

Bail-in credibility: evidence from emerging markets

Bail-in
credibility in
emerging
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Giulio Velliscig
Department of Economics and Statistics, University of Udine, Udine, Italy
Stefano Piserà
Department of Economics, University of Genoa, Genoa, Italy, and
Maurizio Polato and Josanco Floreani
Department of Economics and Statistics, University of Udine, Udine, Italy

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Abstract

Purpose – Some controversial cases of bail-in in the emerging countries have raised the question about whether for those countries to have in place a regulation for the bail-in is appropriate or not. To assess appropriateness, this paper investigates bail-in credibility among investors, as crucial condition for the credibility's smooth implementation, by measuring the yield spread between bailinable and non-bailinable bonds.

Design/methodology/approach – The authors compare the yield spread of banks located in emerging countries that have in place a framework for the bail-in to the comparable yield spread measured for banks located in emerging countries without such framework. The comparison permits to detect whether there is a significant difference between the two spreads, which would suggest that bail-in regulation has been deemed credible by market participants where enforced, or not, which in this case would signal a problem of credibility.

Findings – The authors' results point out a significantly higher yield spread for banks located in emerging countries that have adopted a framework for the bail-in of creditors. Bail-in regulation has, therefore, being deemed credible in the adopting emerging countries, thus ensuring a crucial condition for bail-in regulation's smooth application. The authors also point out bank size and country's gross domestic product (GDP) growth as crucial moderators of bail-in expectations of market participants that can guide the implementation of bail-in rules in emerging countries.

Originality/value – This paper contributes to the literature on the credibility of bail-in with a new perspective from the emerging countries.

Keywords Bail-in, Credibility, Emerging countries, Global financial development report

Paper type Research paper

1. Introduction

The latest Global Financial Development Report (GFDR) reviews the last 10 years of banking supervision and regulation to contribute to the ongoing debate regarding the right blend of regulation, supervision and market discipline required to ensure the safety and efficient functioning of the banking systems (World Bank, 2019). One of the key questions in the report is how appropriate is to apply regulation designed for advanced economies to developing countries?

This question piqued our interest as two controversial cases of bail-in in Poland and India raised some doubts about the appropriateness of bail-in regulation in emerging countries. The complicated application of bail-in in the Polish case of Podkarpackiego Banku Spółdzielczego (PBS) perpetuated the concerns, originally raised by the cases of the four Italian banks (Asimakopoulou, 2018), about the appropriateness of using the bail-in tool to



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banks with inadequate loss-absorbency capacity and characteristics of the creditors at stake (Stopczynski, 2020). Similarly, the bail-in application in the Indian case of Punjab & Maharashtra Co-operative (PMC) Bank has raised concerns about the depositors' treatment and the implications for the economic fabric (Dugal, 2021).

The difficulties emerged in the two abovementioned cases of bail-in application clash with its smooth implementation in the resolution of the Spanish Banco Popular Español, which has been claimed by authorities as a virtuous example and a model for future interventions in terms of speed, efficacy and protection of public finances (Erzegovesi, 2020).

Thus, inspired by the GFDR's research question, this paper questions whether the institutional environment, strength of market discipline, supervisory capacity, and business model of banks in emerging markets actually match the tenets of the bail-in or not.

We delve into this question from the perspective of bail-in credibility as crucial backbone for bail-in regulation to take hold. Transferring risk from taxpayers to bank creditors, bail-in rules worsen the payoffs of the latter in case of failure, and this results in higher risk-premia required by investors in bank bonds. Understanding bail-in risk and embedding it into securities' prices is, therefore, essential for a smooth implementation of the bail-in tool as, otherwise, adverse implications may arise for bank operativity. In detail, a mispricing of debt instruments may cause moral hazard, in case of underpricing, or it may cause an increase in funding costs and a following compromise growth as a result of a restricted lending, in case of overpricing (Tröger, 2019). In addition, unanticipated bail-in during a financial crisis could spark an overreactive price correction on bond yields culminating in a liquidity freeze and collapse of the interbank market (Noller, 2019).

