THE IMPLICATIONS FOR BANK RISK POSED BY THE BAIL-IN AMENDMENTS TO THE RANKING OF UNSECURED SENIOR DEBT INSTRUMENTS IN INSOLVENCY HIERARCHY

Laurence Jones [*], Enrico Geretto [*], Maurizio Polato [**], Giulio Velliscig [*]

* Department of Economics and Statistics, University of Udine, Udine, Italy
** *Corresponding author,* Department of Economics and Statistics, University of Udine, Udine, Italy
Contact details: University of Udine, Via Tomadini 30/A, Udine, Italy

Abstract

Given the scarce empirical research supporting the branch of literature investigating the shortcomings of the bail-in regime (Hadjiemmanuil, 2015; Walther & White, 2020; Tröger, 2020), this paper offers a contribution in this regard investigating the implications for bank risk posed by the amendments to the unsecured senior debt asset class required to enhance the bail-in regime. To this purpose, we use a sample of 46 banks distributed over 17 European countries over the period of Q1 2010–Q4 2019. We thus run a fixed effect panel data regression over the entire period and also over the subperiods before and after the start of the overhaul of the unsecured senior debt asset class. Our main result points out the significant role of unsecured senior debt in explaining bank's risk after the start of the amendments campaign which allowed this asset class to serve the enhancement of the bail-in regime. We attribute this result to the uncertain gone-concern loss-absorbing capacity of unsecured senior debt and its material cost exacerbated by the bail-in buffer shortfall of many European banks. Our result pique policymakers' attention to the side-effects of the amendments to the bail-in regime and further guide bank managers' decisions about regulatory funding strategies.

Keywords: Unsecured Senior Debt, MREL, Bail-In, Credibility

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1. INTRODUCTION

The aim of this paper is to delve into the implications for bank's risk posed by the alignment of the bank's capital structure to bail-in prescriptions.

The legislative developments in the field of systemic banks and bank crisis management mark a change of route in the composition of the banks' capital structure. Although Basel III has reduced the share of instruments different from CET1, the above-mentioned interventions have increased again the buffer of other loss-bearing liabilities. The implementation of the bail-in tool in the European bank resolution framework has indeed

required banks to meet at all times a minimum requirement for their own funds and eligible liabilities (MREL).

However, things got complicated starting from 1st January 2016 when Bank Recovery and Resolution Directive's (BRRD) provisions extended the scope of bail-in from subordinated debt to unsecured bonds and uninsured depositors. It, therefore, resulted quite confounding for investors and supervisors to clearly quantify the actual stock of bail-inable liabilities, especially with respect to cross-border banking groups (Erzegovesi, 2017).

As designed, moreover, even senior debt sold to retail customers may be subjected to bail-in causing hefty reputational damages for banks and undermining their capacity to raise retail funding at low costs (Resti, 2016).

In addition, misalignments in the creditors' insolvency hierarchy across member states and the resulting litigations that may arise from the violation of the no-creditor-worse-off (NCWO) principle together with the ample discretion given to authorities regarding the decision about to whether exclude some liabilities from the bail-in further complicated the framework.

To address these shortcomings, regulators set out the MREL subordination requirement which requires banks to meet the MREL with instruments that rank in insolvency below other liabilities that are either not bail-inable by law or difficult to bail-in.

To efficiently abide by the subordination requirement, some European countries have amended the rules regarding the insolvency hierarchy of unsecured senior debt under their national insolvency legislation. These amendments split the asset class represented by unsecured senior debt into two categories: non-preferred and preferred senior debt. The former is eligible to meet the subordination requirement and is meant to allow banks to efficiently pile up the buffer consisting of bail-inable liabilities as non-preferred senior debt is less expensive than other subordinated liabilities.

Preferred senior debt instead is not eligible to meet the subordination requirement but can still be accounted, under certain conditions, within the MREL buffer and also be bailed-in if necessary. This is the approach pursued by France. Similarly, Germany and Italy introduced preferential treatment for other senior claims against an outstanding senior bond, which makes most outstanding senior bonds eligible for MREL. Other member states instead opted for a different subordination approach. Spanish banks followed the contractual approach whereas the UK, given the legal structure of their banks, followed the structural solution.

At the EU level, these amendments culminated with the entry into force of the Directive 2017/2399, which supports the French solution and harmonises the ranking of unsecured senior debt across the member states. The Directive, therefore, allows also those banks of countries that did not amend their insolvency law to issue non-preferred senior debt and so being effective in piling-up the bail-in buffer. As a result, unsecured senior debt, especially in its non-preferred format, plays a crucial role in shaping the banks' capital structure in a consistent way with the bail-in regime so as to make the bail-in tool effective in case of resolution.

Non-preferred senior debt represents, however, a competitive advantage for larger institutes, as it allows them to comply with the MREL requirement in a more efficient way than the smaller ones. Mid-sized banks, whose business model and funding strategy are incompatible with large bond issuances, would not be able to take advantage of non-preferred senior bonds. As a result, these banks could struggle to comply with the MREL requirement, as it would be rather expensive to pile up the MREL buffer by using other subordinated liabilities.

