The European Banking Institute

The European Banking Institute based in Frankfurt is an international centre for banking studies resulting from the joint venture of Europe’s preeminent academic institutions which have decided to share and coordinate their commitments and structure their research activities in order to provide the highest quality legal, economic and accounting studies in the field of banking regulation, banking supervision and banking resolution in Europe. The European Banking Institute is structured to promote the dialogue between scholars, regulators, supervisors, industry representatives and advisors in relation to issues concerning the regulation and supervision of financial institutions and financial markets from a legal, economic and any other related viewpoint. The Academic Members of EBI are the following:

1. Universiteit van Amsterdam, Amsterdam, The Netherlands
2. Universiteit Antwerpen, Antwerp, Belgium
3. Πανεπιστήμιο Πιεραιώς / University of Piraeus, Athens, Greece
4. Alma Mater Studiorum – Università di Bologna, Bologna, Italy
5. Academia de Studii Economice din București (ASE), Bucharest, Romania
6. Universität Bonn, Bonn, Germany
7. Trinity College, Dublin, Ireland
8. Goethe-Universität, Frankfurt, Germany
9. Universiteit Gent, Ghent, Belgium
10. Helsingin yliopisto (University of Helsinki, Helsinki, Finland)
11. Universiteit Leiden, Leiden, The Netherlands
12. Universidade Católica Portuguesa, Lisbon, Portugal
13. Universidade de Lisboa, Lisbon, Portugal
14. Univerze v Ljubljani / University of Ljubljana, Ljubljana, Slovenia
15. Queen Mary University of London, London, United Kingdom
16. Université du Luxembourg, Luxembourg
17. Universidad Autónoma Madrid, Madrid, Spain
18. Universidad Complutense de Madrid/CUNEF, Madrid, Spain
19. Johannes Gutenberg University Mainz (JGU), Mainz, Germany
20. University of Malta, Malta
21. Università Cattolica del Sacro Cuore, Milan, Italy
22. Πανεπιστήμιο Κύπρου / University of Cyprus, Nicosia, Cyprus
23. Radboud Universiteit, Nijmegen, The Netherlands
24. Université Panthéon - Sorbonne (Paris 1), Paris, France
25. Université Panthéon-Assas (Paris 2), Paris, France
26. Stockholms Universitet/University of Stockholm, Stockholm, Sweden
27. Tartu Ülikool / University of Tartu, Tartu, Estonia

Supervisory Board of the European Banking Institute:

Thomas Gstaedtner, President of the Supervisory Board of the European Banking Institute

Enrico Leone, Chancellor of the European Banking Institute

EBI Working Paper Series

EBI Working Paper Series are a project of the European Banking Institute e.V.. EBI Working Paper Series represent a selection of academic researches into the area of banking regulation, banking supervision and banking in general which have been drafted by professors and researchers of EBI Academic Members and selected by the Editorial Board.

Editorial Board

The Dark Side of Bank Resolution: Counterparty Risk through Bail-in

Wolf-Georg Ringe* and Jatine Patel**

January 2019

Abstract

The introduction of bail-in resolution powers to impose the costs of a large bank’s failure on its creditors (rather than on the taxpayer) is the most enthralling initiative of the post-financial crisis regulatory framework. However, one important conundrum remains in the elaborate bail-in regime: it is unclear who is best qualified to hold bank capital that is subject to bail-in. This paper argues that such regulatory agnosticism as to the ideal counterparty of bail-in-able debt is subverting the new bail-in tool altogether, verily inducing banking capital investors to counterproductively choose outcomes that further systemic risk.

Using a difference-in-differences methodology, we provide evidence from the introduction of bail-in powers at the Eurozone level, confirming that it has led to a growing interconnectedness of banks. We then discuss the regulatory challenges of addressing the problem of banking capital counterparties and develop Coasian-style principles that may improve the current framework. This article builds upon the literature by providing an analysis of the interaction between banking capital counterparties and bail-in; identifying a significant gap in the regulatory framework; and explaining why Coasian, as opposed to prescriptive, regulatory measures are necessary.

Keywords: bail-in, bank resolution, interconnectedness, systemic risk, Eurozone

JEL codes: G21, G28, G33

* Professor of Law, Director of the Institute of Law & Economics, University of Hamburg; Visiting Professor, University of Oxford.
** Research Associate, Institute of Law & Economics, University of Hamburg.

We are grateful for valuable comments and feedback on earlier versions of this paper from […] as well as workshop participants at the Institute of Monetary and Financial Stability, Goethe University; an Empirical Legal Studies Workshop at the University of Amsterdam; and the French Law & Economics Association annual conference in Nancy.
Introduction

Systemic risk is a cornerstone concern of most recent policy initiatives concerning financial regulation worldwide (FSB, 2017). A key element of that global agenda are new “bail-in” powers that regulators across the world have designed, in conjunction with banking capital requirements, to end taxpayer-financed public rescues of large banks, or “bail-outs”. Bail-in holds the promise of allocating the losses of a failing bank to its creditors instead of the public purse, and thereby seeks to reduce the different types of moral hazard that arise from bail-outs. The Chair of the Financial Stability Board (“FSB”) praised those regulatory developments, stating that the:

“FSB has agreed a robust global standard so that G-SIBs can fail without placing the rest of the financial system or public funds at risk of loss. This new standard, which will be implemented in all FSB jurisdictions, is an essential element for ending too-big-to-fail for banks.” (FSB, 2015)

As this paper shows, however, bail-in may actually be furthering, rather than reducing, systemic risk, particularly systemic risk that arises from banking interconnections. This is because the regulatory framework is inadep of a fundamental concern: who is, and who should be the counterparty of banking issuances, including bail-in-able issuances. That aperture, as we demonstrate in the context of the current regulatory framework, creates relative advantages for banks that invest in other banks because presently market participants do not internalise systemic risk costs that arise out of counterparty selection. This induces increased interconnections between banks, resulting in an undesirable increase of systemic risk. The result is a prisoners’ dilemma between banks as investors and investees, because their best response is to choose to invest in interconnected banks, and thereby select more systemic risk than is desirable.

To bolster this claim, we provide quantitative evidence from the years preceding and subsequent to the adoption of the European Single Resolution Mechanism (“SRM”), the authority responsible for resolving banks under the EU Banking Union, that commenced in January 2016. We show that this legislative change led to an increase in interconnectedness between banks, and we argue that this development runs against several legislative objectives, in particular the goal of making large financial institutions more resolvable.

We then turn to discussing the challenges in regulating this issue, noting that in addition to the incentives problem mentioned above, there are also extensive knowledge, and
regulatory challenges. Whilst some aspects of the current regulatory framework including Basel III, Total Loss Absorbing Capacity (“TLAC”), and standardised information disclosure under IFRS 9, indirectly affect those knowledge and incentive issues, they insufficiently address the bail-in counterparty problem. This is because those measures seek to address pre-resolution systemic risk, and not post-resolution systemic risk, and more crucially they do not facilitate optimisation, or the who should hold corollary. Instead, we posit normative Coasian supplements through information provision and functional incentives for improved market adaptation to systemic risk, including better monitoring and managing of bank interconnectedness.

This article proceeds as follows: Part II provides the premises of the framework that we analyse by outlining the broad objectives of the bail-in regime, including the post-crisis efforts to reduce systemic risk, bail-outs, and moral hazard in banking. Then in Part III we explain why the constellation of counterparties to banking capital matter to how bail-in functions, by analysing the literature on how counterparties are intrinsic to systemic risk; how bail-in can further affect different types of systemic risk; how banking interconnections magnify those issues; and how bail-in is actually inducing banks into those interconnections. We supplement the literature and support the interconnectedness assertions in Part IV, with empirical evidence from the Eurozone. Part V then discusses the knowledge challenges and regulatory insufficiencies of various policy responses, and explores a number of potential regulatory supplements to the existing framework to facilitate better selection of banking capital counterparties. Part VI concludes.

[II] Bail-in: A Primer

In this Part we detail relevant background details including the historical emergence of the “bail-in” tool as part of broader efforts to shape a credible bank resolution framework. This is important for understanding the paradigms of its development of bail-in, especially its focus on avoiding bail-outs, as opposed to other approaches such as transaction efficiency. Moreover, explaining the underlying objectives of bail-in provides the premises from which to analyse how there is a gap in the regulatory architecture, or its dark side.

Ten years after the global financial crisis, “bail-in” has come to be understood as the most significant regulatory achievement in post-crisis efforts to end the problem of “Too Big To Fail”. It empowers regulatory efforts to impose losses on a failing financial institution’s creditors through a process in which a regulator decides to write down or convert liabilities.
pursuant to particular regulatory objectives and in a particular priority order, defined ex ante. In so doing, it de facto operates as a specific bankruptcy regime (or insolvency law) for banks – tailored to the specific needs of the urgency and complexity of the failure of a global financial institution.

Conceptually, bail-in can be understood as the modern alternative to the two traditional crisis-fighting tools that were already described by 19th century economist Walter Bagehot. In his influential book *Lombard Street*, Bagehot famously distinguished two alternatives: (i) providing central bank liquidity for banks that are illiquid, and (ii) winding down insolvent ones (Bagehot, 1873). Bail-in is a “third way” to handle a failing institution by, in effect, bank creditors insuring their bank to recapitalise so that a rescue with public money becomes unnecessary. It has developed in four predominant stages (Ringe, 2018):

1. First, the immediate post-crisis experience showed that special powers were required in order to orderly wind down large financial institutions, and that existing insolvency (or bankruptcy) laws were inadequate. This was the basis for developing “resolution” powers for state regulators, as a de facto specific bankruptcy regime for banks (Bliss and Kaufman 2011; Scott and Taylor 2012; Guynn 2012).

