipinsky, F., Otani, A., & Wu, X. (2013). The Macroprudential Framework; Policy Responsiveness and Institutional Arrangements. *IMF Working Papers*, 13/166, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/13-166.html>
- Liu, J., & Kool, C. J. (2018). Money and credit overhang in the euro area. *Economic Modelling*, 68, 622–633. Retrieved from <https://www.sciencedirect.com/science/article/pii/S026499931730740X> doi: 10.1016/J.ECONMOD.2017.05.003
- Lo Duca, M., & Peltonen, T. (2011). Macro-financial vulnerabilities and future financial stress: assessing systemic risks and predicting systemic events. *Working Paper Series*, 1311, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20111311.html>
- Lombardi, D., & Siklos, P. L. (2016). Benchmarking macroprudential policies: An initial assessment. *Journal of Financial Stability*, 27, 35–49. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308916300924> doi: 10.1016/J.JFS.2016.08.007
- Long, D., Bradford, J., & et Al. (1990). Positive Feedback Investment Strategies and Destabilizing Rational Speculation. *Journal of Finance*, 45(2), 379–395. Retrieved from <https://ideas.repec.org/a/bla/jfinan/v45y1990i2p379-95.html>

REFERENCES

- Lozej, M., Onorante, L., Rannenberg, A., Lozej, M., Onorante, L., & Rannenberg, A. (2017). Countercyclical Capital Regulation in a Small Open Economy DSGE Model. *Research Technical Papers, 03/RT/17*, Central Bank of Ireland. Retrieved from https://econpapers.repec.org/paper/cbiwpaper/03{}_2ftrt{}_2f17.htm
- Lucas, R. E. (1972). Expectations and the neutrality of money. *Journal of Economic Theory*, 4(2), 103–124. Retrieved from <https://www.sciencedirect.com/science/article/pii/0022053172901421> doi: 10.1016/0022-0531(72)90142-1
- Lucas, R. E. (2003). Macroeconomic Priorities. *American Economic Review*, 93(1), 1–14. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/000282803321455133> doi: 10.1257/000282803321455133
- Maas, D., Mayer, E., & R  th, S. K. (2018). Current account dynamics and the housing cycle in Spain. *Journal of International Money and Finance*, 87, 22–43. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560618303267> doi: 10.1016/J.JIMONFIN.2018.05.007
- Maddaloni, A., & Peydr  , J.-L. (2011). Bank Risk-taking, Securitization, Supervision, and Low Interest Rates: Evidence from the Euro-area and the U.S. Lending Standards. *Review of Financial Studies*, 24(6), 2121–2165. Retrieved from <https://academic.oup.com/rfs/article-lookup/doi/10.1093/rfs/hhr015> doi: 10.1093/rfs/hhr015
- Maes, I. (2010). Alexandre Lamfalussy and the origins of the BIS macro-prudential approach to financial stability. *PSL Quarterly Review*, 63(254), 265–292. Retrieved from <https://ideas.repec.org/a/psl/pslqrr/201034.html>
- Magud, N. E., Reinhart, C. M., & Vesperoni, E. R. (2014). Capital Inflows, Exchange Rate Flexibility and Credit Booms. *Review of Development Economics*, 18(3), 415–430. Retrieved from <http://doi.wiley.com/10.1111/rode.12093> doi: 10.1111/rode.12093
- Margerit, A., Magnus, M., & Mesnard, B. (2017). The EU macro-prudential policy framework. *Briefing, Economic Governance Support Unit, Directorate General for Internal Policies, European Parliament*, 23 May 2017.
- Martin, F., & Zhang, J. (2017). Modelling European sovereign bond yields with international portfolio effects. *Economic Modelling*, 64, 178–200. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0264999316308884> doi: 10.1016/J.ECONMOD.2017.03.031
- Masciandaro, D., & Volpicella, A. (2016). Macro prudential governance and central banks: Facts and drivers. *Journal of International Money and Finance*, 61, 101–119. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0261560615001916> doi: 10.1016/j.jimonfin.2015.11.002
- Mastromatteo, G., & Rossi, S. (2015). The economics of deflation in the euro area: a critique of fiscal austerity. *Review of Keynesian Economics*, 3(3), 336–350. Retrieved from <http://www.elgaronline.com/view/journals/roke/3-3/roke.2015.03.04.xml> doi: 10.4337/roke.2015.03.04
- McKinnon, R. I. (1963). *Optimum Currency Areas* (Vol. 53). American Economic Association. Retrieved from <https://www.jstor.org/stable/1811021> doi: 10.2307/1811021
- Meeks, R. (2017). Capital regulation and the macroeconomy: Empirical evidence and macroprudential policy. *European Economic Review*, 95, 125–141. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0014292117300570> doi: 10.1016/j.eurocorev.2017.03.010