This topic is prominent nowadays, as the debate over the applicability of the bail-in also to smaller banks is taking hold among European authorities. Nevertheless, complying with the MREL requirement could be demanding also for banks able to tap the market of non-preferred senior bonds.

The bail-in regime is indeed not only transforming the banks' capital structure but is also increasing its intrinsic costs by transferring risk from taxpayers to unsecured bondholders (Crespi, Giacomini, & Mascia, 2019).

As investors in senior unsecured debt are those more affected by the change of route from bail-out to bail-in policies, especially by the above-mentioned amendments on the asset class, they are expected to ask for a higher risk premium, thereby materially affecting the banks' cost of debt. In addition, such an impact is further exacerbated by the material MREL deficit of EU banks (García & Rocamora, 2018).

Furthermore, doubts arise as to whether unsecured senior debt actually fulfils its purpose to enhance the bail-in tool. The bail-in, indeed, suffers from credibility problems that stem from the political and regulatory discretion that might hamper its application (Hadjiemmanuil, 2015; Walther & White, 2020).

The resulting uncertainty regarding its prompt and full application in case of crisis may therefore jeopardise the efforts made to enhance its framework. As a result, the large issuances of unsecured senior debt, especially in its non-preferred format, may turn out to be counterproductive as, instead of an efficient precaution, they may weigh on bank operativity.

Uncertainty further impedes investors from correctly price bank risk into securities as they are not able to predict their loss exposure in case of bail-in. The resulting mispricing may therefore jeopardise bank operativity and further exacerbate systemic adverse effects in case of crisis (Tröger, 2020).

To sum up, large issuances of unsecured senior debt, especially in its non-preferred format, could sharply increase the cost of debt of banks able to tap this market and also cut off those that are not familiar with the international bond market as they struggle to change their capital structure in a way coherent with the bail-in regime.

Moreover, these efforts could be jeopardised by the lack of credibility of the bail-in regime that could lead competent authorities to pursue different crisis management techniques which do not involve the employment of such resources.

Given these issues, the research question that this paper seeks to answer is whether the increasing weight of unsecured senior debt within the bank capital structure is affecting the bank's risk.

Providing an empirical study of this relationship, we contribute to the extensive theoretical literature investigating the shortcomings of the bail-in regime. Despite providing thoughtful insights about the authorities' discretion (Walther & White, 2020),

the political interests (Hadjiemmanuil, 2015), and the investor's concerns (Tröger, 2020), such literature is inadequately supported by empirical evidence.

Our sample consists of 46 EU banks distributed over 17 member states. We collect from Bloomberg quarterly bank-level and country-level data over the period Q1 2010–Q4 2019. We, therefore, implement a fixed effects panel data regression to study the relationship between a bank's risk and the weight of unsecured senior debt within the bank capital structure.

Our main result points out that the weight of unsecured senior debt became relevant as the bank's risk driver after the amendments campaign which allowed this asset class to serve the enhancement of the bail-in regime.

We explain this result with the scarce contribution of unsecured senior debt to the bank's loss bearing capacity and its material costs caused by the replacement of bail-out policies with a bail-in regime and further exacerbated by the bail-in buffer shortfall of many European banks.

These results indicate to policymakers the possible side-effects of the implementation of the bail-in regime amendments to the unsecured senior debt asset class and are also useful to bank managers when planning their regulatory funding strategies.

The rest of the paper is organized as follows. Section 2 discusses the relevant literature and provides an overview of the bail-in buffer regulation. Section 3 describes the sample and the methodology employed. Section 4 presents and discusses the results. Section 5 concludes the paper.

2. LITERATURE REVIEW

This section provides a review of the relevant literature regarding the shortcomings of the bail-in regime and the resulting implications in terms of bank operativity, which provide the cornerstone on which some hypothesis about the relationship between bank risk and the alignment of the bank's capital structure to bail-in prescriptions are developed.

Regarding credibility, the bail-in regime is disciplined by a tangled and complicated mass of regulation whose main vulnerability lies in the major discretion allowed to the authorities involved in the resolution process. In particular, Hadjiemmanuil (2015) points out the crucial role played by political authorities in the decision process for the imposition of the bail-in indicating their discretion as fundamental in determining bail-in credibility. Moreover, national politicians may also back down to short-term political pressures for bailouts. Then, Walther and White (2020) focus on the regulator's discretion. They develop a model in which regulators decide upon resolution actions with discretion after analyzing private information regarding the bank's viability. Their results show that regulators with bad news and discretion have incentives to conduct excessively weak bail-in policies due to the costly consequences that the signal of a bail-in may trigger, such as bank runs. Philippon and Salord (2017) further indicate the large flexibility granted to authorities as the main concern for bail-in application. In order to enhance credibility, the authors suggest

the application of the bail-in to medium-sized ailing banks as their systematic relevance is often overestimated.