2. These resolution powers were refined further, and the second step was to equip resolution authorities with “bail-in” powers, to force creditors to pay for a failing institution’s losses. The major driver for granting regulators such powers was not so much the specific nature of banks or banking business, but rather the political will to end taxpayer-funded bailouts (Calello and Ervin 2010). Endorsed by the G20 and coordinated by the Financial Stability Board, such rules were adopted around the world. Most well-known are the US Dodd-Frank Act\(^1\) and the EU Bank Recovery and Resolution Directive (BRRD)\(^2\).

3. The third phase in the post-crisis agenda was the gradual emergence of a specific strategy of using such bail-in powers in a global context. International consensus is growing to apply resolution and bail-in powers with the so-called single point of entry

\(^1\) [Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010).]

(“SPOE”) approach, meaning that the institution’s home regulator is responsible for an international banking group at the group’s holding company level (Gordon & Ringe 2015a, b).

4. Based on this approach, the fourth step required was to adopt rules that guarantee the availability of sufficient bail-in debt at the holding company level. This is the current state of the regulatory process: the Financial Stability Board (“FSB”) published the final minimum total loss-absorbing capacity (“TLAC”) standard for thirty banks identified as global systemically important banks (“G-Sibs”) on 9 November 2015 (FSB, 2015). These will become binding over the years 2019-2022.

Of course the regime is far from perfect, and many problems remain (Avgouleas and Goodhart, 2015; Tröger, 2018). Still, the different steps outlined above show a remarkable learning process, driven by the broader objective to avoid government-sponsored bail-outs, and largely for two reasons: First, politically speaking, it has become increasingly difficult to explain why taxpayers’ money is used to rescue large banks that had entered irresponsible risks. Secondly, and more importantly, ending the prospect of bail-outs would re-introduce market discipline into banking. That is, finding a credible alternative to wind down a failing bank would remove the implicit guarantee that a large bank would be rescued – thus reducing moral hazard in large banks and treating them like other firms.

In the EU, bank resolution rules have an additional twist. As the financial crisis in Europe was followed by a severe sovereign debt crisis, EU leaders established the so-called “Banking Union” in 2012 to stabilise the Eurozone. This entailed the initiative to “federalise” the responsibility for supervision and resolution of banks on the EU level, rather than leaving every Eurozone Member State to operate their own banking market. The goal of this framework was to break the “doom loop” and dangerous links between Member States and their banks, and to establish a genuine EU level playing field for banking. Of interest here is particularly the Single Resolution Mechanism (“SRM”), which centralises resolution powers for large Eurozone banks in the hands of a new authority, the Single Resolution Board (SRB), and together with the National Resolution Authorities of participating Member States form the resolution authority within the Banking Union. The SRB supervises the most

---

significant credit institutions whereas all other credit institutions are supervised by their national competent authorities.  

The resolution powers of the SRM can be found in the BRRD and became effective on 1 January 2016. Bail-in is one of the resolution tools available under the BRRD, in addition to sale of business (Articles 38 and 39), bridge institution (Article 40), and asset separation (Article 41). According to Article 32(1) and (5) of the BRRD, bail-in and the other resolution tools may only be applied if a competent authority has determined that the institution is failing or likely to fail (for which the European Banking Authority (EBA) has provided further guidelines), there is no reasonable prospect that any alternative private action would prevent failure within a reasonable timeframe, it is necessary and proportionate to those objectives, and normal insolvency proceedings would not meet those objectives. This is also known as the point of non-viability ("PONV"). Article 32(4) of the BRRD provides a general description of the circumstances in which an institution shall be deemed to be failing or likely to fail, including if it is likely to infringe continuing authorisation obligations, to incur losses that will deplete all or a significant amount of its own funds, or if it is likely to become insolvent.

Importantly, whilst the BRRD outlines the circumstances in which the SRM can exercise its bail-in discretion, it specifies how a bail-in occurs. Specifically, Article 48(1) of the BRRD details that conversion or write-down of creditors’ interests under bail-in should proceed in the following order:

1. Common Equity Tier 1 (predominantly common equity); followed by
2. Additional Tier 1 instruments (other equity and convertible or hybrid securities); then
3. Tier 2 instruments (other hybrids, revaluation reserves, subordinated debt); before
4. Other subordinated debt, as defined under insolvency rules; then
5. Other unsecured debt, as defined under insolvency rules; and subsequently

Notably, that order is in effect defined ex ante because the various capital raising transactions that affect those instruments take place before any realisation of problems that give rise to the bail in. Crucially therefore, for the purposes of bail-in, any write-down is not

---

5 See above n 2.
6 SRM Regulation, Article 99(2).
ordered according to ex-post effects, including any systemic risk effects during the bail-in moment. In fact, resolution authorities are required to allocate losses equally amongst creditors by tier under BRRD Article 48(2). EBA and ESMA (2018) have accordingly reinforced this position by determining that the bail-in decisions are unable to discriminate liability write-downs by types of counterparties:

“in cases of bail-in, the BRRD does not provide for a different treatment of eligible liabilities based on the nature of the holder. Resolution authorities are required to apply the bail-in tool according to the waterfall of liabilities established in the framework regardless of the nature of the holders of the debt. Therefore, debt held by retail investors is subject to loss in resolution together with that owned by holders of other pari passu liabilities.”

Any conversion must comply with the no creditor worse off ("NWCO") principle under Article 34(1)(g). Article 74(2) of the BRRD defines NCWO as “treatment that shareholders and creditors, or the relevant deposit guarantee schemes, would have received if the institution under resolution with respect to which the resolution action or actions have been affected had entered normal insolvency proceedings at the time when the decision referred to in Article 82 was taken”, which given the economic duality of realising systemic shocks or thwarting systemic shocks and therefore not realising them, has resulted in several legal challenges as to whether creditors are actually “no worse off”.

The SRB may nevertheless invoke discretionary exclusions in Article 44(3), and be subject to exemptions may occur under the Commission Delegated Regulation 2016/860, if there are reasons to conclude that bailing in such liabilities would: (i) not be possible within a reasonable timeframe, (ii) cause contagion, (iii) impair the continuity of the institution’s critical functions or (iv) cause a disproportionate destruction in value (EBA and ESMA, 2018). The regulatory framework thereby indirectly affirms that bail-in may be undermined by systemic risk.

To respond to shocks and supplement bank resolution, the Capital Requirements Directive (2013/36/EU) (“CRD”) and the Capital Requirements Regulation (575/2013) (“CRR”), together known as “CRD IV”, oblige banks to hold particular capital. Correspondingly, BRRD Article 45 requires that financial institutions “meet, at all times, a minimum requirement for own funds and eligible liabilities” (“MREL”) and that the “minimum requirement shall be calculated as the amount of own funds and eligible liabilities expressed as a percentage of
the total liabilities and own funds of the institution”. MREL differs in some respects to the international standard known as TLAC (discussed above), but legislation is currently underway to reconcile the MREL with TLAC requirements.7

Given the contractual and property rights challenges, and the need to translate the macro objective into specific resolutions situations, the BRRD a long list of recitals, according to which the primary objectives for banking capital purposes are to:

- Ensure continuity of critical functions, such as payments systems.8
- Preserve financial stability.9
- Optimise timing and speed of intervention or action.10
- Minimise systemic risk damage.11
- Avoid moral hazard in the use of taxpayer funds.12
- Apply the “no creditor worse off” principle.13

As the next Part explains, however, there are significant trade-offs in applying those objectives, and moreover given the significant aperture in the broader regulatory framework of BRRD and CRD IV as to whom should counterparty banking capital, bail-in may be inducing systemic risk.


Having outlined the key elements and rationale of bank resolution and bail-in, this paper now seeks to provide its crucial insights in four key parts. Although the regulatory framework for bank resolution is extremely elaborate, and further developing to this day, it does not regulate who are the counterparties of banking capital. That indifference is surprising. The following explains why the identity of counterparties is paramount for the purposes of bail-in, perhaps most importantly because the legal framework’s blind eye to counterparties may

8 BRRD Recitals 1, 4, 5, 25, 49, 70, 72, 90, 114, and 125.
9 Recitals 3, 4, 11, 13, 14, 18, 24, 29, 38, 40, 41, 45, 49, 63, 67, 92, 97, 99, 102, 108, and 132.
11 Recitals 2, 6, 11, 21, 25, 29, 41, 45, 49, 56, 57, 60, 64, 67, 68, 70, and 106.
12 Recitals 1, 5, 8, 31, 45, and 67.
13 Recitals 5, 13, 47, 49, 50, 51, 67, 73, 77, 78, 111, and 119.
jeopardise the entire functionality of the bail-in regime, because it may induce, rather than reduce, systemic risk.

This section builds as follows: First, we will explain why counterparties are intrinsic to systemic risk in section 1, and then why a bail-in decision may increase systemic risk as a result of its intervention in section 2. Section 3 then demonstrates why increasing banking interconnections exacerbate those systemic risks, and Section 4 explains why bail-in is actually inducing those banking interconnections.