- Mendicino, C., & Punzi, M. T. (2014). House prices, capital inflows and macroprudential policy. *Journal of Banking & Finance*, 49, 337–355. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S037842661400209X> doi: 10.1016/j.jbankfin.2014.06.007
- Merler, S., & Pisani-Ferry, J. (2012). Sudden stops in the euro area. *Policy Contributions*, 718. Retrieved from <https://ideas.repec.org/p/bre/polcon/718.html>
- Merrouche, O., & Nier, E. (2010). What Caused the Global Financial Crisis; Evidence on the Drivers of Financial Imbalances 1999: 2007. *IMF Working Papers*, 10/265. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/10-265.html>
- Mersch, Y. (2016). Monetary policy in the euro area: scope, principles and limits. *Keynote speech by Yves Mersch, Member of the Executive Board of the ECB, at the Natixis Meeting of Chief Economists Paris, 23 June 2016*, Paris, 23 June 2016.
- Mian, A., Rao, K., & Sufi, A. (2013). Household Balance Sheets, Consumption, and the Economic Slump*. *The Quarterly Journal of Economics*, 128(4), 1687–1726. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.1093/qje/qjt020> doi: 10.1093/qje/qjt020
- Mian, A., Sufi, A., & Verner, E. (2017). Household Debt and Business Cycles Worldwide*. *The Quarterly Journal of Economics*, 132(4), 1755–1817. Retrieved from <http://academic.oup.com/qje/article/132/4/1755/3854928> doi: 10.1093/qje/qjx017
- Milesi-Ferrett, G. M., & Razin, A. (1998). Current Account Reversals and Currency Crises: Empirical Regularities. *NBER Working Papers*, 6620, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/6620.html>
- Minea, A., & Parent, A. (2012). Is High Public Debt Always Harmful to Economic Growth? Reinhart and Rogoff and some complex nonlinearities. *Working Papers*, 201218, CERDI. Retrieved from <https://ideas.repec.org/p/cdi/wpaper/1355.html>
- Minsky, H. P. (1986). *Stabilizing an unstable economy*. Yale University Press. Retrieved from <https://books.google.fr/books?id=MmGtHAAACAAJ&dq=stabilizing+an+unstable+economy&hl=en&sa=X&ved=0ahUKEwi9jffCzevgAhURu3EKHZ{-}BACkQ6AEINTAC>
- Minsky, H. P. (1992). The Financial Instability Hypothesis. *Economics Working Paper Archive*, wp_74. Retrieved from <https://ideas.repec.org/p/lev/wrkpap/wp{-}74.html>
- Mishkin, F. S. (1999). Global Financial Instability: Framework, Events, Issues. *Journal of Economic Perspectives*, 13(4), 3–20. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/jep.13.4.3> doi: 10.1257/jep.13.4.3
- Mundell, R. A. (1961). *A Theory of Optimum Currency Areas* (Vol. 51). American Economic Association. Retrieved from <https://www.jstor.org/stable/1812792> doi: 10.2307/1812792
- Muth, J. F. (1961). Rational Expectations and the Theory of Price Movements. *Econometrica*, 29(3), 315. Retrieved from <https://www.jstor.org/stable/1909635?origin=crossref> doi: 10.2307/1909635
- Nier, E., Jácome, L. I., Osinski, J., & Madrid, P. (2011). Institutional Models for Macroprudential Policy. *IMF Staff Discussion Notes*, 11/18, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfstdn/11-18.html>
- Nyberg, P. (2011). Misjudging risk: causes of the systemic banking crisis in Ireland. *Report of the commission of investigation into the banking sector in Ireland*.

REFERENCES

- Obstfeld, M. (2012). Does the Current Account Still Matter? *American Economic Review*, 102(3), 1–23. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.102.3.1> doi: 10.1257/aer.102.3.1
- Obstfeld, M. (2013a). Finance at Center Stage: Some Lessons of the Euro Crisis. *CEPR Discussion Papers*, 9415, C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/9415.html>
- Obstfeld, M. (2013b). On Keeping Your Powder Dry: Fiscal Foundations of Financial and Price Stability. *Monetary and Economic Studies, Institute for Monetary and Economic Studies, Bank of Japan*, 31, 25–38. Retrieved from <https://ideas.repec.org/a/ime/imemes/v31y2013p25-38.html>
- Obstfeld, M., & Rogoff, K. (1995). Chapter 34 The intertemporal approach to the current account. *Handbook of International Economics*, 3, 1731–1799. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1573440405800140> doi: 10.1016/S1573-4404(05)80014-0
- Osinski, J., Seal, K., & Hoogduin, L. (2015). Macroprudential and Microprudential Policies: Toward Cohabitation. *Staff Discussion Notes*, 13(5), 1. Retrieved from <https://ideas.repec.org/p/imf/imfsdn/13-5.html> doi: 10.5089/9781484369999.006
- Ostry, J. D., Ghosh, A. R., Chamon, M., & Qureshi, M. S. (2012). Tools for managing financial-stability risks from capital inflows. *Journal of International Economics*, 88(2), 407–421. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0022199612000177> doi: 10.1016/J.JINTECO.2012.02.002
- Padoa-Schioppa, T. (2002). Central Banks and Financial Stability: Exploring a Land in Between. *Paper presented at the Second ECB Central Banking Conference*, Frankfurt am Main, 24–25 October.
- Paligorova, T., & Santos, J. A. (2017). Monetary policy and bank risk-taking: Evidence from the corporate loan market. *Journal of Financial Intermediation*, 30, 35–49. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1042957316300626> doi: 10.1016/J.JFI.2016.11.003
- Pan, H., & Wang, C. (2013). House prices, bank instability, and economic growth: Evidence from the threshold model. *Journal of Banking & Finance*, 37(5), 1720–1732. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0378426613000435> doi: 10.1016/J.JBANKFIN.2013.01.018
- Papadia, F. (2018). Macroprudential policy: The Maginot line of financial stability. *Bruegel Blog Post*, January 17th 2018. Retrieved from <http://bruegel.org/2018/01/macroprudential-policy-the-maginot-line-of-financial-stability/>
- Perotti, E., & Suarez, J. (2011). A Pigovian Approach to Liquidity Regulation. *International Journal of Central Banking*, 7(4), 3–41. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2011q4a1.html>
- Pool, S. (2018). Mortgage debt and shadow banks. *DNB Working Papers*. Retrieved from <https://ideas.repec.org/p/dnb/dnbwpp/588.html>
- Poutineau, J.-C., Sobczak, K., & Vermandel, G. (2015). The analytics of the New Keynesian 3-equation Model[Analyses du modèle à 3 équations de la Nouvelle Macroéconomie Keynésienne]. *Working Papers*, hal-011946, HAL. Retrieved from <https://ideas.repec.org/p/hal/wpaper/hal-01194642.html>