The uncertainty resulting from the ample discretion granted to authorities regarding bail-in application also jeopardises the investors' ability to predict the outcome in case of bail-in. As a result, investors are not able to correctly price bail-inable securities in line with the risks they are going to incur in case of bail-in. Mispricing thus opens up to two different possibilities: underpricing, which may cause a moral hazard, or overpricing which, due to harsher refinancing costs, may hamper lending capacity, therefore, impairing growth. In addition, in case of mispricing, an unanticipated bail-in during a financial crisis might cause an overreactive price correction in bond yields resulting in a liquidity freeze and collapse of the interbank market (Noller, 2018). The investor's predictability of outcome emerges, therefore, as a material problem that pledges to hamper the bail-in application. Moreover, this problem appears also to be unsolved by the enhancements to the bail-in regime as not even a sufficient MREL, which mitigates the confusion caused by the discretionary exemptions from bail-in for certain liabilities and by the NCWO principle, is able to tackle investors' uncertainty. The latter, indeed, would still be hampered by the degree of administrative discretion inherent in the resolution process (Tröger, 2020).

Some actual cases of crisis management can give the extent of the credibility issue suffered by bail-in. In the Eurozone, since the creation of the Single Resolution Board (SRB), the resolution has been decided by the SRB just once with regard to the Banco Popular Español case of 6th June 2017. On that occasion, the resolution was deployed in three phases: 1) write-down of CET1 and AT1 capital; 2) conversion into equity of all Tier 2 capital; 3) transfer of shares converted to Banco Santander for 1 euro. Regardless of the favourable comments by the authorities involved, doubts remain as to whether the bank became insolvent because of the bank-run on the wholesale funding, fostered by the threat of the bail-in, or because of the capital deficit detected afterwards during resolution. Moreover, the later cases of banks in distress, such as the Banca Popolare di Vicenza and Veneto Banca in Italy, or Ablv Banka and As Pnv Banka in Latvia have not been managed according to BRRD provisions (Erzegovesi, 2020).

In addition to the bad design of bail-in rules, scholars' attention has been piqued also by bail-in implications for bank operativity. In detail, the introduction of the bail-in regime marks a break from the previous bail-out era by transferring risk from taxpayers to unsecured bank creditors. Given the worsening of their risk-profile, bail-inable investors will therefore ask for higher returns in comparison to non-bail-inable investors.

Some explorative studies have therefore empirically addressed the question. J. P. Morgan suggested that the introduction of bail-in would result in an expected increase of 87 basis points in the long-term debt yield for a single A-rated bank (J. P. Morgan, 2011). Moreover, The European Commission has estimated an overall increase in bank funding costs of 31.6 basis points (European Commission, 2012).

Moreover, the study conducted by Crespi et al. (2019) over a sample of 1,798 fixed-rate bonds issued by Italian banks during the period of 2013–2016 finds out an increase in the spread at issuance of bail-inable bonds compared to non-bail-inable bonds after the enforcement of the bail-in in 2016. In a similar vein, Giuliana (2019) explores the impact of bail-in events, both legislative and related to its enforcement, on a sample of 23,756 EU bonds between 2012 and 2016. As both studies measure the impact of bail-in on the yield spread between bail-inable and non-bail-inable bonds, which literature deems a reliable measure of bail-in credibility, their results point out higher expectations of bail-in among investors, therefore, supporting the credibility of the bail-in.

Contrarily, Pablos (2019) does not find any increase in the subordinated spread, namely the difference between subordinated bonds' yields and senior unsecured bond's yields, by analysing the impact of the EU implementation of the bail-in regime for 41 EU credit institutions over the period of Q4 2014–Q2 2018. Consistently, Chan-Lau and Oura (2016) point out only a modest increase in senior unsecured debt yields which does not support the thesis of a credible bail-in.

In addition to the impact on the cost of debt, literature has also expressed the bail-in implications for banks' business model. In order to enhance bail-in credibility, the abovementioned study by Philippon and Salord (2017) suggests applying bail-in to medium-sized banks, however, most of them present a retail-oriented business model, mostly funded with capital and deposits, which makes them unsuitable for the bail-in.

Referred to as "middle class" by Fernando Restoy, Chairman of the Financial Stability Institute, these banks, in case of crisis, are generally too large to be subjected to normal insolvency proceedings but also unprepared to align their capital structure to the recent amendments in terms of subordinated bail-inable instruments as they are unfamiliar with the international bond market whose access may further result economically unfeasible (Restoy, 2016, 2018). As a result, these banks may lack the sufficient loss-absorbency capacity required by the bail-in thereby hampering its application or causing counterproductive effects if the bail-in would be forced. As the number of these banks is potentially material and the regulator efforts are focused on tailoring the bail-in rules for systemically important groups, then the bail-in applicability to this class of banks becomes a relevant subject of analysis which further casts some shadows about bail-in credibility. On the basis of the above, we have developed the following hypotheses to test:

H_0: The weight of unsecured senior debt does not affect the bank's risk. Specifically, the weight of unsecured senior debt does neither weigh on banks' cost of debt nor is perceived as unnecessary in case of crisis.

H1: The weight of unsecured senior debt increases the bank's risk. Specifically, this relationship would corroborate our thesis of a negative effect of large issuances of non-preferred senior bonds as well as preferred senior bonds to comply with bail-in rules, that weighs on banks' cost of debt and is further perceived as unnecessary in cases of crisis as bail-in suffers from severe credibility issues.