1. How counterparties are intrinsic to systemic risk

We start by explaining how the totality of counterparties to financial instruments constitute the ‘topology’ of a financial system, which means that financial instrument counterparties are intrinsic to the composition of systemic risk. Topology is the basis for understanding the sections that follow, especially how and why bail-in and banks interact with the financial system to affect systemic risk.

Systemic risk is, as the name implies, the aggregate potential variation of returns throughout the system, both known and unknown. Owing to the revelations from portfolio theory and the origins of financial risk analysis, the literature primarily differentiates financial risks that are unique to an individual entity (“idiosyncratic risk”), and covariate risks or the market portfolio across each of those entities (“systematic risk”). More recently, the effect of the combinations of relationships, both formal and perceived, between the entities in the system such as contagion and amplification (“system-interaction risk”), most notably during crises, have also proven immensely important for financial risk analyses.

The important difference between idiosyncratic risks, and systematic and system-interaction risks, is that financial counterparties are intrinsic to the latter two. Idiosyncratic risk, by definition, does not have an effect on counterparties, as it is unique to one entity. This difference is important because each individual entity is exposed to each type of risk, but they depend on other entities in the system for information on and control of systematic and system-interaction risks. For this reason, whilst those risks emanate from the sum of individual entity choices, their effects are imposed across the system: systemic risk externalities are thereby affected through counterparties.
The aggregation of those financial risks and relationships across the system is called the “topology” because those risks and relationships are the shape of the financial system (Allen and Gale, 2000).

The realisation of either systematic and system-interaction risks, called a systemic ‘event’ or ‘shock’, is defined by the International Monetary Fund, the Bank of International Settlements, and the Financial Stability board as:

“the disruption to the flow of financial services that is (i) caused by an impairment of all or parts of the financial system; and (ii) has the potential to have serious negative consequences for the real economy” (IMF, BIS, and FSB, 2009)

A fruition of systemic risk may have large or small consequences or separate effects on direct counterparties and other participants in the system, including ‘indirect’ counterparties, depending on both the systematic effects, and how the aggregation of interconnection sequences responds to each subsequent entity in the chain of entities’ relationships, or how the risk undulates across the topology (Freixas, Parigi, and Rochet, 2000). That undulation differs, moreover, between different seniority layers of financial instruments (Hüser et al, 2018).

The shock’s topological transformation that results from the fruition of risk is a result both of the nature of the interaction between entities in the system and the nature of that risk. That transformation is contingent on the totality of each entity’s realisations of the risk event (Bernard, Capponi, and Stiglitz, 2017), including all system interaction and systematic risk realisations, until the new “payment equilibrium” is settled upon (Acemoglu et al., 2015; Eisenberg and Noe, 2001).

The effect of a systemic risk event on any one entity is contingent therefore on more than that entity’s direct choices of investment or the selection of any of its counterparties, but rather the nature of its interaction in the totality of the system, the topology. Additionally, therefore, the effects that any interaction chosen or selected by one entity, has systematic and system-interaction effects on the topology, and all of its entities, that are not equivalent to the effects on that particular entity. It is the interrelated nature of a topology which externalises systemic risks from the choices that any individual entities make. To illustrate, the realisation of a seemingly large risk event may bring down a large player without dramatic consequences to the market topology, such as the collapse of Barings bank,
Drexel, or MF Global; but an individual instrument default may reverberate through the system causing multiple investor collapses and a large loss of welfare, such as simple mortgage defaults (Sommer, 2014).

For bail-in purposes, specifically, there are critical distinctions between the priority orders of bail-in-able debt that are determined by the choices of entities individually, ex ante to a systemic risk shock (as detailed in the previous Part); and the effects of financial risks on each entity in the system which are determined by that nature of the system itself and the nature of the shock. Importantly, the set and structure of counterparties determined ex ante will necessarily differ from the optimal topology, due to the lack of ex-ante knowledge that we have about the nature of any systemic shock and the ideal topology to respond to it (see below Part V.1). This is the cause of the aperture in the regulatory framework. That aperture is the difference between the system’s selection and the optimal selection of the constellation of counterparties. The sections that follow explain why that aperture matters for regulatory purposes.

In brief, it is crucial to note that the constellation of counterparties, and how their layers of financial issuances interact, are intrinsic to systemic risk. If regulation is to minimise the economic costs of any shock -- and accordingly affect desired levels of systemic risk --, the topology (the constellations of counterparties) needs to be optimally matched to that shock.

2. How bail-in can propagate systemic risk

This section expands on the previous section by exploring how bail-in decisions affect financial system topologies, in ways that may propagate systemic risk. Core to this section is the insight that bail-in as such does not vanquish a shock, but rather passes on the effects of the shock in its particular way. That particular way, however is extraneous to how the shock will managed by the new topology’s structure and information systems. It thereby affects how any shock traverses the topology, yet those changes are not evaluated by the regulator when forming their decision.

More specifically, bail-in operates directly on banks, and consequently bail-in generates its effects through banks in both how they affect the topology itself, and how banks are affected by the topology, in reaction to the shock. Some of the ways in which bail-in can propagate systemic risk are common to other forms of resolution, whilst others result uniquely from bail-in. Nevertheless, both are important to establishing how bail-in can propagate systemic risk.
Moreover, as is explained below, the effects of bail-in can exceed other resolution methods, insolvency, and bail-out, because of its immediate effects on the topology, including recapitalising critical functions as opposed to dissolving pari passu.

Bail-in may affect systemic risk through its restructuring. First, bail-in can increase systematic risk. This is because once a bank resolution has taken place, the profit margins of other non-resolved banks are squeezed by the subsequent market frictions and uncertainty in banking markets. Subsequently, the cost of supplying banking services increases and thereby profit margins of any financial instrument that operates concurrently are reduced (Acharya, 2009), beyond the risk effects that directly led to that resolution. Bank resolution actions, additionally, tend to increase the concentration of banks in financial markets: if the shock is large, the topology is more likely to suffer even greater loss because increasing concentrations of banks will further magnify the effects of a large systemic shock (Bernard, Capponi, and Stiglitz, 2017). Moreover, because bail-in occurs overnight, by design, before any positive effects such as ‘last bank standing’ can take effect (Perotti and Suarez, 2002), bail-in is likely to affect those systematic effects in a stronger manner than other forms of bank resolution.

Additionally, in anticipation of bail-in specifically, banks themselves are prone to adopt more systematic risk than is desirable because their downside risks are imposed on bondholders, and those bondholders are not provided with corresponding power to affect management decisions. Shareholders, who do select management and receive the surplus from owning the enterprise that provides banking critical functions (mentioned above), are thereby further subsidised in their preference for managers who improve the expected returns albeit with increased exposure to risk (Jensen and Meckling, 1976; Pennacchi, 2011), because critical function users can expect to be rescued. Further, depositors are prioritised to bondholders by regulatory obligations such as deposit insurance, as opposed to market determinations, and to the extent those obligations differ to preferences, depositors’ monitoring incentives correspondingly diminish. Therefore, due to their influence over management, and the implicit subsidy of shareholders’ and depositors’ risk preferences, correspondingly banks that are subject to bail-in will adopt higher than desired levels of systematic risk.

There is furthermore an anticipation effect from the knowledge that interconnections amongst banks result in more systemic risk, causing banks to further prefer interconnections because by herding their investments there are ‘too many to fail’ and so bail-out becomes more likely (Acharya and Yorulmazer, 2011). Albeit that banks therefore place a higher
premium on riskier investments, that choice is driven in reaction to the regulatory intervention, so bail-in incentivises increased levels of systematic risk.

Moreover, system-interaction risk effects may also occur because observing the resolution of a bank can signal bad health of any correlated banks. This is a result of the necessarily opaque nature of banks (Dang et al., 2017), and therefore markets judge them conjunctively by the performance of other banks, thereby affecting runs on other banks when shocks occur (Aghion, Bolton, and Dewatripont, 2000; Acharya and Thakor, 2016). In the extreme, a negative information shock can shut down banking markets altogether (Morris and Shin, 2012).

Furthermore, that contagion risk is exacerbated by recent regulatory capital requirements and bail-in risks because banks have subsequently become increasingly reliant on short-term funding, in order to price in more delineated risk responsibility and increased responsibility for systemic risk (Brunnermeier and Oehmke, 2013). Havemann (2018) has shown that this took place after the bail-in of a small South African credit institution. Therefore, in addition to the signalling effect, a bail-in may subsequently trigger a short-term debt run because of the (non)coordination effects in not expecting other investors to roll over short-term debt (Martin, Skeie, and Von Thadden, 2014; He and Xiong, 2012).

Additionally, bail-in can further induce system-interaction risk in relation to instruments that are more complex, and involve significant levels of information gathering and analysis, or ‘tail-risk’ instruments (Shleifer and Vishny, 1992; Coval and Stafford, 2007). Upon a resolution event, the subsequent counterparties to those instruments will be unlikely to develop sufficient knowledge of those instruments during a bail-in window, such that a significant mismatching of portfolio assets is likely to result. Moreover, both before and after a bail-in, the (in)ability of investors to monitor and affect outcomes concerning those instruments might induce even further risk (Gennaioli, Shleifer and Vishny, 2013; Biasis et al, 2010; Freixas and Rochet, 2013).