- Poutineau, J.-C., & Vermandel, G. (2015). Cross-border banking flows spillovers in the Eurozone: Evidence from an estimated DSGE model. *Journal of Economic Dynamics and Control*, 51, 378–403. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165188914003030> doi: 10.1016/J.JEDC.2014.11.006
- Poutineau, J.-C., & Vermandel, G. (2017). Global banking and the conduct of macroprudential policy in a monetary union. *Journal of Macroeconomics*, 54, 306–331. Retrieved from <https://www.sciencedirect.com/science/article/pii/S016407041730160X> doi: 10.1016/J.JMACRO.2017.04.010
- Quint, D., & Rabanal, P. (2014). Monetary and Macroprudential Policy in an Estimated DSGE Model of the Euro Area. *International Journal of Central Banking*, 10(2), 169–236. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2014q2a8.html>
- Rahal, C. (2016). Housing markets and unconventional monetary policy. *Journal of Housing Economics*, 32, 67–80. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1051137716300730> doi: 10.1016/J.JHE.2016.04.005
- Rajan, R. G. (2005). *Has Financial Development Made the World Riskier?* Retrieved from <https://ideas.repec.org/p/nbr/nberwo/11728.html>
- Reinhart, C. M., Reinhart, V. R., & Rogoff, K. S. (2012). Public Debt Overhangs: Advanced-Economy Episodes Since 1800. *Journal of Economic Perspectives*, 26(3), 69–86. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/jep.26.3.69> doi: 10.1257/jep.26.3.69
- Reinhart, C. M., & Rogoff, K. S. (2011). From Financial Crash to Debt Crisis. *American Economic Review*, 101(5), 1676–1706. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.101.5.1676> doi: 10.1257/aer.101.5.1676
- Rey, H. (2015). Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. *CEPR Discussion Papers*, 10591, C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/10591.html>
- Rodrik, D. (2008). The Real Exchange Rate and Economic Growth. *Brookings Papers on Economic Activity*, 39(2 (Fall)), 365–439. Retrieved from https://econpapers.repec.org/article/binbpeajo/v_{_}3a39_{_}3ay_{_}3a2008_{_}3ai_{_}3a2008-02_{_}3ap_{_}3a365-439.htm
- Rogoff, K. (1985). The Optimal Degree of Commitment to an Intermediate Monetary Target. *The Quarterly Journal of Economics*, 100(4), 1169. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.2307/1885679> doi: 10.2307/1885679
- Rubio, M. (2014). Housing-market heterogeneity in a monetary union. *Journal of International Money and Finance*, 40, 163–184. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560613000867> doi: 10.1016/J.JIMONFIN.2013.06.013
- Rubio, M. (2017). The role of macro-prudential policies in prevention and correction of asset imbalances in the Euro Area. *Scrutiny paper provided in the context of Economic Dialogues with the President of the Eurogroup in the Economic and Monetary Affairs Committee*, European Parliament.
- Rubio, M. (2018a). National macroprudential policies in the euro area: Flexibility vs. supervision. *Economics Letters*, 170, 55–58. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165176518302155> doi: 10.1016/J.ECONLET.2018.05.036

REFERENCES

- Rubio, M. (2018b). National macroprudential policies in the euro area: Flexibility vs. supervision. *Economics Letters*, 170, 55–58. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165176518302155> doi: 10.1016/J.ECONLET.2018.05.036
- Rubio, M., & Carrasco-Gallego, J. A. (2014). Macroprudential and monetary policies: Implications for financial stability and welfare. *Journal of Banking & Finance*, 49, 326–336. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0378426614000740> doi: 10.1016/j.jbankfin.2014.02.012
- Rubio, M., & Carrasco-Gallego, J. A. (2016). The new financial regulation in Basel III and monetary policy: A macroprudential approach. *Journal of Financial Stability*, 26, 294–305. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308916300651> doi: 10.1016/J.JFS.2016.07.012
- Scharfstein, D. S., & Stein, J. C. (1990). Herd Behavior and Investment. *American Economic Review*, 80(3), 465–479. Retrieved from <https://ideas.repec.org/a/aea/aecrev/v80y1990i3p465-79.html>
- Schinasi, G. J. (2004). Defining Financial Stability. *IMF Working Papers*, 04/187, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/04-187.html>
- Schivardi, F., Sette, E., & Tabellini, G. (2017). Credit misallocation during the European financial crisis. *BIS Working Papers*, 669, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/669.html>
- Schoenmaker, D., & Wiert, P. (2011). Macroprudential Policy: The Need for a Coherent Policy Framework. *Duisenberg School of Finance Policy Paper*, 13. Retrieved from <http://www.ssrn.com/abstract=1876595> doi: 10.2139/ssrn.1876595
- Schularick, M., & Taylor, A. M. (2012). Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008. *American Economic Review*, 102(2), 1029–1061. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.102.2.1029> doi: 10.1257/aer.102.2.1029
- Schumpeter, J. (1934). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credits, Interest, and the Business Cycle*. , Piscataway: Transaction Publishers.
- Sengupta, R. (2010). Alt-A: the forgotten segment of the mortgage market. *Review*(Jan), 55–72, Federal Reserve Bank of St. Louis. Retrieved from <https://ideas.repec.org/a/fip/fedlrv/y2010ijanp55-72nv.92no.1.html>
- Shiller, R. J. (2017). Narrative Economics. *American Economic Review*, 107(4), 967–1004. Retrieved from <http://pubs.aeaweb.org/doi/10.1257/aer.107.4.967> doi: 10.1257/aer.107.4.967
- Shim, I., Bogdanova, B., Shek, J., & Subelt, A. (2013). Database for policy actions on housing markets. *BIS Quarterly Review*, Bank for International Settlements, September. Retrieved from <https://ideas.repec.org/a/bis/bisqtr/1309i.html>
- Smets, F. (1997). Financial asset prices and monetary policy: theory and evidence. *BIS Working Papers*, 47, Bank for International Settlements. Retrieved from <https://ideas.repec.org/p/bis/biswps/47.html>
- Smets, F. (2000). What horizon for price stability. *Working Paper Series*, 24, European Central Bank. Retrieved from <https://econpapers.repec.org/paper/ecbecwps/200024.htm>