For smaller banks, this relationship demonstrates the incompatibility of such banks with the bail-in regime and the struggle they are facing in coping with it.

H2: The weight of unsecured senior debt decreases the bank's risk. Specifically, the increasing weight of unsecured senior debt proves the soundness and resilience of the bank as it is able to attract capital, abide by bail-in rules, and further expand its activities. With regard to smaller banks, this relationship accounts for a lower MREL buffer for such banks and also discounts lower expectations over the extension of the bail-in regime also to these banks.

2.1. Regulatory framework

In the afterwards of the global financial crisis (GFC), one of the key objectives pursued by the regulatory overhaul has been focused on strengthening the banks' capital base. In Europe, the Directive 2014/59/EU, known as BRRD, introduced the MREL, which ensures that banks hold a sufficient amount of bail-inable liabilities in order to grant their stand-alone loss-bearing and recapitalization capacity in case of resolution.

Almost at the same time, on 9 November 2015, the Financial Stability Board (FSB) established international principles and a term sheet (the FSB TLAC Term Sheet) that set out internationally agreed rules regarding the total loss-absorbing capacity (TLAC) for global systemically important banks (G-SIBs). Accordingly, cross-border banking groups of systemic relevance, whose failure may threaten the stability of the entire financial system, have been required to pile up a buffer of securities and other liabilities that should be promptly available in case of distress to bear the losses.

TLAC and MREL are conceptually equivalent but diverge under specific aspects related to their scope, calibration, application, and eligibility criteria.

Regarding the scope, the MREL applies to all credit institutions in the EU whereas TLAC applies to G-SIBs only.

Regarding calibration, whilst in the case of the TLAC, the FSB provides for a minimum requirement which each G-SIB is obliged to respect, in the case of the MREL the BRRD does not set out a minimum level or target but designs the MREL as an institution-specific requirement which has to be tailored to each individual bank. The different approach stems from the broader scope of the MREL which needs to account for differences in banks' size, risk profile, organizational structure, and systemic importance. Moreover, differences emerge also in the calculation of the two requirements.

The TLAC Term Sheet drafted by the FSB in November 2015 makes provision for a minimum TLAC standard equal to 16% of the risk-weighted assets (RWAs) of the bank and 6% of its leverage ratio exposure (LRE). These percentages have a binding effect from 1st January 2019. They will subsequently be increased to 18% of the RWAs and 6.75% of the LRE as soon as the TLAC enters its full regime (1st January 2022).

The MREL requirement, instead, consists of two fundamental components, identifiable according to the function that the eligible resources need to guarantee during the resolution process of the bank.

These components are the loss absorption amount (LAA) and the recapitalization amount (RCA). The first aggregate is compulsory for all the banking intermediaries and represents the set of instruments that are most appropriate for guaranteeing the loss-absorption. The resources which compose the LAA have to appear in the balance sheet prior to the start of the crisis management process (Crespi & Mascia, 2018). To be more specific, the LAA is equal to the greater of the following two amounts: a) the sum of the requirements of Pillar I, Pillar 2 (P2R), and the combined buffer ratio (CBR), together with any further supervisory review and evaluation process (SREP) requirements; b) the amount defined by the compulsory leverage ratio requirement.

The RCA is only binding for those institutions for which an ex-ante resolution submission was approved in the event of their failure. The available instruments in the RCA are therefore intended to re-establish the regulatory capital of the bank after the losses have been absorbed. On a technical basis, the RCA is determined by the maximum value of the following amounts: a) the sum of the Pillar I and P2R requirements; b) the amount defined by the compulsory leverage ratio requirement.

In the definition of the RCA, an incremental component may be provided. This is represented by the so-called "market confidence charge" (MCC), which is intended to maintain market confidence following the resolution process of the intermediary (SRB, 2018). The relevant provisions set a calibration equal to the CBR of the bank minus 125 basis points.

Further adjustments to the MREL requirement are provided by the deposit guarantee schemes (DGS) adjustment and the SREP adjustment (SREPA). Regarding the former, an amount equal to the contribution of the specific bank towards the DGS for the resolution process must be deducted from the values related to the LAA, the RCA, and the MCC components, as it is provided for in Article 6 of the Directive 2016/1450 of the European Commission (Dreke & Wollinsky, 2017). Regarding the latter, the resolution authority is required to quantify a component, positive or negative, which should account for the individual characteristic of each bank.

In the standard case of a systemic bank, these procedures allow for the definition of a MREL similar to the minimum TLAC. The MREL is instead significantly lower in the case of small banks which are likely to be subjected to insolvency proceedings.

Different from TLAC, which has to be expressed in percentage of RWA and also requires a backstop related to the leverage ratio, the MREL target needs to be expressed in percentage of the total liabilities and own funds (TLOF). Calculations based on the TLOF are required to determine the access to national and supranational resolution funds or other programs of public support. Access to these funds is indeed subject to the bail-in of at least 8% of a bank's TLOF. In addition, the support provided by these funds can exceed 5% of the TLOF.