Consequently for the purposes of bail-in counterparties matter fundamentally, because systemic risk propagation occurs through the topology. That propagation may exceed the consequences of other bank resolution tools and insolvency methods, because of how bail-in differs to those other approaches in how it interacts with the system. This may seem counterintuitive given that bail-in’s primary attribute is utilising TLAC’s “loss” absorbing capacity, but as this section has shown, in reality a systemic shock is neither “absorbed” nor
vanquished but rather passed on to counterparties, and bail-in’s intervention can thereby exacerbate any shock through its systemic effects.

3. How bank interconnections can further exacerbate systemic risk

The previous section explained how a bail-in decision can propagate systemic risk, in which it is prevalent throughout that banks are a predominating component in that propagation. We now turn to the problem that interconnections between banks (a particular topological formation) can further exacerbate systemic risk effects from bail-in, especially due to the impact of increased exposure to the bail-in effects that we explained above.

When more banks are the investors in banking capital then a bail-in decision will subsequently result in increased effects of bank concentration in the topology, and moreover their squeezed profit margins (Bernard, Capponi, and Stiglitz, 2017). This is because banks would then be, by the definition of their increasing interconnections, more exposed to the effects of bailing in another bank.

Additionally, when banks are more interconnected, any bail-in operation affecting one bank will signal poorer health about other banks, because that resolution will signal correlations between banks, in a manner that increases with interconnections, and thereby increasingly threaten a run on each of the more interconnected banks (Acharya and Thakor, 2016).

The effects, furthermore, of banks being counterparties to other banks’ liabilities are that after a bail-in action occurs, banks would be increasingly exposed to tail risk investments that they are not accustomed to sufficiently monitoring, because of the concentration of their holdings in other banks and because banks being a predominant developer of tail risks (Acharya et al, 2010).

With more bank investment in banking issuances there is consequently a more interconnected network of banks. When banks are more interconnected, large risk shocks are likely to be propagated or amplified by such a financial system because the shock has larger and bigger effects on the other interconnected banks, due to their reliance upon each other for funding (Acemoglu et al., 2015).
Interconnections between banks are therefore likely to exacerbate the systemic risk effects of bail-in, further demonstrating why banking capital counterparties matter fundamentally for the purposes of bail-in, especially if those counterparties are other banks.

4. How bail-in incentivises banks to become more interconnected

We now turn to explore why the current regulatory framework also incentivises further interconnections between banks, and thereby why counterparties matter fundamentally to bail-in, particularly how bail-in is being subverted.

A bail-in decision may be frustrated by any systemic risk it creates, and therefore, as Bernard, Capponi, and Stiglitz (2017) note, “a commitment not to intervene [by way of bail-out] may be credible under some topologies but not under others”. This is because both before the bail-in framework was established, and despite the adoption of bail-in legislation, bail-out has been implicitly signalled as inevitable for systemic risk that cannot be stemmed by bail-in (Gropp, Gruendl, & Guettler, 2014). The more interconnected banks become, the more likely it is that the authorities will resort to a bail-out rather than a bail-in resolution. This is because both the investor and the issuing bank, in any bank interconnection, are less likely to be bailed in if doing so creates further systemic risk. Therefore, banks’ appraisals of banking interconnections would implicitly incorporate the benefits of the same types of moral hazard that are brought about by a bail-out.

Additionally, as discussed above, banks do not bear the systemic costs of their choices because the systemic risk effects of interconnectedness are externalised to the decision and evaluation about the premium on any one particular issuance, each risk is collectively borne by the commons of the banking and financial system, and are not borne internally to any one bank’s investment (Farhi and Tirole, 2012). Each of the risks mentioned above are externalised from the individual choices of each bank, and therefore banks are not incentive constrained into minimising systemic risk in their counterparty choices.

In fact, banks are incentivised to become interconnected in anticipation of the realisation of any small financial risk. This is because a network of interbank links is more robust than a circular chain of interbank links (Freixas, Parigi, and Rochet, 2000), and larger degrees of financial institution interconnections increase the potential of the network to absorb small shocks (Acemoglu et al., 2015). Indeed, smaller degrees of financial institution interconnections reduce direct contagion (Hüser et al, 2018), but in the extreme, a single

Electronic copy available at: https://ssrn.com/abstract=3314103
(central) counterparty, a ‘star’, increases the amplification of small shocks (Allen and Babus, 2009).

The combination of small risk and large systemic benefits, and the externalisation of costs to the system for banks therefore means that banks, by ‘virtue’ of bail-in, retain relative advantages in investing in other banks’ capital. Moreover, due to the additional systemic risk induced by the desire for interconnectedness, bail-in has thereby separated the market for holding banking liabilities, and counterproductively developed an equilibrium where banking capital liabilities are more attractive to other banks, than to non-banks.

To be clear, this means that banking capital is subject to increased systemic risk, but crucially banks face different (cheaper) costs of investing in banking capital than other, non-bank investors. Consequently, during the ‘holistic’ processing of banks’ portfolios, and their assessments of new investments (McKinsey, 2016), they are more likely to purchase other banks’ issuances because they would estimate higher implicit premiums than other non-bank investors, and so whilst banks may have less holdings in total, they become more interconnected with each other.

The imposition of bail-in, therefore, creates a moral hazard in the system’s choice of banking capital counterparties because it induces more risk in the system, that moreover adversely selects non-bank investors away from banking capital due to the implicitly higher costs they face compared to banks. The consequence is that in spite of investors preferring no systemic risk, they chose (banking) investments that induce systemic risk. For these reasons, bail-in may be counterproductive in inducing a type of prisoners’ dilemma in the choice of risk adopted by banking capital counterparties.

5. Conclusion

The bottom line is that banking capital counterparties matter significantly for bail-in purposes. As we have demonstrated, on the one hand bail-in can be undermined by a set of counterparties, and on the other hand, bail-in is incentivising the development of such a topology. Bail-in’s intervention is thereby interacting with financial system topologies in a manner that may be inducing further systemic risk, especially through counterparty selection. This is particularly concerning for the BRRD’s objectives of: preserving financial stability;14

14 BRRD Recitals 3, 4, 11, 13, 14, 18, 24, 29, 38, 40, 41, 45, 49, 63, 67, 92, 97, 99, 102, 108, and 132.
minimising systemic risk damage;\textsuperscript{15} avoiding moral hazard in the use of taxpayer funds;\textsuperscript{16} and optimising the timing and speed of intervention or action.\textsuperscript{17} It moreover demonstrates inconsistency between those objectives, and ensuring the continuity of critical functions, and applying the “no creditor worse off” principle.\textsuperscript{18}

[IV] Evidence from the Eurozone

This Part provides evidence that supplements the arguments made above. In particular, it shows that banking interconnections are increasing in the Eurozone subsequent to the introduction of bail-in. This serves to provide significant evidence that counterparties do matter for the purposes of bail-in, and moreover, in the context of the literature, that counterparties matter in a way that is fundamental to the purposes of bail-in. We first explain why the Eurozone provides an appropriate case study, and then provide the data analysis with additional quantitative support for this article’s assertions.

1. The SRM and Bail-in Credibility

The Eurozone, through the Single Resolution Mechanism (SRM), provides an appropriate source of analysis for the expectations that we have generated from our analysis of the literature. Legislative changes adopted for the Eurozone framework provide a unique opportunity to study the impact of bail-in because its practical credibility coincided with both their de jure and de facto legal powers coming into force. This is particularly due to the ratification timing of the intergovernmental agreement, obligations to incorporate BRRD susceptibility in banking capital contracts, and the unification of national policies through member states implementation (so the anticipation effect is minimal). Simultaneously, albeit at an aggregated level, EBA provides data regarding banking interconnectedness and therefore in addition to providing a clear date for testing bail-in’s effect, data is also available to conduct that test.

The EU Regulation governing the SRM was adopted in 2014 but became applicable, in its main parts, from 1 January 2016.\textsuperscript{19} Due to political reasons, the SRM Regulation was accompanied by a separate Intergovernmental Agreement (IGA) between the Member

\textsuperscript{15} Recitals 2, 6, 11, 21, 25, 29, 41, 45, 49, 56, 57, 60, 64, 67, 68, 70, and 106.
\textsuperscript{16} Recitals 1, 5, 8, 31, 45, and 67.
\textsuperscript{17} Recitals 4, 15, 22, 23, 40, 51, 53, and 101.
\textsuperscript{18} Recitals 5, 13, 47, 49, 50, 51, 67, 73, 77, 78, 111, and 119.
\textsuperscript{19} SRM Regulation, Article 99(2).
States that specifically created a “Single Resolution Fund” (SRF) to make the SRM fully operational. By the end of November 2015, a sufficient number of Member States had ratified the IGA so that it could enter into force on 1 January 2016 (European Council, 2015). According to the European Commission, “The ratification of IGA means that the Single Resolution Board, which is the resolution authority established in 2015 to deal with eurozone banks in difficulty, will become fully operational … It also ensures that the full resolution powers of the Single Resolution Board will apply as of 1 January 2016 to allow for the timely and effectively resolution of banks in the EU’s Banking Union” (European Commission, 2015).

The BRRD – the legal instrument that provides for the different resolution tools – became operational at the same time. Although Member States were required to implement the BRRD into national law already by the end of 2014, the bail-in tool was to be applied only from 1 January 2016 onwards. Moreover Article 55 of the BRRD required EEA financial institutions to have ensured that any banking liabilities were contractually subject to, and recognise bail-in under the BRRD from 1 January 2016. Therefore, from 1 January 2016 there were significant reductions in legal ambiguity in the application of the BRRD to banking liability contracts.