- Smets, F. (2014). Financial Stability and Monetary Policy: How Closely Interlinked? *International Journal of Central Banking*, 10(2), 263–300. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2014q2a11.html>
- Smets, F., & Beyer, R. (2015). Labour market adjustments in Europe and the US: How different? *Working Paper Series*, 1767, European Central Bank. Retrieved from <https://econpapers.repec.org/paper/ecbecbwps/20151767.htm>
- Smets, F., & Wouters, R. (2003). An Estimated Dynamic Stochastic General Equilibrium Model of the Euro Area. *Journal of the European Economic Association*, 1(5), 1123–1175. Retrieved from <https://academic.oup.com/jeea/article/2280815/An> doi: 10.1162/154247603770383415
- Stein, J. C. (2012). Monetary Policy as Financial Stability Regulation. *The Quarterly Journal of Economics*, Oxford University Press, 127(1), 57–95. Retrieved from <https://academic.oup.com/qje/article-lookup/doi/10.1093/qje/qjr054> doi: 10.1093/qje/qjr054
- Storz, M., Koetter, M., Setzer, R., & Westphal, A. (2017). Do we want these two to tango? On zombie firms and stressed banks in Europe. *Working Paper Series*, 2104, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20172104.html>
- Stremmel, & Hanno. (2015). Capturing the financial cycle in Europe. *Working Paper Series*, 1811, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20151811.html>
- Svensson, L. (2017). How robust is the result that the cost of “leaning against the wind” exceeds the benefit? *Working Paper Series*, 2031, European Central Bank. Retrieved from <https://ideas.repec.org/p/ecb/ecbwps/20172031.html> <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp2031.en.pdf> doi: 10.2866/652040
- Svensson, L. (2018). Monetary policy and macroprudential policy: Different and separate? *Canadian Journal of Economics*, 51(3), 802–827. Retrieved from <https://ideas.repec.org/a/cje/issued/v51y2018i3p802-827.html>
- Szczerbowicz, U. (2015). The ECB Unconventional Monetary Policies: Have They Lowered Market Borrowing Costs for Banks and Governments? *International Journal of Central Banking*, 11(4), 91–127. Retrieved from <https://ideas.repec.org/a/ijc/ijcjou/y2015q5a3.html>
- Tavolaro, S., & Visnovsky, F. (2014). What is the information content of the SRISK measure as a supervisory tool? *Débats économiques et financiers*, 10, Banque de France. Retrieved from <https://ideas.repec.org/p/bfr/decfin/10.html>
- Taylor, W. J., & Zilberman, R. (2016). Macroprudential regulation, credit spreads and the role of monetary policy. *Journal of Financial Stability*, 26, 144–158. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308916300869> doi: 10.1016/J.JFS.2016.08.001
- Taylor, A. M. (2015). Credit, Financial Stability, and the Macroeconomy. *NBER Working Papers*, 21039, National Bureau of Economic Research, Inc. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/21039.html>
- Timmermans, T. (2001). Monitoring the macroeconomic determinants of banking system stability. *BIS Papers chapters*, in: *Bank for International Settlements (ed.), Marrying the macro- and micro-prudential dimensions of financial stability*, 1, 117–137, Bank for International Settlements. Retrieved from <https://ideas.repec.org/h/bis/bisbpc/01-04.html>

REFERENCES

- Tobin, J. (1964). Commercial banks as creators of “money”. *Banking and Monetary Studies. Cowles Foundation for Research in Economics at Yale University*, 408–419. Retrieved from <https://ideas.repec.org/p/cwl/cwldpp/159.html><http://dido.econ.yale.edu/P/cm/m21/m21-01.pdf>{%}5Cnpapers2://publication/uuid/A6FD0F97-1B5A-49FC-8A76-1FA3890A050B
- Tola, A., & Wälti, S. (2015). Deciphering financial contagion in the euro area during the crisis. *The Quarterly Review of Economics and Finance*, 55, 108–123. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S1062976914000775> doi: 10.1016/J.QREF.2014.09.009
- Tucker, P. (2011). Macroprudential policy: building nancial stability institutions. *Remarks by Mr Paul Tucker, Deputy Governor for Financial Stability at the Bank of England, at the 20th Annual Hyman P. Minsky Conference*, New York, 14 April 2011.
- Tucker, P. (2016). The Design and Governance of Financial Stability Regimes: A Common-resource Problem that Challenges Technical Know-How, Democratic Accountability and International Coordination. *Essays on International Finance*, 3, Centre for International Governance Innovation.
- Tucker, P. (2018). *Unelected power : the quest for legitimacy in central banking and the regulatory state*. Princeton University Press. Retrieved from <https://press.princeton.edu/titles/11240.html>
- Turner, A. (2015). Between Debt and the Devil: Money, Credit, and Fixing Global Finance. *Economics Books, Princeton University Press, edition 1, number 10546*. Retrieved from <https://ideas.repec.org/b/pup/pbooks/10546.html>
- Ueda, K., & Valencia, F. (2014). Central bank independence and macro-prudential regulation. *Economics Letters*, 125(2), 327–330. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0165176513005776> doi: 10.1016/j.econlet.2013.12.038
- Unger, R. (2017). Asymmetric credit growth and current account imbalances in the euro area. *Journal of International Money and Finance*, 73, 435–451. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560617300372> doi: 10.1016/J.JIMONFIN.2017.02.017
- Upper, C. (2011). Simulation methods to assess the danger of contagion in interbank markets. *Journal of Financial Stability*, 7(3), 111–125. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1572308910000550> doi: 10.1016/J.JFS.2010.12.001
- Vandenbussche, J., Vogel, U., & Detragiache, E. (2015). Macroprudential policies and housing prices: A new database and empirical evidence for central, Eastern, and Southeastern Europe. *Journal of Money, Credit and Banking*, 47(S1), 343–377. Retrieved from <http://doi.wiley.com/10.1111/jmcb.12206> doi: 10.1111/jmcb.12206
- Villar, A. (2017). Macroprudential frameworks: objectives, decisions and policy interactions. *in: Bank for International Settlements (ed.), Macroprudential frameworks, implementation and relationship with other policies*, 94, 7–24, Bank for International Settlements. Retrieved from <https://ideas.repec.org/h/bis/bisbpc/94-02.html>
- Werner, R. A. (2014). Can banks individually create money out of nothing? — The theories and the empirical evidence. *International Review of Financial Analysis*, 36, 1–19. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1057521914001070> doi: 10.1016/J.IRFA.2014.07.015