Being fundamental for its implementation, bail-in credibility has piqued the interest of numerous scholars that have addressed the question mostly focusing on the shortcomings of its implementation in the European bank resolution framework (Giuliana, 2019; Crespi *et al.*, 2019; Pablos, 2019; Cucinelli *et al.*, 2020; Gai *et al.*, 2020).

Our paper contributes to this literature by addressing the instances that emerge from the controversial cases of bail-in in the emerging markets and, therefore, extending the investigations on the credibility of the bail-in outside the European boundaries.

To this purpose, we design an empirical study that gauges bail-in credibility among bank investors of emerging countries that have adopted such regime. In detail, we identify emerging countries according to their inclusion within the MSCI (Morgan Stanley Capital Index)-emerging countries index and, then, we create two groups depending on whether a country has in place a framework for the bail-in of bank creditors or not. We, then, select from Bloomberg all the banks located in our sample of countries with at least a bailinable and a non-bailinable bond. For each bank, we thus create a portfolio of bailinable and non-bailinable bonds expressive of the mean of the yield to maturity of all respective bonds. We, then, compute the yield spread between the bailinable and non-bailinable portfolios, which is regarded by literature as a reliable measure of bail-in credibility (Crespi *et al.*, 2019; Giuliana, 2019; Cucinelli *et al.*, 2020). Finally, we employ a fixed effects panel data regression to compare the yield spread between the two groups of emerging countries with a framework for the bail-in and not. The rationale is the following: a positive difference would indicate that, where enforced, bail-in regulation has induced market participants to reprice bonds thereby reflecting higher expectation of bail-in in case of bank distress. Conversely, a negative or close to zero difference between the yield spreads would instead indicate a misalignment between bail-in regulation and investors' expectations that may cause the abovementioned adverse consequences.

Our results point out a positive difference between the yield spreads of the two groups, which indicates a higher yield spread for banks located in emerging countries with a framework for the bail-in of bank creditors. This suggests that, where enforced, bail-in rules have been deemed credible by investors who have asked for higher returns compared to holders of liabilities excluded from the bail-in. The repricing caused by bail-in rules results

thus in a higher yield spread between bailinable and non-bailinable bonds with respect to the baseline yield spread caused by seniority for banks located in emerging countries without a framework for the bail-in.

Drawing from the abovementioned cases of bail-in in emerging countries, we perform additional tests to delve into the role of size as moderator of bail-in expectations. A common threshold assumed by scholars for the suitability of bail-in is 50 billion of total assets, whereas both banks involved in the two abovementioned cases of bail-in account for less than 2 billion each (García and Rocamora, 2019). In addition, the business model oriented towards traditional financial intermediation and the simplified capital structure concur to cast shadows over the applicability of bail-in as crisis management tool. We, therefore, re-estimate the baseline model by differentiating between above and below the mean of bank size to examine whether bank size could play a role in moderating bail-in expectations among investors in emerging markets. We found that bail-in regulation had a stronger impact on the yield spread of smaller banks in line with the signals provided to the market by the abovementioned misapplications of bail-in to small banks. Following the same implementation strategy, we also investigate the moderating role of countries' Gross domestic product (GDP) and find that the relationship between bail-in rules and the yield spread is stronger for countries with a higher GDP growth. Countries with a stronger developing economic framework prefer, indeed, to recur to bail-in and preserve public finances to this purpose instead of channeling them for bailing out ailing banks. Our results have important implications for policymakers as bail-in credibility supports the implementation of bail-in regulation in the emerging countries, and its distortions caused by the uncertainty regarding the crisis management of small banks further help policymakers addressing eventual shortcomings of the bail-in regulation design and implementation.

The paper is organized as follows: [Section 1](#) discusses the related literature; [Section 2](#) presents the dataset and describes the methodology employed; [Section 3](#) presents the results; [Section 4](#) provides some robustness checks; [Section 5](#) concludes.

2. Literature review

The bail-in is a crisis management tool that requires bank shareholders and creditors, instead of taxpayers as in the case of bailouts, to bear the costs of failure of a bank. In particular, it mandates the write-down and/or conversion into equity of debt owed by a bank to creditors in order to recapitalize the bank or to smooth the application of the others crisis management tools.