The combination of the BRRD and SRM meant that “cross-border banking” and “national financial policies” in the Eurozone were unified in regards to bank resolution, so as to overcome the “financial trilemma” (Schoenmaker, 2011; 2013), and provide a credible bail-in scheme. This is because, in addition to bail-in powers becoming legally enforceable on 1 January 2016, virtually all Eurozone Member States had implemented their obligations under the BRRD by 1 December 2016 (ISDA, 2016).

There is support in the literature for bail-in taking effect on the date that de-jure powers became effective. For example, Schäfer, Schnabel, and Weder di Mauro (2016) analyse CDS spreads and share prices, Benczur et al. (2017) evaluate public financing costs, and both studies find a significant effect from bail-in. Notably for this article’s purposes, Acharya, Anginer, and Warburton (2014) found that the Dodd-Frank Act did not significantly reduce systemic banks’ bail-out expectations.


\footnote{BRRD Article 130(1).}
In sum, the entry into force of the SRM marks a credible de jure and de facto imposition of bail-in, which makes the SRM an appropriate object to study our analysis.

2. **Empirical Support**

This section details our quantitative support for the assertion that counterparties matter fundamentally to bail-in including that it is driving interconnectedness. We use a difference-in-differences research methodology, from which we find support for our four key expectations:

1. The effect takes place on the date that bail-in becomes legally applicable, 1 January 2016.
2. Banks, the treatment group, become more interconnected as a result of bail-in. There is strong support to reject the null hypothesis that banks are becoming less interconnected as a result of bail-in.
3. Non-banks, the control group, are becoming less interconnected with banks as a result of bail-in. We find strong support to reject the null hypothesis that they are becoming more interconnected as a result of bail-in.
4. Bank size is decreasing at a higher rate, as a result of bail-in. We are able to provide data that supports this claim, and it is supported more generally in the literature.

Finding data to represent network topology is challenging, especially given the diffuse and private nature of these transactions. However, data from the Securities Holding Statistics ("SHS") database provided by the European Central Bank details total values of assets held by types of holders, defined by regulatory supervision structures (Rousovea and Caloca, 2014). The SHS data concerning “Monetary Financial Institutions" ("MFI") is a good proxy for banks because MFIs are defined as (ECB, 2018a): 22

> “Financial institutions which together form the money-issuing sector of the euro area. These include the Eurosystem, resident credit institutions (as defined in EU law) and all other resident financial institutions whose business is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account (at least in economic terms), to grant credit and/or invest in securities. The latter group consists predominantly of money market funds."

---

22 MFIs include money market funds, but they constitute approximately only 00.18% of total MFI funds, so they are relatively quite small (see ECB, 2018b).
The graphs that follow illustrate the relevant SHS data, and we detail the regression results of our difference-in-differences study to verify our arguments. Amongst the myriad of data available from the ECB, the primary data we have sourced for this article details the euro value of Eurozone MFI holdings, and all other (non-MFI) holdings of worldwide MFI issuances, by each quarter from the Quarter 4/2013 to Quarter 2/2018, providing a total of 38 data points, which are themselves collectively representative of the changes across that 5 year period.

In order to discern interconnectedness between banks we deduce the proportion of Eurozone MFI holdings that are other worldwide MFIs’ issuances (for each quarter), and for our difference-in-differences study we correspondingly deduce proportions (again for each quarter) of Eurozone non-MFIs’ holdings of worldwide MFIs’ issuances. The relevant data is annexed to this article.

The data reveals significant support for the assertion that bail-in is catalysing Eurozone MFI interconnectedness, and therefore in the context of the preceding discussion that bail-in has precipitated a moral hazard in the choice of banking capital counterparties, and a prisoners’ dilemma in systemic risk choice.

This first graph shows the remarkable change in direction of Eurozone MFI interconnectedness from the date that bail-in became credible (1 January 2016):

---

23 Some readers may be curious as to whether wholly owned subsidiaries matter for this analysis. As mentioned earlier, the topology is what matters. If there are some instances of much higher concentration of ownership, even 100% of equity ownership, in the hands of only one other entity, systemic risk remains a concern not least because any debt relationships are likely to be dispersed amongst the system, but more importantly because what matters, as discussed above, is the interaction between any shock and the current topology. Given our lack of knowledge in expecting shocks it is equally 'likely' that a wholly owned subsidiary will propagate systemic risk and not propagate systemic risk and every degree in between.
The graph that follows shows that before bail-in there is a parallel trend between MFIs’ investments, and non-MFIs’ investment, in MFIs’ issuances. Critically, however, after 1 January 2016 (Quarter 1/2016) MFIs’ investment in MFIs’ issuances follows a markedly increasing rate that clearly contrasts to non-MFIs’ investment, in MFIs’ issuances.
This graph clearly shows the opposite directions that MFIs’ and non-MFIs’ investment in MFIs’ issuances have been following since bail-in became credible on 1 January 2016, notably showing the significant increase in MFI interconnectedness subsequent to bail-in. Whilst non-MFIs’ investment decreased by 1.24% or 597 billion Euros over the first quarter of 2016, MFI investments increased by 2.80% or 165 billion Euros over the same period. The proportional trends prior to 1 January 2016 also illustrate the strength of the common trends assumption for our difference-in-differences test that follows.
We use a difference-in-differences methodology to test the significance and the degree of the effect that bail-in had on MFI interconnectedness, using the data displayed in the previous graph. Our treatment group, MFIs, were subject to bail-in treatment from 1 January 2016, whilst our control group, non-MFIs, were not subject to bail-in treatment: and both remained able to invest in MFIs. The methodology therefore tests the effect of bail-in rules on investment preferences, and more particularly therefore tests whether counterparties matter for bail-in generally and what effect bail-in had on counterparty preference. We additionally control for: the value of banking assets, in case bank returns affected any changes during the period, by averaging the performance of the EURO STOXX Banks index per quarter to coincide with the SHS data; the number of banking entities in the Eurozone, because as discussed above these might affect interconnections due to the differing ‘profit’ that banks, as opposed to non-banks, can expect to yield from these ‘connections’; and interest rates, for that same reason. Our results very significantly support our hypotheses, and are as follows:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.249900632</td>
</tr>
<tr>
<td></td>
<td>(0.0642)</td>
</tr>
<tr>
<td>Bank Index</td>
<td>-0.02657547</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
</tr>
<tr>
<td>Rate of decrease of Bank Entities</td>
<td>-0.155775455</td>
</tr>
<tr>
<td></td>
<td>(0.5873)</td>
</tr>
<tr>
<td>Interest Rates</td>
<td>-0.23064965</td>
</tr>
<tr>
<td></td>
<td>(0.2129)</td>
</tr>
<tr>
<td>Bail-in?</td>
<td>-0.04227591</td>
</tr>
</tbody>
</table>

Electronic copy available at: https://ssrn.com/abstract=3314103
We repeat our test, using the raw quantities (by Millions of Euros), as opposed to proportions, which is a less perfect measure of interconnectedness, but also supports our arguments with a (very) significant quantum increase in MFI to MFI instruments, when compared to non-MFIs to MFI interconnections. Again, we find very statistically significant support for our hypotheses:

\[
\begin{array}{|c|c|}
\hline
\text{Variables} & \text{Coefficients} \\
\hline
\text{Intercept} & 4394189.511 \\
& (989885.0334) \\
\text{Bank Index} & 8015.015559 \\
\hline
\end{array}
\]

\[0.026205004***\] (0.0073)

*** Very significant positive effect

24 Again, some readers may be curious as to whether this increasing interconnectedness is simply the result of consolidation of banking entities. Indeed, there has been some consolidation in banking entities, which we report further below. But this is clearly shown above to be an insignificant factor (“Number of Bank Entities”) in increasing interconnectedness. Furthermore, qualitatively, given the small proportion of consolidation within the eurozone, and the fact that this analysis evaluates Eurozone bank interconnectedness, it seems unlikely that the increasing interconnectedness that we find is the result of consolidations. In general, and most importantly, as is explained earlier in this section, even if their interconnections were driven by banking industry consolidations, the upshot or implications for systemic risk remain.
<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of decrease of Bank Entities</td>
<td>344.4303783</td>
</tr>
<tr>
<td></td>
<td>(72.6825)</td>
</tr>
<tr>
<td>Interest Rates</td>
<td>-4142204.3</td>
</tr>
<tr>
<td></td>
<td>(1965496.2468)</td>
</tr>
<tr>
<td>Bail-in? (Time)</td>
<td>36201.92061</td>
</tr>
<tr>
<td></td>
<td>(148604.5592)</td>
</tr>
<tr>
<td>MFI Interconnections (Treatment)</td>
<td>-6071956.741</td>
</tr>
<tr>
<td></td>
<td>(55770.0632)</td>
</tr>
<tr>
<td><strong>Interaction</strong> (Difference in Differences Measure)</td>
<td><strong>252445.0471</strong>*</td>
</tr>
<tr>
<td></td>
<td>(76873.727)</td>
</tr>
<tr>
<td>Observations</td>
<td>38</td>
</tr>
<tr>
<td>R Square</td>
<td>0.998712885</td>
</tr>
</tbody>
</table>

*** Very significant positive effect

It is uncertain at what stage those increasing interconnections will cause enough systemic risk to affect a bail-in decision exemption, especially because the effects of those interconnections depend on the nature of the shock. Hüser et al's (2018) study is the closest estimate of the contagion effects of a bail-in decision, but it only measures contagion effects that are direct. It is clear, nevertheless, that increasing interconnections amplify the likelihood of a legal exemption from bail-in, and that those increasing interconnections are taking place.
3. Additional Support

In order to verify the arguments provided in Part III and this section, we conducted further research, and found significant support for our interconnections assertion. We additionally: test our common trends assumption; show that MFIs are increasingly utilising short term debt in the churn of their issuances and holdings, and that they are therefore more susceptible to systemic risk; and show that bank concentration in the Eurozone grew at an increasing rate subsequent to the introduction of bail-in, founding further concerns about systemic risk stemming from bank concentration.