-
- Wicksell, K. (1907). The Influence of the Rate of Interest on Prices. *The Economic Journal*, 17(66), 213. Retrieved from <https://www.jstor.org/stable/2220665?origin=crossref> doi: 10.2307/2220665
- Wong, E., Fong, T., Li, K.-f., & Choi, H. (2011). Loan-to-Value Ratio as a Macro-Prudential Tool - Hong Kong's Experience and Cross-Country Evidence. *Working Papers*, 1101, Hong Kong Monetary Authority. Retrieved from <https://ideas.repec.org/p/hkg/wpaper/1101.html>
- Woodford, M. (2003). *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton: Princeton University Press.
- Woodford, M. (2012). Inflation Targeting and Financial Stability. *NBER Working Papers*, 17967. Retrieved from <https://ideas.repec.org/p/nbr/nberwo/17967.html>
- Wu, J. C., & Xia, F. D. (2016). Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound. *Journal of Money, Credit and Banking*, 48(2-3), 253–291. Retrieved from <http://doi.wiley.com/10.1111/jmcb.12300> doi: 10.1111/jmcb.12300
- Zhang, L., & Zoli, E. (2014). Leaning Against the Wind; Macroprudential Policy in Asia. *IMF Working Papers*, 14/22, International Monetary Fund. Retrieved from <https://ideas.repec.org/p/imf/imfwpa/14-22.html>

Appendix A

Model details

Table A.1: **Structural Parameters**

Sensitivity of output to lending rate	$\beta, \beta^c = 0.05, \beta^p = 0.01$ (Smets, 2000)
Sensitivity of inflation to output	$\lambda = 0.18$ (Smets, 2000)
Sensitivity of deposits to output	$\eta_y^c = 1, \eta_y^c = 1.3$ (Bouvatier et al., 2014; Leroy, 2014)
Sensitivity of deposits to policy rate	$\eta_n = 0.2$ (Leroy, 2014)
Sensitivity of loan supply creation to output (“Minsky residual”)	$\zeta_y^c = 1, \zeta_y^p = 1.7$ (Bouvatier et al., 2014; Leroy, 2014)
Sensitivity of loan supply to lending margins	$\omega_{cs} = 0.1$ (Bouvatier et al., 2014; Leroy, 2014)
Sensitivity of loan demand to output	$\mu_y = 1$ (Calza et al., 2006)
Sensitivity of loan demand to the lending rate	$\mu_c = 1.5$ (Calza et al., 2006)
Sensitivity of interbank loan supply to interbank lending margins	$\omega_{IB} = 0.5$ (Leroy, 2014)
Sensitivity of interbank loan supply to domestic lending margins	$\omega_L = 0.4$ (Assumed)
Sensitivity of interbank loan demand to the interbank rate	$\delta_{ib} = 3$ (Leroy, 2014)
Sensitivity of interbank loan demand to output	$\delta_y = 0.3$ (Leroy, 2014)
Sensitivity of interbank loan demand to MaP	$\delta_{Map} = 1$ (Assumed)

To derive the in-fine expressions of the national MaP rules (2.23 and 2.24), we first compute the initial response of MaP to deviations in credit without accounting for the second-order effects on output and interest rates. Formally, we solve $L_s = L_s^*$ for MaP without substituting y , i_c and i_{IB} for their expressions $IS^{c,p}$, $FF^{c,p}$ and FF_{IB} , yielding these auxiliary macroprudential rules:

$$MaP^c = i_c^c + \xi_y^c y^c - \xi_n^c i_n - \xi_\tau^c \tau^c \quad (\text{A.1})$$

with $\xi_y^c = \frac{\eta_y + \zeta_y - \chi'^c}{\omega_{cs}} > 0$, $\xi_n^c = \frac{\eta_n + \omega_{cs}}{\omega_{cs}} > 0$ and $\xi_\tau^c = \frac{1}{\omega_{cs}} > 0$.

$$MaP^p = i_p^c + \xi_y^p y^p - \xi_n^p i_n - \xi_\tau^p \tau^p - \xi_{IB} i_{IB} \quad (A.2)$$

with $\xi_y^p = \frac{+\eta_y + \zeta_y + \delta_y - \chi'^p}{\omega_{cs} + \delta_{MaP}} > 0$, $\xi_n^p = \frac{\eta_n + \omega_{cs}}{\omega_{cs} + \delta_{MaP}} > 0$, $\xi_\tau^p = \frac{1}{\omega_{cs} + \delta_{MaP}} > 0$ and $\xi_{IB} = \frac{\delta_{IB} + \omega_{cs}}{\omega_{cs} + \delta_{MaP}}$.

In order to compute the coefficients in the periphery's MaP rule, we also need to have the in-fine expression of the interbank rate, given by:

$$i_{IB} = \rho_n i_n + \rho_{MaP^p} MaP^p - \rho_{MaP^c} MaP^c - \rho_{yp} \epsilon_d^p - \rho_{yc} \epsilon_d^c \quad (A.3)$$

We then substitute into (A.1) and (A.2) the expressions of i_c^p (2.19 and 2.20), $y^{c,p}$ (2.1 and 2.2) and i_{IB} ; yielding the national rules that we use for our calibration:

$$\begin{aligned} MaP^c &= \kappa_{yc}^c \epsilon_d^c - \kappa_n^c i_n - \kappa_\tau^c \tau^c \\ MaP^p &= \kappa_{yp}^p \epsilon_d^p + \kappa_{yc}^p \epsilon_d^c - \kappa_n^p i_n + \kappa_{MaP^c}^p MaP^c - \kappa_\tau^p \tau^p \end{aligned}$$

In order to compute the coefficients in the periphery's MaP rule, we also need to have the in-fine expression of the interbank rate, given by:

$$i_{IB} = \rho_n i_n + \rho_{MaP^p} MaP^p - \rho_{MaP^c} MaP^c - \rho_{yp} \epsilon_d^p - \rho_{yc} \epsilon_d^c$$

Where the values of the coefficients are as follows:

Table A.2: **Derived Parameters for national MaP rules**

Parameter	Expression
Core	
Reaction to the policy rate	$\kappa_n^c = \frac{(1 - \beta^c \xi_{yc}) \psi_n^c - \xi_n^c}{1 - (1 - \beta^c \xi_y^c) \psi_{yc}^c}$
Reaction to the domestic shock	$\kappa_{yc}^c = \frac{\xi_y^c - (1 - \beta^c \xi_y^c) \psi_{MaP}^c}{1 - (1 - \beta^c \xi_y^c) \psi_{MaP}^c}$
Reaction to the regulator's discretion	$\kappa_{yc}^c = \frac{\xi_{\tau^c}}{1 - (1 - \beta^c \xi_y^c) \psi_{MaP}^c}$
Periphery	
Reaction to the policy rate	$\kappa_{MaP^c}^p = \frac{\psi_n^p - \xi_n^p - \beta^p \xi_{yp} \psi_n^p - \xi_{IB} \rho_n}{1 - \psi_{MaP^p}^p + \beta^p \xi_{yp} \psi_{MaP^p}^p - \xi_{IB} \rho_{MaP^p}}$
Reaction to the domestic shock	$\kappa_{yp}^p = \frac{\xi_{yp}^p - \xi_{IB} \rho_{yp} + \psi_{yp} [\beta^p \xi_{yp}^p - 1]}{1 - \psi_{MaP^p}^p + \beta^p \xi_{yp} \psi_{MaP^p}^p - \xi_{IB} \rho_{MaP^p}}$
Reaction to the core's shock	$\kappa_{yc}^p = \frac{\xi_{yp}^p \beta^p \psi_{yc}^p + \xi_{IB} \rho_{yc} - \xi_{yc}^p}{1 - \psi_{MaP^p}^p + \beta^p \xi_{yp} \psi_{MaP^p}^p - \xi_{IB} \rho_{MaP^p}}$
Reaction to the core's MaP	$\kappa_{MaP^c}^p = \frac{\psi_{MaP^c}^p [\beta^p \xi_{yp}^p - 1] + \xi_{IB} \rho_{MaP^c}}{1 - \psi_{MaP^p}^p + \beta^p \xi_{yp} \psi_{MaP^p}^p - \xi_{IB} \rho_{MaP^p}}$
Reaction to the regulator's discretion	$\kappa_\tau^p = \frac{\xi_\tau^p}{1 - \psi_{MaP^p}^p + \beta^p \xi_{yp} \psi_{MaP^p}^p - \xi_{IB} \rho_{MaP^p}}$

An analogous process is used to derive core MaP rule that minimizes the internalizing loss function (2.25), resulting in the aforementioned core MaP rule under internalization:

$$MaP_I^c = \theta_{yc} \epsilon_d^c - \theta_{yp} \epsilon_d^c - \theta_n i_n + \theta_{MaP} MaP^p - \theta_{\tau^c} \tau^c + \theta_{\tau^c} \tau^c$$

Table A.3: **Derived parameters for core MaP rule under internalization**

Parameter	Expression
Reaction to the policy rate	$\theta_n = \frac{\psi_n^p - \Theta^p - \psi_n^c \Theta^c}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$
Reaction to the domestic shock	$\theta_{yc} = \frac{\Theta_{MaP}^c [\mu_y - (\tau_c + 1)] + \psi_{yc}^c \Theta^c - \psi_{yc}^p}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$
Reaction to the periphery's shock	$\theta_{yp} = \frac{\Theta_{MaP}^p [\mu_y - (\tau_p + 1)] + \psi_{yp}^p \Theta^p - \psi_{yp}^c}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$
Reaction to the periphery's MaP	$\theta_{MaP} = \frac{\Theta^p \psi_{MaP}^p}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$
Reaction to the core regulator's discretion	$\theta_{\tau^c} = \frac{\Theta_{MaP}^c}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$
Reaction to the periphery regulator's discretion	$\theta_{\tau^p} = \frac{\Theta_{MaP}^p}{\psi_{MaPc}^c \Theta^c + \psi_{MaPc}^p \Theta^p}$

With

$$\begin{aligned}
\Theta_{MaP}^p &= \psi_{MaPc}^p [\mu_c + \beta^p \mu_y - \beta^p (\tau^p + 1)], \\
\Theta_{MaP}^c &= \psi_{MaPc}^c [\mu_c + \beta^c \mu_y - \beta^c (\tau^c + 1)], \\
\Theta^p &= \psi_{MaPc}^p [\mu_c + \beta^p \mu_y - \beta^p (\tau^p + 1)]^2, \\
\Theta^c &= \psi_{MaPc}^c [\mu_c + \beta^c \mu_y - \beta^c (\tau^c + 1)]^2
\end{aligned}$$

Table A.4: **Model Variables**

Variable	Description
$y^{p,c}$	Output
Υ	Output (level)
$\pi^{c,p}$	Inflation
i_n	Policy Rate
i_{IB}	Interbank Rate
$i_c^{p,c}$	Domestic Lending Rate
$L_{s,d}^{p,c}$	Loan Supply, Demand
Λ	Loan Supply (level)
L_s^{op}	Optimal National Loan Supply
$D^{c,p}$	Bank Deposits
$MaP^{c,p}$	Macroprudential Policy
$\epsilon_d^{p,c}$	Demand Shock

Appendix B

Microfoundation for the spillover effect

The nature of the spillover effect in our model is very related to the hypothesis that a tightening of the CCyB results in an expansion interbank loan supply by the core bank (equation 2.9). To support this intuition with a microfounded argument, we propose an elementary microeconomic optimization program for a bank that maximizes shareholder returns and inspired from the classic literature on the theory of the banking firm (Klein, 1971). For the purposes of this exercise, we introduce bank capital K into the framework, remunerated at rate r . We assume that the bank does not wish to adjust to the regulatory tightening by raising capital, as this would dilute individual shareholder returns, so the capital stock is held constant ($K = \bar{K}$). The bank's profit equation may therefore be written as:

$$\Pi = Li_c + IBi_{IB} - Kr - Ei_n \quad (\text{B.1})$$

Where L is the bank's domestic loan portfolio, IB outward interbank loans and E the bank's external funds: household deposits and central bank refinancing, both remunerated at the policy rate¹. Rearranging the terms, we can write return on equity:

$$r = \frac{Li_c + IBi_{IB} - Kr - Ei_n}{K} \quad (\text{B.2})$$

The first constraint the bank faces is the balance sheet constraint:

$$L + IB = K + E \quad (\text{B.3})$$

It also faces a capital requirements constraint $\frac{K}{RWA} = CR$, which we rearrange to:

$$Lw_L + IBw_{IB} = \frac{K}{CR} \quad (\text{B.4})$$

where w_L and w_{IB} are the risk coefficients in risk-weighted assets and CR is the prevailing minimum capital requirements rate. A macroprudential tightening would entail a higher value for CR .

Given a fixed amount of equity capital, the bank chooses its investments (domestic loans and foreign interbank loans) and its residual external funding (central bank refinancing) to maximize shareholder returns (the rate of return on equity capital)². The bank therefore solves:

¹To simplify, we assume a null premium on deposits. These are a given stock; all adjustments come from central bank borrowing.