Another difference between the two frameworks regards subordination. The TLAC rules indeed require global systemically important institutions (G-SIIs) to meet the minimum requirement with subordinated liabilities that rank in insolvency below liabilities excluded from TLAC. Subordination can be met a) contractually, through the contract relating to the particular financial instrument, b) statutorily, through national law in an individual member state, and c) structurally, through the specific corporate structure of the banking group. The BRRD instead does not provide for mandatory subordination of MREL instruments but the resolution authority can set a requirement on a case-by-case basis.

Given the misalignment between the TLAC and the MREL frameworks, the European Commission has deployed a series of amendments, contained in the so-called "banking package", 2016, to the current banking directives and regulations (BRRD, Capital Requirements Regulation and Directive (CRR/CRD)) with the purpose of harmonizing the G-SIBs' MREL with the TLAC standard and adapt MREL rules to the other classes of banks.

In short, the banking package implements the TLAC for G-SIIs into EU law, adapts the MREL calibration in order to ensure a sufficient loss absorption and recapitalization capacity for banks, and also strengthens and standardizes the subordination rules.

The new provisions, therefore, classify banks in four categories adapting the MREL calibration and subordination to each of them. The MREL is now expressed in the percentage of the RWAs and the LRE.

The four categories of banks are the following: 1) G-SIBs; 2) top-tier banks, namely those banks whose resolution group's consolidated size is above EUR 100 bn; 3) "fished" banks, namely non-GSII and non-top-tier banks which are selected by the national resolution authority as likely to pose a systemic threat in case of failure; 4) other banks.

The minimum MREL requirement for EU G-SIIs is set as the highest between 16% of RWAs and 6% of LRE until Q1 2022. Starting from this date, the ratios are raised up to 18% of RWAs and 6.75% of the LRE. Starting from Q1 2024, a further ratio of 8% of TLOF applies to EU G-SIIs. Regarding subordination, EU G-SIIs have to comply with a mandatory subordination requirement which coincides with the minimum MREL requirement set out for 2024 (equal to the highest between 18% of the RWAs, 6.75% of the LRE, or 8% of the TLOFs).

Regarding top-tier and fished-banks, the minimum MREL requirement remains institution-specific until Q1 2022. Starting from this date, the minimum MREL requirement is set as the highest between 13,5% of RWAs and 5% of LRE. Starting from Q1 2024, a further ratio of 8% of TLOF is applied. The subordination requirement coincides with the minimum MREL requirement for top-tier banks and fished banks, although under certain conditions for the latter.

Regarding the class of "other banks", the MREL requirement qualifies as an individual bank-specific requirement, and subordination is decided by the resolution authority which decides upon its level on a case-by-case basis.

The banking package further provides banks with new tools to achieve subordination. In detail, the asset class of unsecured senior debt is split into two categories: senior preferred debt and senior non-preferred debt. Of these two classes, only the latter is eligible to meet the MREL subordination requirement whereas preferred senior debt is only bail-inable but can still be counted towards the MREL under specific conditions.

Senior non-preferred bonds are designed to help banks piling up efficiently the MREL buffer and further address the issues related to the violation of the no-creditor-worse-off principle, which requires that creditors do not suffer higher losses in resolution than those that they would have suffered in case of normal insolvency proceedings, as this new asset class clearly distinguishes between bail-inable and non-bailinable instruments, therefore, tackling investor's uncertainty regarding the actual stock of bail-inable debt available in case of bail-in.

3. DATA AND METHODOLOGY

This paper investigates whether the bank capital structure alignment to the bail-in rules has implications in terms of the bank's risk. More in detail, we analyse the relationship between bank risk and the increasing weight of unsecured senior debt within the bank capital structure following

the recent amendments which split the unsecured senior debt asset class to ease the pile-up of the MREL and the overall bail-in application.

We proceed by collecting from Bloomberg quarterly bank-level and country-level data over the period from the first quarter of 2010 to the last quarter of 2019. The sample selection strategy consists of focusing on European banks subjected to MREL or TLAC, and their subordination requirements as well, which are therefore affected by the re-design of the unsecured senior asset class. Among them, we selected those with available data regarding the outstanding amount of unsecured senior bonds. As designed, the sample selection procedure produced a sample of 46 banks distributed over 17 European countries (AT, BE, CZ, DK, FR, DE, GR, HU, IT, NL, NO, PO, PT, ES, SE, CH, and GB). Table 1 provides a detailed list of the banks included in the sample, together with their total assets.