In a recent International Monetary Fund working paper, Malik and Xu (2017) measure interconnectedness using another methodology that involves comparing the Vector Autoregression systemic risk measure with equity returns and volatilities. Importantly their results support our findings find that:

“Notably, the degree of connectedness for both equity returns and volatilities among global banks and insurers has risen sharply since January 2016 and now has reached levels observed during the European Sovereign Debt Crisis.”

In order to verify our common trends assumption we compared the rate of change of MFI-MFI holdings between Q4 2013 - Q4 2014 and Q1 2015 - Q4 2015, for which we are able to show that there is a non-significant difference between the two trends (before bail-in):

<table>
<thead>
<tr>
<th>Interaction Term</th>
<th>0.00250536</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Stat</td>
<td>0.4908537</td>
</tr>
<tr>
<td>P Value</td>
<td>0.63238347</td>
</tr>
</tbody>
</table>

To illustrate the common trends assumption, this graph superimposes the MFI-MFI interconnectedness trend onto the Non MFI-MFI interconnectedness trend, before and after 1 January 2016.

25This summarises the method they use: “The spillover analysis based on the Diebold and Yilmaz (2014, 2015) methodology first estimates a Vector Autoregression (VAR) approximating model with equity market data of global banks and insurers. The connectedness measure is then derived from the forecast error variance decomposition of the underlying VAR for equity returns and volatilities.”
To illustrate the effect that the regulatory framework has had on long, as opposed to, short-term debt issuances, the following graphs show a proportional substitution of long-term MFI debt into short-term MFI debt, and then from bail-in credibility (1 January 2016) the increase in short-term debt continues, whilst the long-term debt decline decreases at an accelerated rate. Notably, the decline in the long-term debt proportion of MFI portfolio holdings became steady at approximately 25% of MFIs' portfolios, once bail-in became credible. These graphs reinforce the assertion that bail-in has had a discernable impact on systemic risk, especially due to its effect on short term debt issuances:
On the other hand, with bail-in, short-term debt portions of holdings portfolios increases.

These results are consistent with the prediction from the literature that long term debt is being substituted for short term debt, indicating, as discussed, a stronger systemic risk effect arising out of those banking interconnections.

At the same time bank concentration has also increased since bail-in became credible. Notably, the marginal decline before 1 January 2016 was -0.34%, and after 1 January 2016 (the kink) -0.50%: An increase in the decline of number of banks indicates an increasingly increasing concentration of banks after bail-in.
This provides further support for the concerns about the systemic risk effects from the increasing interconnections detailed above, resulting from Bail-in.

The data available from the Eurozone case study therefore provide significant support for this paper’s assertions, especially in relation to effects of bail-in on the interconnectedness of banks.

[V] The Challenges In Solving The Conundrum & Possible Coasian Supplements

This Part explains why the counterparty conundrum cannot be solved by private contracting, because in addition to the incentive problems detailed above, there are extensive knowledge insufficiencies that impede market players from behaving optimally, and regulators from deciding bail-ins optimally. We explain why subsequently therefore, regulators and market participants are unable to prescribe optimal topologies, despite some calls to do so. We nevertheless posit some Coasian style supplements to the current regulatory framework that might assist in developing solutions, including allocating default voting rights to bail-in-able
capital holders, increasing the provision of credible information about systemic interactions, and some amendments to the BRRD.

1. **General Impediments to Systemic Knowledge**

This section explains why there are fundamental knowledge insufficiencies in both knowing optimal topologies and the current topology, and predicting shocks.

As discussed above, previous literature holds that even beyond being unable to price in unknown-unknown risk, there is an extensive lack of understanding of how any shock may traverse any topology, and the shape of both the current topology and the optimal topology for any risk (Bonisch and Di Giammarino, 2010). For example, a large shock may be subdued by the same network topology that accentuates a small shock, and vice-versa (Gai and Kapadia, 2010; Elliot, Golub, and Jackson, 2014).

These challenges are evident in attempts to sufficiently model systemic risk. Primarily, Allen and Gale (2007) and Morris and Shin (2008) have shown that capital requirements do not sufficiently account for how the structure of interconnections among banks affect systemic risk. Various models have been posited since, including “VaR” and “CoVar” (Adrian and Brunnermeier, 2016), that differ in their approach according to the business cycle stage (Clerc et al., 2015), the position of the bank within the topology of the market (Alter, Craig, and Raupach, 2015), the effects of different systems (Goodhart et al., 2012), and the interaction of idiosyncratic attributes of the bank itself with the market (Adrian and Brunnermeier, 2016). Notably, additional to the lack of concordance in those models, the use of those models in the context of uncertainty about systemic events increases the procyclical herding effects of any systemic risk (Danielsson and Zigrand, 2008). These models demonstrate the practical analytical challenges, and indeed shortcomings, of gathering sufficient data, knowing the causal factors, delineating their effects, and generating an overall understanding of any one system.

Moreover, the crux of ex-ante banking regulation, particularly capital requirements, stress tests, and living wills, provide signals about the ability of banks to internalise a shock (Goodhart, 2016), but do not facilitate knowledge about how the system might absorb any shock. Moreover, our lack of knowledge about systemic risk causes, and matching sufficient networks to manage shocks can be further exacerbated by bail-in decisions themselves, because the decision, by design, operates before systemic risk is realised (SRB, 2015), so
we do not know whether any bail-in decision is a false positive event. The current regulatory framework is therefore geared towards hoping for sufficient ability for absorption of systemic risk, as opposed to generating information and learning about systemic risks and the financial system (Morris and Shin, 2008).

Moreover, to discern the interconnections between system participants, the ECB’s Securities Holding Statistics, which we sourced our data from, is unique in being able to source, and provide information about topologies, but it is limited in its Eurozone holding scope, and provides data at an aggregate level, as opposed to an entity specific level.26 Additionally, given that the Transparency Directive (2013/50/EU) is concerned with financial instrument holdings that carry “voting rights” over the issuer, for the most part, bail-in-able securities and banking capital are not subject to those disclosure obligations. Market players are therefore unable to map topologies. More generally, therefore, both markets and their watchdogs are unable to facilitate the matching of investors and investments according to systemic risk concerns.

Furthermore, the International Accounting Standards Board recently promulgated the International Financial Reporting Standard 9 (“IFRS 9”), in response to the financial crisis of 2008, and concerns about banking market disclosure deficiencies. It became the mandatory reporting requirement in the EU as of 1 January 2018 (EBA, 2018), but is not mandatory in other jurisdictions. IFRS 9 specifies the financial accounting methodology for valuing financial instruments (“ECL”), depending on the instruments classification, and creates a common language from which to understand a bank’s assessment of their financial risks (IFRS, 2018). However, in centralising the determination of valuation methodologies, IFRS 9 thereby increases the centralisation of banking methods, and therefore contributes to the herding potential discussed earlier. As the Chair of ESMA, Steven Maijoor, recently observed (ESMA, 2018):

“This increased complexity and reliance on judgements will pose additional challenges in assessing objectively the provisioning approaches by external auditors but also by banking supervisors and accounting enforcers”

If all banks are valuing their instruments in the same manner, the market is channelled into a more uniform understanding. Given our lack of systemic risk understanding, it would be preferable to facilitate heterogeneous methodologies (Ayres and Mitts, 2015).

Finally, even if one market player were fully informed about systemic risks, they would be unable to profit from their knowledge, because interest rates would also systematically deviate and therefore not provide an arbitrage option. Even if an entity were able to detect systemic risk, the collective action and transaction costs required to reduce any costs they expect to suffer would be inexorably high (Haldane and May, 2011). Accordingly, there is little incentive for market players to detect and develop information about systemic risk, nor act on their knowledge.

To illustrate, the insufficiency of systemic risk information for investors in the current regulatory environment is depicted by the difficulties that markets experienced in pricing contingent-convertible bonds (“CoCos”). CoCos are bonds that were issued to become convertible from liabilities into equity upon the realisation of an event. However, on the one hand, investors have endogenous information about their issuances, and on the other hand, the benefit of that information is rivalrous between investors and issuers (Dang et al., 2017), which results in significant moral hazards in divulging that information. We can therefore neither rely on individual banks, nor contracting relationships between them, to facilitate disclosure of this information. This is illustrated by the challenges issuers experience in appropriately pricing CoCos:

“There exists a tension between … the prudential needs of an issuer to optimize its capital structure with affordable loss absorption funding that maintains the entity as a going concern” (ESMA, 2014)

More broadly, there is a lack of knowledge across CoCo markets concerning the causes of systemic risk. According to ESMA:

“given the varying trigger levels of issuance across a given banking group it is difficult to envision exactly how the contractual provisions relating to the conversion or write-down of CoCos will play out. There exists uncertainty in the context of a supervisory decision establishing when the point of non-viability has been reached as well as in the context of a statutory bail-in set up under the new Bank Recovery and Resolution Directive.” (ESMA, 2014)
Therefore, in addition to the incentive challenges discussed earlier in this article, market players and regulators are subject to fundamental knowledge insufficiencies within the current institutional environment, which impede the optimal management of systemic risk.