²Standard maximization of total profits yields an equivalent final result.

$$\begin{aligned}
 & \max_{L, IB, E} \quad \frac{Li_c + IBi_{IB} - Kr - Ei_n}{K} \\
 & \text{s.t.} \quad Lw_L + IBw_{IB} = \frac{K}{CR} \\
 & \quad \quad L + IB = K + E
 \end{aligned} \tag{B.5}$$

The corresponding Lagrangian function is:

$$Lag = \frac{Li_c + IBi_{IB} - Kr - Ei_n}{K} - \lambda_1(Lw_L + IBw_{IB} - \frac{K}{CR}) - \lambda_2(L + IB - E - K)$$

The first order conditions to this problem are:

$$Lag_E = 0 \quad \Leftrightarrow \quad \lambda_2 = i_n \tag{B.6}$$

$$Lag_L = 0 \quad \Leftrightarrow \quad \lambda_1 = \frac{i_c - i_n}{w_L} \tag{B.7}$$

$$Lag_{IB} = 0 \quad \Leftrightarrow \quad w_{IB} = \frac{i_n - i_{IB}}{i_c - i_n} w_L \tag{B.8}$$

$$Lag_{\lambda_1} = 0 \quad \Leftrightarrow \quad K = CRw_L \left(\frac{i_n - i_{IB}}{i_c - i_n} IB + L \right) \tag{B.9}$$

$$Lag_{\lambda_2} = 0 \quad \Leftrightarrow \quad IB = \frac{(CRw_L - 1)L + E}{1 - \frac{CRw_L(i_{IB} - i_n)}{i_c - i_n}} \tag{B.10}$$

By differentiating the expression of IB in (B.10) with respect to CR, we can examine the marginal effect of increased capital requirements on the supply of foreign interbank lending:

$$IB_{CR} = \frac{(i_n - i_c)w_L[(i_n - i_{IB})E + (i_{IB} - i_c)L]}{[(i_n - i_{IB})CRw_L - i_n + i_c]^2}$$

Since $i_n < i_{IB} < i_c$, the numerator in the above term is the sum of two products between negative terms and therefore is necessarily positive. Given that the denominator is also necessarily positive, this means that raising capital requirements increases the supply of interbank lending.

List of Figures

1	The relationships between macroprudential, microprudential and monetary policies	4
2	Euro area macroprudential authorities	5
1.1	The dilemmas of monetary policy	27
1.2	The place of Macroprudential Policy	29
1.3	The long-term leveraging of advanced economies	33
1.4	Incidence of financial crises across time	33
1.5	Real estate lending overtakes banking	34
1.6	Prudential policy activism in deficit countries	43
1.7	Evolution of private debt in the Euro area	45
1.8	Evolution of public debt in the Euro area	46
1.9	Public debt-to-GDP ratio: average over 2000-2008	46
1.10	Euro crisis: External (not sovereign) debt crisis	47
1.11	Real interest rate differential with respect to area average	48
1.12	Periphery: gaps between market rates and natural rates	49
1.13	Periphery: gross fixed capital formation and construction investment (% of GDP)	51
1.14	Euro interbank lending boom and bust	52
1.15	Sovereign spreads, failed bailouts and contagion	53
1.16	Sovereign and bank CDS premia comove in Ireland and Greece during the crisis .	54
1.17	Fiscal policy: procyclical shift after the initial stimulus	55
1.18	Monetary policy responses: the ECB and the FED	56
1.19	Central bank balance sheets and Target 2 (im)balances	57
1.20	Debt in the Euro area one decade after the GFC	59
1.21	Sovereign debt-related vulnerabilities persist	60
1.22	Annual % increase in Eurostat house price index	61
1.23	ECB estimates of over/undervaluation of average residential properties (% of fundamental value)	61
1.24	Growth of the shadow banking sector in the Euro area (EUR Millions)	62
2.1	The structure of the model	70
2.2	Liabilities of periphery banks during the boom	73
2.3	EA-bound interbank lending and domestic margins	74
2.4	Credit growth and systemic risk at the country level	79
2.5	Euro area stress tracks credit growth in the periphery	80
2.6	Internalization: core loses, periphery gains, favorable aggregate net effect .	83
3.1	Country Score Map	105
3.2	Austria (58.3) Power: 66.6, Will: 50	106
3.3	Belgium (50) Power: 50, Will: 50	110
3.4	Finland (75) Power: 83.6, Will: 66.6	113
3.5	France (100) Power: 100, Will: 100	117
3.6	Germany (58.3) Power: 83.3, Will: 33.3	120

3.7	Ireland (100) Power: 100, Will: 100	125
3.8	Netherlands (66.6) Power: 83.3, Will: 50	128
3.9	Spain (50) Power: 66.6, Will: 33.3	132

List of Tables

1.1	The macroprudential and microprudential views	24
1.2	Timeline of financial liberalization reforms	50
3.1	Coordination bodies in France and Spain	91
3.2	Different degrees of control over mortgage market instruments	92
3.3	Decision-making expeditiousness in Ireland and Austria	96
3.4	Power to act scoring grid	103
3.5	Willingness to act scoring grid	104
3.6	Austria scoreboard	107
3.7	Belgium scoreboard	110
3.8	Finland scoreboard	114
3.9	France scoreboard	117
3.10	Germany scoreboard	121
3.11	Ireland scoreboard	125
3.12	Netherlands scoreboard	129
3.13	Spain scoreboard	133
A.1	Structural Parameters	179
A.2	Derived Parameters for national MaP rules	180
A.3	Derived parameters for core MaP rule under internalization	181
A.4	Model Variables	181

Acronyms

ACPR Autorité de Contrôle Prudentiel et de Résolution. 117

AFM Authority for the Financial Markets. 128

AMCESFI Autoridad Macroprudencial Comité de Estabilidad Financiera. 132

BaFin Federal Financial Supervisory Authority (Germany). 120

BCBS Basel Committee on Banking Supervision. 6

BdE Banco de España. 132

BdF Banque de France. 117

BIS Bank for International Settlements. 1

BoF Bank of Finland. 113

CB Central Bank. 85

CBI Central Bank of Ireland. 125

CCyB Countercyclical Capital Buffer. 5

CESFI Comité de Estabilidad Financiera. 132

CNMV Comisión Nacional del Mercado de Valores. 132

CRD IV Capital Requirements Directive. 6

CRR Capital Requirements Regulation. 6

DGSyFP Dirección General de Seguros y Fondos de Pensión (Spanish Insurance Regulator).
132