Table 1. The sample by banks

Country	Bank name	Total assets (in millions)	Country	Bank name	Total assets (in millions)
Austria	Erste Group Bank AG	215103.4	Italy	Intesa Sanpaolo SpA	704027.9
Austria	Raiffeisen Bank	129984	Italy	Mediobanca SpA	74387
Belgium	KBC Group NV	282350	Italy	UBI Banca	125656
Czech Republic	Komerční Banka AS	34723	Italy	Unicredit SpA	881531
Denmark	Danske Bank A/S	465096	Netherlands	ING Bank NV	1032654
Denmark	Jyske Bank A/S	58918	Norway	DNB ASA	287503
Denmark	Sydbank A/S	19674	Poland	mBank SA	27848
France	BNP Paribas SA	2082181	Poland	Powszechna Kasa Oszczędności Bank Polski SA	57724
France	Crédit Agricole SA	1640596	Portugal	Banco BPI SA	39577
France	Société Générale	1288214	Portugal	Banco Comercial Português	82548
Germany	Aareal Bank AG	45201	Spain	Banco Bilbao Vizcaya Argentaria SA	652104
Germany	Bayerische Landesbank	257872	Spain	Banco de Sabadell	172648
Germany	Commerzbank AG	592393	Spain	Banco Santander SA	1321501
Germany	Deutsche Bank AG	1736552	Spain	Bankinter SA	63751
Germany	Norddeutsche Landesbank-Girozentrale	194224	Spain	CaixaBank SA	339465
Greece	Alpha Bank A.E.	65547	Sweden	Skandinaviska Enskilada Banken	277519
Greece	Eurobank Ergasias Services and Holdings SA	71318	Sweden	Svenska Handelsbanken AB	286031
Greece	National Bank of Greece SA	95555	Sweden	Swedbank AB	225909
Hungary	OTP Bank Nyrt	38119	Switzerland	Credit Suisse Group AG	764290
Italy	Banca Carige SpA	34631	UK	Barclays Bank PLC	1616179
Italy	Banca Monte Paschi di Siena	185855	UK	HSBC Bank PLC	2149338
Italy	Credito Emiliano SpA	35675	UK	Lloyds Bank PLC	1050429
Italy	Credito Valtellinese SpA	27123	UK	Royal Bank of Scotland PLC	1283432

Note: This table displays the banks covered in this study and their size. Total assets are in millions and their value is the average over the entire sample period 2010–2019.

Almost the entire sample (81%) consists of banks whose total assets exceed the threshold of 50 billion euros, which is commonly assumed to distinguish banks that follow a bail-in strategy as opposed to those which follow an alternative process (García & Rocamora, 2018). The remaining banks (19%) can be regarded as smaller banks. Given the sample composition, we are able to address the critical issues introduced by the amendments to the recovery and resolution framework on both large and smaller banks.

We use a research design similar to that employed by Beltrame, Grassetti, Polato, and Velliscig (2020) which study the effect of the introduction of a valuation metric within the European Central Bank's (ECB) asset quality review (AQR) exercise

on banks' third party pricing policies. In detail, the authors implement a fixed effect panel data regression over three periods: 1) the entire time-period, 2) the sub-period before the introduction of a valuation metric within the ECB's AQR exercise, and 3) the sub-period after. As a result, the authors have an overview of the phenomenon but can also discern the effect before and after the specific event. In a similar vein, to study the relationship between bank's risk and the weight of senior unsecured debt in the capital structure of banks, we run a fixed effect panel data regression considering the entire time period and the periods before and after the first national amendment to the unsecured senior asset class. The regression model is:

$$B1YDP_{j,t} = \alpha_t + \beta_j + \gamma_0 + \gamma_1 SUNS/RWA_{j,t} + \gamma_2 BANK_{j,t} + \gamma_3 COUNTRY_{j,t} + \varepsilon_{j,t} \qquad (1)$$

where, $B1YDP_{j,t}$ is the dependent variable, namely Bloomberg's 1-year probability of default of bank j at time t. Bank's risk is thus approximated by Bloomberg's 1-year probability of default whose score results from a model which uses the following nine inputs: credit default swap (CDS) spread, the volatility of the stock price, the net income, non-performing loans, market-to-book ratio, total assets, short-term leverage, long-term leverage, and loan losses reserves.

The main independent variable $SUNS/RWA_{j,t}$ is the ratio of outstanding senior unsecured bonds to risk-weighted assets of bank j at time t.

The variable $BANK_{j,t}$ is a vector of bank-level control variables which includes capitalization (namely the ratio of Tier 1 to total assets — $T1TA$), business model (namely the ratio of deposits to total assets — $DEPTA$), risk (namely the ratio between non-performing loans and total assets — $NPLTA$), size (namely the natural logarithm of total assets — $lnTA$) and profitability (namely the return on assets — ROA).

The variable $COUNTRY_{j,t}$ is a vector of country-level control variables which includes a gross domestic product of countries (GDP) and unemployment rate (UNP). The variable α_t captures the time trends, whereas the variable β_j captures instead the bank fixed effects. Table 2 provides the descriptive statistics of the variables included in the regression together with their definition.

Table 2. List of variables used together with their definition and summary statistics

Variable	Description	Min.	Max.	Mean	Median	Std. Dev.
B1YDP	The Bloomberg's 1 year default probability	0.00003	0.21154	0.00760	0.00332	0.01979
SUNSRWA	The ratio of senior unsecured bonds to risk-weighted assets	0.01464	0.70697	0.21315	0.16618	0.17459
lnTA	The natural logarithm of total assets	9.78240	14.73587	12.27289	12.32227	1.40374
T1TA	The ratio of Tier 1 to total assets	0.02195	0.12290	0.05712	0.05364	0.01967
NPLTA	The ratio of non-performing loans to total assets	0.00175	0.30184	0.04906	0.02793	0.06089
DEPTA	The ratio of total deposits to total assets	0.14797	0.82890	0.46048	0.45959	0.14554
ROA	The return on assets	-1.16060	1.26490	0.28800	0.32960	0.55766
GDP	The gross domestic product rate	-3.99822	3.41113	0.31187	0.37939	0.71324
UNP	The unemployment rate	2.2	27.8	9.81724	8.19705	6.10587

Note: This table reports the definition and summary statistics of variables used in regression (equation (1)).
Source: Bloomberg (2010–2019).