2. Inability to Prescribe nor Regulate Holders

Against this backdrop, we can now explore how these knowledge insufficiencies make both prescriptions of banking capital investors and other current regulatory efforts that seek to optimise holders largely ineffective. In a nutshell the rules need to focus on facilitating who should hold, as opposed to arbitrary obstacles to who should simply not hold banking capital.

There have been calls for ‘pension funds’, ‘insurance companies’, or ‘hedge funds’ to be the primary holders of bail-in-able securities, simply because they can ‘absorb’ the risk. This seems to be an ineffective approach because sufficiency is not contingent on whether the potential holder is called a “pension fund” or perhaps “insurance company” or even necessarily a “household”, but rather on other factors such as portfolio diversification, Kelly criteria, and duration (Persaud, 2016). Moreover, their ability to affect systemic risk is contingent on their ability to manage risks as well as their “ability to monitor” (Shleifer and Vishny, 1992; Coval and Stafford, 2007).

In any case, some measures have been taken to restrict the degree to which banks are holders of other banks’ issuances. The Basel III rules discount and limit the extent to which banking issuances to other banks can be counted towards sufficient TLAC (BCBS, 2016) and risk-weighted assets (BCBS, 2017), and those rules become applicable from January 2019.27 The Basel Committee moreover has previously expressed concern about interrelationships between “Global Systemically Important Banks” (BCBS, 2014b). Despite these efforts, Gofman (2017) finds the effect of bank interconnectedness restrictions to be increasingly costly, whilst improving stability but non-monotonically with shock size. Further, as mentioned above, the optimal financial system topography depends on the type of risk, where higher levels of interconnectedness may be more functional for small systemic shocks. Furthermore, the rate at which banking interconnections are costly, and correspondingly the rate at which they should be deterred, cannot be known ex ante, and because these rules only reduce TLAC count as opposed to penalising banking concentration more generally, systemically threatening interconnectedness may persist.

27 These rules will be enforceable under EU Directive 2013/36/EU and EU Regulation 575/2013.
Moreover, the ability to transact at the time of larger systemic risk events, and to create *indirect* and opaque holdings, means these rules are ineffective during the sudden onset of big shocks. The Basel III rules may do no more than artificially increase costs to banking capital. Reducing TLAC counts may not affect systemic risk and unfortunately serve to increase the costs of capital.

To illustrate the prevailing helplessness of regulators, consider the recent statement adopted by the European Banking Authority and the European Securities Markets Authority about the treatment of retail holdings of debt instruments that are subject to BRRD, in which they noted that:

“The distribution of debt financial instruments issued by institutions to retail clients, including the practice of ‘self-placement’ — whereby institutions place the debt financial instruments that they themselves (or other group entities) have issued with their own client base — may raise significant consumer protection issues and affect the practical application of the resolution framework under the BRRD.” (ESMA, 2014)

That statement implies serious concerns, but stops short of imposing any additional regulatory moves to limit retail holdings of bail-in-able securities. In a similar vein, Article 44(3) of the BRRD encourages consideration of “the number of natural persons directly and indirectly affected by the bail-in, visibility and press coverage of the resolution action, insofar as that has a significant risk of undermining overall confidence in the banking or broader financial system”, for which there is further support in Article 27(5)(c) of the SRM Regulation.\(^28\) Indeed there is some justification for ‘retail’ investors being unsuitable bail-in-able liability counterparties, because any bail-in decision may undermine critical functions including payment infrastructure access, and induce political risks (Calello and Ervin 2010; Schäfer, Schnabel, and Weder di Mauro, 2016), but neither EBA nor ESMA provide explanation nor theory of who should hold bail-in-able securities instead, nor how to shift the topology in that direction.

Even if regulators had information advantages in discerning banking capital holders, there is significant evidence indicating that regulators are incentivised to ‘allow’ systemic risk to

---

\(^{28}\) See Article 8(2)(b) of Commission Delegated Regulation (EU) 2016/860 of 4 February 2016 specifying further the circumstances where exclusion from the application of write-down or conversion powers is necessary under Article 44(3) of Directive 2014/59/EU of the European Parliament and of the Council establishing a framework for the recovery and resolution of credit institutions and investment firms.
occur beyond socially preferable levels. This is because regulators face a trade-off between ensuring that all banks have the same prudent behaviour and encouraging heterogeneity in risk-taking (Wagner, 2010). Therefore, supervisors may be imposing their own views about risk on banks and implicitly increase herding banking investment behaviour (Bernanke, 2013). Moreover, bail-outs tend to be less costly for regulators, and their limited resources, when many financial institutions fail at the same time (Farhi and Tirole, 2012), due to the fixed costs in conducting regulatory resolution processes, that, moreover, incentivise regulators to provide a better picture of banks before systemic events (Walther and White, 2015). Those issues are further accentuated when attempting to manage functional cooperation between regulators in separate jurisdictions (Lehmann, 2017), due to decisional uncertainty, and information provision between regulators (Carletti, Dell’Ariccia, and Marquez, 2016).

It is precisely because any systemic risk event affects different institutions in different ways that any prescribed network structure will be unequally costly, or discriminatory, across different types of institutions. This may distort markets, and may cause significant legal problems, aside from any political challenges. For example, if we force banks into ‘weak’ interconnectedness, there may be less systemic fragility (Acemoglu et al., 2015), but we would correspondingly lose the significant cost of capital and diversification benefits that interconnectedness provides. Ex-ante prescriptions about who should not hold may not only be ineffective, but costly, especially without facilitation of who should hold bail-in-able securities.

3. Regulatory Supplements

Given the incentive, knowledge, and regulatory challenges outlined above, the following outlines some potential supplements to the current regulatory framework so as to develop more knowledge, and allow market players to transact more effectively. Importantly, given our lack of knowledge, diversification remains our most effective ex-ante tool to manage systemic shocks.

As this article has shown, bail-in induces moral hazard in the selection of banking capital counterparties, and subsequently a prisoners’ dilemma amongst investors. Therefore, conversely to the identified problems, we need to facilitate sufficient cooperation mechanisms amongst investors, and internalise systemic risk costs, whilst ensuring the provision of credible information to sufficiently match investors with banking investments,
beyond the current regulation’s hopeful absorption of any shock. Accordingly, the following suggestions argue for the facilitation of optimal topologies through learning and incentives. These suggestions are provided in response to the identified issues, and further analysis would be required to understand how they might fit within the broader legal and market ecosystem.

Our primary suggestion is that informing markets about banking liability counterparties at an entity-specific level, and that IFRS 9 obligations should be a default option for reporting under a comply or explain approach. This approach would facilitate some heterogeneity in reporting, and assist in decreasing centralised herding behaviour around instrument types and methods of valuation (Ayres and Mitts, 2015). There are concerns that increased banking transparency might affect banks’ ‘opacity’, and thereby undermine the functionality of banks and result in banking runs (Dang et al., 2017; Landier and Thesmar, 2014; Morgan, Peristiani, and Savino, 2014). But research has shown that if systemic risk information is provided with enough time before the event, participants are able to focus on subsequent equilibria and avoid unfounded fears, and therefore would not cause runs (Bouvard, Chaigneau, De Motta, 2015). Banking functionality, on the other hand, may be impaired, because, for example, the disclosure of stress test results can destroy opportunities for risk-sharing (Goldstein and Leitner, 2015). But because we do not want systemic risk to be managed on an intra-bank level, but rather by all market players, credible disclosure of systemic risk would facilitate socially optimal risk sharing arrangements (Bonisch and Di Giammarino, 2010). That is to say, opacity of banking capital counterparties does not seem to provide any benefits, but rather produces significant information costs to prevent an appropriate assessment of systemic risk. Financial network topology data is available, and there is little reason to restrict access to it.

Given that individual market entities are not incentivised to disclose that information, investors are dependent on regulators who are currently not responsible to market players for the quality of the information. Consequently, it appears that some form of regulatory duty, or verification mechanism may be necessary. Additionally, information provided by market players to the regulator needs credibility, which is currently lacking (Bonisch and Di Giammarino, 2010). By placing misstatement liability above manager’s bonus remuneration in any resolution the agents that provide the information would be incentivised to provide it credibly. Indeed governance developments may be preferable to further capital controls (Goodhart, 2016).
If bail-in-able asset counterparties are granted sufficient power to exercise appointment and removal powers over directors, in the same way that shareholders exercise power, then managers’ interests would be more aligned with investor preferences (Schwarcz, 2017). Consequently the most efficient monitors would be incentivised to select-in as banking capital counterparties, regardless of whether we classify them as ‘pension funds’, ‘insurer’ or ‘households’, because what really matters for their, and their system’s, purposes are their portfolio’s attributes. Moreover, therein, investors would be better positioned to enforce cooperative structures across banking institutions to prevent the banking capital dilemma, which complementary to the information disclosure argued for below, would assist in breaking down the moral hazard amongst banking capital investors. Banks themselves have created non-regulatory bilateral bail-in arrangements (Leitner, 2005). Indeed, if those voting rights are granted, Article 9 of the Transparency Directive may correspondingly afford information disclosure obligations on banks for those issuances, and correlative rights to their investors.