DNB De Nederlandsche Bank. 128

DSGE Dynamic Stochastic General Equilibrium. 10

DSTI Debt Service-to-Income ratio. 42

DTI Debt-to-Income ratio. 42

EBA European Banking Authority. 91

EMU European and Monetary Union. 1

ESM European Stability Mechanism. 53

ESRB European Systemic Risk Board. 5

FDI Foreign Direct Investment. 35

FIN-FSA Finnish Financial Supervisory Authority. 113

FMA Financial Markets Authority. 106

FMSB Financial Market Stability Board. 106

FSB Financial Stability Board. 13

FSC Financial Stability Committee. 128

FSMA Financial Services and Markets Authority. 110

G-FSC German Financial Stability Committee. 120

G20 Group of 20. 87

GFC Global Financial Crisis. 1

HCSF Haut Conseil de la Stabilité Financière. 117

IMF International Monetary Fund. 13

LAW Lean Against the Wind. 27

LTV Loan-to-Value ratio. 41

MoF Ministry of Finance. 93

MOIKR Ministry of the Interior and Kingdom Relations. 128

MoSH Ministry of Social Affairs and Health. 113

MoUs Memorandum of Understanding. 90

NBB National Bank of Belgium. 110

NFAs Non-Financial Agents. 2

NK New Keynesian. 11

OMT Outright Monetary Transactions. 57

ONB Oesterreichische Nationalbank (Central Bank of Austria). 106

PR Prudential Regulator. 85

QE Quantitative Easing. 30

RBC Real Business Cycle. 23

SIFIs Systemically Important Financial Institutions. 2

SMP Securities Markets Program. 56

SRF Single Resolution Fund. 5

SRM Single Resolution Mechanism. 5

SSM Single Supervisory Mechanism. 58

VIX Chicago Board Options Stock Exchange Volatility Index. 43

ZLB Zero Lower Bound. 55

Challenges for Macroprudential Policy in the Euro Area: Cross-Border Spillovers and Governance Issues

Abstract: The purpose of this thesis dissertation is to enrich the debate surrounding Euro area macroprudential policy by exploring how macrofinancial and institutional heterogeneity can condition its proper conduct. Macroprudential policy is a popular subject in post-crisis macroeconomics, but analysis is often built on premises that fail to acknowledge the complexities inherent to its most basic concepts, such as financial stability itself. This problem can be addressed by conducting a critical reflection on the field's conceptual bases before formulating a model's assumptions. In the first chapter, we conduct a critical review of the literature and identify several points of tension, interpreting their implications for the Euro area case. Based on the insights of chapter 1, chapter 2 revisits the question of whether it is ideal for regulators to keep a narrow focus on national financial stabilization in the presence of cross-border spillovers. To do so, we build a static two-country New-Keynesian model where counter-cyclical capital regulation in the core affects financial stability in the periphery through the interbank market. By comparing national stabilization rules to a regime where the core regulator internalizes the spillover, we identify scenarios where the latter are preferable. Finally, chapter 3 examines the significant institutional differences that exist among EMU national regulators. By reviewing official information, as well as assessment reports from the IMF and the FSB; we map the qualitative differences of national governance frameworks. Given that institutional characteristics influence reactivity, we aim to quantify how this institutional heterogeneity affects the vulnerability to inaction bias through a comparative synthetic index. We find that countries are unequally protected against inaction bias, but there are several possible approaches to building robust governance frameworks.

Keywords: Macroprudential Policy, Financial Stability, Euro Area, Systemic Risk, Political Economy

Les Défis de la Politique Macroprudentielle dans la Zone Euro: Effets de Report Transfrontaliers et Problématiques de Gouvernance

Résumé: Cette thèse a comme but d'enrichir le débat en examinant comment les hétérogénéités macrofinancières et institutionnelles peuvent conditionner la conduite des politiques macroprudentielles. Il s'agit d'un sujet souvent abordé dans la littérature macroéconomique d'après-crise, mais la réflexion est souvent fondée sur des prémisses ne prenant pas compte des complexités inhérentes aux concepts fondamentaux, tels que la stabilité financière elle-même. Plutôt que construire des modèles davantage sophistiqués visant à incorporer toutes les dimensions du phénomène, il est possible d'améliorer l'exercice de modélisation en réévaluant les bases conceptuelles. Pour cette raison, le premier chapitre est dévoué à un survol critique de la littérature dans lequel on identifie plusieurs points de tension souvent ignorés, puis on les interprète dans le contexte de l'UEM. Sur la base des enseignements du chapitre 1, le chapitre 2 aborde la question de s'il est souhaitable que les régulateurs se soucient de stabiliser le cycle financier national en présence d'effets de report transfrontaliers, tel que dans le régime en vigueur. Dans ce but, on se sert d'un modèle statique Néo-Keynésien à deux pays où l'utilisation du coussin de fonds propres contracyclique dans le cœur peut nuire à la stabilité financière de la périphérie via le marché interbancaire. En comparant une règle de stabilisation nationale à un régime où le régulateur du cœur internalise les effets de report, on cible des scénarios où ce dernier s'avère préférable. Finalement, le chapitre 3 s'intéresse aux importantes divergences institutionnelles qui existent entre les régulateurs nationaux. En examinant l'information officielle, ainsi que les évaluations du FMI et du FSB, on documente les différences qualitatives dans le cadre de gouvernance. Sachant que les caractéristiques institutionnelles affectent la vitesse de réaction, on propose un index synthétique comparatif pour capturer quantitativement comment ces divergences institutionnelles sont susceptibles d'influencer le biais à l'inaction. On trouve que les pays sont inégalement protégés contre le biais d'inaction, mais qu'il existe différentes approches possibles pour créer des cadres de gouvernance résilients.

Mots clés: Politique Macroprudentielle, Stabilité Financière, Zone Euro, Risque Systémique, Économie Politique