As it is mentioned above, the regression is run over three different time periods. First, it is run over the entire time window of 2010–2019 (Model 3). We then split the time window in order to capture the evolution of the role of unsecured senior debt within the capital structure of banks from the bail-out era to the introduction of the bank recovery and resolution framework. The former covers the time window between 2010 to 2016 (Model 1) whereas the latter covers the period of 2017–2019 (Model 2). We select 2016 as a reference year because the first legislative acts that enabled banks to issue non-preferred senior debt entered into force in late 2016, thereby opening the segment of non-preferred senior bonds.

4. RESULTS AND DISCUSSION

Table 3 shows the results of the regression.

Table 3. The relationship between risk and the share of senior unsecured bonds

B1YDP	(Model 1)	(Model 2)	(Model 3)
Time window	2010–2016	2017–2019	Full period
SUNS/RWA	-0.0102	0.1105*	-0.0064
	(0.0064)	(0.0474)	(0.0054)
LNTA	-0.0044	-0.0944***	-0.0101*
	(0.0039)	(0.0270)	(0.0041)
T1/TA	-0.3395**	-0.6903	-0.3736***
	(0.1316)	(0.4720)	(0.1115)
NPL/TA	0.0871	0.1240	0.0997*
	(0.0467)	(0.1607)	(0.0414)
DEP/TA	-0.0056	-0.1218*	-0.0056
	(0.0094)	(0.0506)	(0.0074)
ROA	-0.0076***	-0.0161**	-0.0119***
	(0.0014)	(0.0054)	(0.0018)
GDP	-0.0008	0.0008	-0.0009
	(0.0007)	(0.0010)	(0.0006)
UNP	0.0006	-0.0026	0.0003
	(0.0004)	(0.0016)	(0.0003)
Obs.	1,219	551	1,770
R²	0.42	0.56	0.37

Notes: The table shows the results of estimating equation (1) over the periods: 2010–2016 (Model 1); 2017–2019 (Model 2); 2010–2019 (Model 3). Obs. is the number of observations in the relative time window; R^2 is the R-squared. Robust standard errors are reported in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The relationship between the weight of senior unsecured debt and bank's risk is slightly negative over the entire period and not statistically significant. However, when we consider the two sub-periods, the relationship appears strongly positive since European banks have started testing the market of senior non-preferred debt. Thus, this result supports *H1* about the weight of unsecured

senior debt increasing bank's risk. During the previous period, instead, the results resemble those obtained over the entire period showing a slightly negative and statistically insignificant relationship.

Regarding bank-level control variables, size shows a negative relationship with bank's risk which is consistent over the three different time windows. The negative sign can be explained by means of the too-big-to-fail (TBTF) issue which points out the likelihood for banks whose failure may threaten the banking system as well as the overall economy to receive public support in case of crisis. Accordingly, indeed, the higher the size, the lower the risk of insolvency. Moreover, despite the fact that the recovery and resolution framework aims at ending the TBTF issue, the latter still persists due to the severe credibility issues suffered by the bail-in regime which explains the negative sign between bank size and risk also in Model 2. In addition, the relationship strengthens in Model 2 gaining a higher statistical significance which supports the literature highly debated thesis of size playing a crucial role in easing the implementation of the recent amendments to the bail-in regime.

Capitalization shows a negative relationship with the bank's risk which is consistent over the three models. The negative sign is given by the fact that better-capitalized banks have a greater buffer that protects them from breaching the threshold of the minimum capital requirement, therefore, resulting less risky. The relationship is statistically significant in Model 1 and 3 but not in Model 2, as the relevant asset class explaining risk after the recovery and resolution framework is unsecured senior debt.

The ratio between non-performing loans and total assets shows a positive relationship with the bank's risk which is consistent over the three models. As broadly recognized in literature and further proved by the Spanish case of Banco Popular Español, the higher the share of non-performing loans, the higher the bank's risk. This relationship is statistically significant only for Model 3.

The ratio between deposits and total assets shows a negative relationship with the bank's risk as the higher the customer base, the lower bank's risk. The relationship is statistically significant only in Model 2.

The return on assets shows a negative and statistically significant relationship with the banks' risk consistent across the three models. The negative sign is explained by the fact that the lower the profitability, the higher the probability of default, given that profitability is a key variable for a bank's viability.

Regarding country-level control variables: the GDP shows a negative and statistically insignificant relationship with bank's risk in Model 1 and 3, the sign turns positive in Model 2 but the relationship is still statistically insignificant. The unemployment shows a positive but statistically insignificant relationship with bank's risk in Model 1 and 3, the sign turns negative in Model 2 but the relationship is still statistically insignificant.