For these same reasons moreover, when retail holders are broken down by their heterogeneous preferences, some of them may form ideal holders, and therefore perhaps CRD IV should include a default presumption against retail investors holding bail-in-able liabilities, for which contracting out is available if those investors are sufficiently informed.

In light of the learning concerns detailed above, there may be benefits in randomly utilising non bail-in banking resolution options, as opposed to selecting bail-in for every bank failure. Despite the criticism of the SRM’s inconsistent approach there are significant benefits any counterfactual results from not using bail-in, and so the learning opportunities and diversity of mechanism functionalities that have developed (Ayres and Mitts, 2015).

We moreover suggest that the Eurozone’s “contagion” exemption to bail-in be removed, and instead that the SRB should signal a willingness to resolve multiple entities simultaneously to nevertheless maintain critical functions and sap systemic risk. This will reduce the ex-ante potential for bank interconnections to undermine bail-in, whilst further internalising systemic risk costs to banks because each (and their investors) are then potentially bail-in-able in the event of any of their peers being resolved.

Finally, despite the Basel III criticisms above, we support one of the principles of that rule: a mechanism that makes increasing interconnections amongst financial institutions increasingly costly. In light of our other criticisms, however, we suggest that those increasing
costs should apply to all financial institutions, because increasing interconnections between any types of financial institutions are increasingly concerning for systemic risk (Poledna, Bochmann, and Thurner, 2017). This would moreover prevent unwanted and opportunistic use of voting rights mentioned above. The Basel III rules are targeted at capital sufficiency, so a different form of intervention would be necessary for financial institutions that are not regulated by their capital adequacy, which given the extent of transaction costs, may require a Pigouvian tax (Ayres and Mitts, 2015), from which the proceeds can ‘insure’ for future financial shocks.

[VI] Conclusion

Despite the fact that since the advent of bail-in, we have not experienced a systemic risk event, and therefore to our knowledge bail-in has not been seriously tested, this paper demonstrates the challenge of bail-in functioning within the complexity of its objectives. Optimal systemic risk internalisation is something that we are all still learning about, and may never really understand.

In particular, this article has shown that bail-in powers may actually be increasing systemic risk, particularly systemic risk that arises from banking interconnections. This is because the regulatory framework is inadep of a fundamental concern: the counterparties to banking capital. This creates relative advantages for banks that invest in other banks, because the bail-in framework does not internalise the systemic risk costs that arise out of counterparty selection. Consequently, this creates a moral hazard in the selection of banking capital counterparties. The result is a prisoners’ dilemma between banks as investors and investees, because their best response is to choose to invest in interconnected banks, and thereby select more systemic risk than is socially preferred. We provided evidence from the introduction of bail-in in the Eurozone under the auspices of the SRM and demonstrated that banks have as a consequence begun to invest more into each other’s bail-in-able debt.

We subsequently discussed the challenges in regulating this problem, noting that in addition to the incentive problems discussed above, there are also extensive knowledge and information challenges. Whilst some aspects of the current regulatory framework including the Basel III and the TLAC framework, and standardised information disclosure under IFRS 9, indirectly affect those knowledge and incentive issues, they insufficiently address the bail-in counterparty problem especially because those measures address pre-resolution
systemic risk, and not post-resolution systemic risk. More crucially perhaps, they do not facilitate optimisation, or the who *should* hold corollary.

Finally, we explored steps that may help provide some potential knowledge, incentives, and regulatory supplements to the current framework and thus may assist in reducing the challenge. More analysis and further holistic research is required to understand better what combination of regulatory instruments would be appropriate.
## Data Annex

<table>
<thead>
<tr>
<th></th>
<th>% of MFIs Held by EZNonMFI</th>
<th>% of MFIs Held by EZMFIs</th>
<th>Bank Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013Q4</td>
<td>20.3383%</td>
<td>36.9526%</td>
<td>-10.1503%</td>
</tr>
<tr>
<td>2014Q1</td>
<td>19.9187%</td>
<td>36.1103%</td>
<td>0.4958%</td>
</tr>
<tr>
<td>2014Q2</td>
<td>19.1645%</td>
<td>35.5348%</td>
<td>-0.8365%</td>
</tr>
<tr>
<td>2014Q3</td>
<td>18.7736%</td>
<td>34.9317%</td>
<td>2.6771%</td>
</tr>
<tr>
<td>2014Q4</td>
<td>17.8902%</td>
<td>34.3443%</td>
<td>8.2036%</td>
</tr>
<tr>
<td>2015Q1</td>
<td>16.7011%</td>
<td>33.3347%</td>
<td>11.4082%</td>
</tr>
<tr>
<td>2015Q2</td>
<td>16.7721%</td>
<td>34.1293%</td>
<td>14.7647%</td>
</tr>
<tr>
<td>2015Q3</td>
<td>16.9680%</td>
<td>33.8642%</td>
<td>-10.2000%</td>
</tr>
<tr>
<td>2015Q4</td>
<td>16.3405%</td>
<td>33.6372%</td>
<td>-5.8395%</td>
</tr>
<tr>
<td>2016Q1</td>
<td>15.8184%</td>
<td>32.7229%</td>
<td>-27.4549%</td>
</tr>
<tr>
<td>2016Q2</td>
<td>15.4103%</td>
<td>32.7428%</td>
<td>-8.8159%</td>
</tr>
<tr>
<td>2016Q3</td>
<td>15.2906%</td>
<td>33.6086%</td>
<td>-5.9812%</td>
</tr>
<tr>
<td>2016Q4</td>
<td>15.2785%</td>
<td>34.1390%</td>
<td>9.4422%</td>
</tr>
<tr>
<td>2017Q1</td>
<td>15.1658%</td>
<td>34.4818%</td>
<td>1.6420%</td>
</tr>
<tr>
<td>2017Q2</td>
<td>15.0394%</td>
<td>34.8108%</td>
<td>-5.0685%</td>
</tr>
<tr>
<td>2017Q3</td>
<td>14.7421%</td>
<td>34.7012%</td>
<td>-5.5032%</td>
</tr>
<tr>
<td>Year</td>
<td>Non MFI holdings of MFIs (Millions of Euro)</td>
<td>Total Non MFI Holdings (Millions of Euro)</td>
<td>EZ MFI Holdings of MFIs (Millions of Euro)</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>2013Q4</td>
<td>8390337</td>
<td>41253794</td>
<td>2246104</td>
</tr>
<tr>
<td>2014Q1</td>
<td>8519410</td>
<td>42770961</td>
<td>2249802</td>
</tr>
<tr>
<td>2014Q2</td>
<td>8433818</td>
<td>44007391</td>
<td>2208845</td>
</tr>
<tr>
<td>2014Q3</td>
<td>8406160</td>
<td>44776416</td>
<td>2173369</td>
</tr>
<tr>
<td>2014Q4</td>
<td>8111322</td>
<td>45339409</td>
<td>2096922</td>
</tr>
<tr>
<td>2015Q1</td>
<td>8244490</td>
<td>49364968</td>
<td>2084120</td>
</tr>
<tr>
<td>2015Q2</td>
<td>8036723</td>
<td>47917198</td>
<td>2060808</td>
</tr>
<tr>
<td>2015Q3</td>
<td>7864983</td>
<td>46351970</td>
<td>2037581</td>
</tr>
<tr>
<td>2015Q4</td>
<td>7790243</td>
<td>47674523</td>
<td>1992324</td>
</tr>
<tr>
<td>2016Q1</td>
<td>7606263</td>
<td>48084959</td>
<td>1929962</td>
</tr>
<tr>
<td>2016Q2</td>
<td>7515339</td>
<td>48768237</td>
<td>1932514</td>
</tr>
<tr>
<td>2016Q3</td>
<td>7639806</td>
<td>49963963</td>
<td>1946201</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2016Q4</td>
<td>7752619</td>
<td>50741982</td>
<td>1949572</td>
</tr>
<tr>
<td>2017Q1</td>
<td>7918501</td>
<td>52213005</td>
<td>1979232</td>
</tr>
<tr>
<td>2017Q2</td>
<td>7889596</td>
<td>52459568</td>
<td>1946375</td>
</tr>
<tr>
<td>2017Q3</td>
<td>7843555</td>
<td>53205302</td>
<td>1895667</td>
</tr>
<tr>
<td>2017Q4</td>
<td>7767948</td>
<td>53721391</td>
<td>1876985</td>
</tr>
<tr>
<td>2018Q1</td>
<td>7831420</td>
<td>53737723</td>
<td>1899000</td>
</tr>
<tr>
<td>2018Q2</td>
<td>7631974</td>
<td>54267573</td>
<td>1846394</td>
</tr>
</tbody>
</table>
References


Acharya, V. "Is the international convergence of capital adequacy regulation desirable?." The Journal of Finance 58, no. 6 (2003): 2745-2782.


Bagehot, W. (1873) Lombard Street: A Description of the Money Market


European Commission, Statement: “Commission welcomes the successful ratification of the Intergovernmental Agreement on the Single Resolution Mechanism by Greece and calls on Luxembourg to follow suit” European Commission Brussels, 7 December 2015


Address

European Banking Institute eV.
Mainzer Landstrasse 251
60326 Frankfurt am Main
Germany

For further information please visit our website www.ebi-europa.eu or contact us at info@ebi-europa.eu
The European academic joint venture for research in banking regulation