The main result that emerges from this analysis points out the crucial role played by unsecured senior debt in explaining bank's risk following the bail-in regime amendments which put this asset class at the centre of a regulatory overhaul whose purpose is the enhancement of bail-in implementation.

In detail, the unsecured senior debt asset class is split into two categories, preferred and non-preferred senior debt, which would help banks piling up efficiently the bail-in buffer and further address those shortcomings which stem from the uncertainty about the actual stock of bail-inable debt.

However, our analysis points out a negative relationship between bank risk and the stock of unsecured senior debt, therefore, bringing out the possible side-effects of the policies deployed to enhance the bail-in regime.

Specifically, in line with the branch of literature listing the credibility issues suffered by the bail-in regime, we point out the uncertain loss-bearing capacity of unsecured senior debt in case of the resolution against a certain additional cost, due to the fact that investors in unsecured senior debt faced a change of paradigm from bailout to bail-in that led them to ask for higher risk-premia.

In short, the uncertainty regarding the fulfilment of their purpose in case of resolution together with the certain cost, also material due to the bail-in buffer shortfall of most of EU banks, related to these instrument poses a serious concern to bank operativity which result in higher risk.

As regards smaller banks, instead, which account for 20% of our sample size, the negative relationship between bank risk and the stock of unsecured senior debt points out their difficulties in accessing the unfamiliar and expensive capital market as they struggle to comply with an unsuitable regulation with exacerbating the uncertainty regarding their crisis management in case of failure, as they are not able to adapt to bail-in rules but remain too systemic for being subjected to normal insolvency proceedings, and further calls for the design of an effective regime to manage their failures.

5. CONCLUSION

This paper studies the implications for bank's risk which stem from the compliance to the recent amendments to the bail-in regime as regards the ranking of unsecured debt instruments in the insolvency hierarchy.

According to literature and supported by the mismanagement of several bank crises, we deem that, despite helping banks piling up the bail-in buffer more efficiently and faster and addressing investor's uncertainty regarding the actual bail-inable stock, these amendments may prove inadequate to serve their purposes of enhancing the bail-in regime. In detail, the bail-in shortcomings question the actual employment of these resources in case of resolution and so their loss bearing capacity.

Moreover, the cost of these instruments, increased by the switch of paradigm from bail-out to bail-in that has affected investors in unsecured senior debt, combined with the material bail-in buffer shortfall of most EU banks weigh on the bank's cost of debt.

These implications concur to ground our research question about whether the crucial role assigned to unsecured senior debt is actually jeopardizing bank stability.

To this purpose, we use a sample of 46 banks distributed over 17 European countries over the period Q1 2010–Q4 2019. We thus run a fixed effect panel data regression over the entire period and also over the subperiods before and after the enforcement of the first amendment to the unsecured senior asset class.

Our main result points out the significant role of unsecured senior debt in explaining bank's risk after the start of the amendments campaign which allowed this asset class to serve the enhancement of the bail-in regime.

From an academic standpoint, our work contributes to the branch of literature investigating bail-in credibility. This literature has indeed widely investigated the subject from a theoretical perspective but there is a lack of empirical research supporting such findings. This paper, therefore, aims to fill this gap by empirically addressing the concerns highlighted by theoretical literature and further providing a novel contribution focusing on bank's risk.

From a practical standpoint, our result warns policymakers about the side effects of the recent amendments to the bail-in regime which may hamper bank operativity from a cost perspective and also prove inefficient in case of resolution.

Moreover, these results further support the instances of medium-sized bank managers who suffer from uncertainty regarding the crisis management regulation of their institutes as they are stuck in a grey zone between systemic financial institutions with active participation in the capital markets and unsystematic institutions subjected to normal insolvency proceedings. Our results, therefore, support the managers' call for the design of an effective regime for managing medium-sized bank failures.

In addition, the arguments we use to explain the negative relationship between bank risk and the stock of unsecured senior debt should encourage bank managers to focus on more loss-absorbing instruments when planning their regulatory funding strategies. Indeed, traditional subordinated debt (e.g., Tier 2 instruments), despite being more expensive, ensures higher reliability for resolution purposes as it performs better than unsecured senior debt in each of the eligibility requirements for instruments to be a computer within the regulatory capital.

In detail, its lower subordination ensures its inherent and proved gone concern loss-absorbing capacity which concurs with its higher permanence and uncompromising remuneration in overperforming unsecured senior debt efficacy in resolution.

As regards the limits of this study we point out the level of aggregation of the sample which gathers 46 banks from 17 different European countries. As designed, our result provides just an overview of the relationship investigated which we deem could be deepened by harnessing a larger database to employ a state-level analysis able to gauge the effect of each national amendment of the unsecured senior asset class to bank risk.

Finally, the COVID-19 outbreak has cast further shadows over bail-in credibility as governments may be tempted to recur to bail-out strategies in case of a bank crisis due to the firms' fragile resilience. In this perspective, the implications of our results for policymakers and bank managers emerge as topical calling for lowering the regulatory pressure on banks and also indicating managers a more effective solution for strengthening their capital base.

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