The bail-in tool suffers from severe shortcomings that stem in the ample discretion granted to several authorities regarding its application (Walther and White, 2020; Philippon and Salord, 2017). In detail, costly delays may be due to (1) bailout expectations (Keister and Mitkov, 2017), (2) political pressures (Hadjimmanuil, 2015), and (3) the interest of national jurisdictions (Bolton and Oehmke, 2018) in case of cross-border bail-in.

The uncertainty that follows from this framework undermines bank investors' predictability of the outcome in case of bail-in. Specifically, bank investors are unable to determine their potential loss-exposure in the event of bank failure. This may result in a mispricing of debt instruments that leads to two different adverse scenarios: underpricing would, indeed, induce moral hazard, whereas overpricing could increase bank funding costs, thus undermining growth as a result of reduced lending capacity (Tröger, 2019).

Credibility emerges, therefore, as crucial problem that: (1) prevents the bail-in tool to be applied smoothly, (2) undermines bank operativity, and (3) further compromises market discipline.

This topic has thus piqued the attention of several scholars who have delved into the investors' expectations over the bail-in to pave the way for the branch of literature investigating the credibility of bail-in.

Empirical studies have been thus conducted over the yield spread reaction to bail-in events between bailinable and non-bailinable bonds, which are found to be a reliable measure

to gauge bail-in expectations among investors as bail-in rules make bailinable debt de facto junior to non-bailinable debt, therefore, raising the yield spread (Chan-Lau and Oura, 2016).

Giuliana (2019) measures the yield spread reaction to bail-in events related both to its legislative process and application over a sample of 23,756 EU bonds between 2012 and 2016. His results show that bail-in events indicating an increased (decreased) commitment of authorities to bail-in widen (narrow) yield spread between bailinable and non-bailinable bonds. In addition, the results further indicate the higher yield-risk sensitivity of bailinable bonds following bail-in events as higher bail-in expectations have restored market discipline.

Crespi *et al.* (2019) measures the yield spread reaction at issuance to the introduction of the bail-in tool in 2016 between bailinable and non-bailinable bonds using a sample of 1,798 fixed-rate bonds issued during the period 2013–2016. Consistently with Giuliana's results, this study provides evidence of higher bail-in expectations among market participants in the aftermath of the introduction of bail-in rules, as well as an enhanced market discipline.

The branch of literature investigating bail-in credibility consists also with other studies that instead of focusing on the yield spread between bailinable and non-bailinable bonds have gauged the impact of bail-in regulation on different classes of bailinable debt.

Some studies corroborate the abovementioned results as regards senior unsecured debt, Lewrick *et al.* (2019) find indeed evidence of enhanced market discipline among senior unsecured bondholders, whereas Cucinelli *et al.* (2020) support findings about their higher bail-in expectations. Finally, Gai *et al.* (2020) find an increase in the risk-premium for unsecured bonds, pointing out senior unsecured bonds as those showing the greatest effect on yields and yield spread.

However, other studies provide opposite evidence. In detail, using a sample of 41 EU credit institutions over the period 2014Q4-2018Q2, Pablos (2019) analyses the yield spread reaction between subordinated and senior unsecured bond's yields but does not find evidence of a significant and generalized increase. These findings are corroborated by Chan-Lau and Oura (2016) who point out that asset encumbrance and the implementation new bank resolution tools only increase senior unsecured debt yields modestly for banks under distressed market conditions in 2013.

As the abovementioned studies strictly focus on the bail-in tool as implemented in the European bank resolution framework, the branch of literature investigating the credibility of bail-in fails to collect the instances that come from the emerging countries. Nevertheless, even if not directly related to credibility, few papers already have investigated, under different perspectives, some cases of bail-in the emerging countries.

The Polish case mentioned in the introduction has, indeed, piqued the interest of scholars who have scrutinized the case and called for research about the implementation of bail-in in countries unprepared and unequipped to embraced it (Stopczynski, 2020).

A similar case of misuse of bail-in in South Africa has been addressed by Havemann (2019) who pointed out the unintended consequences, in terms of systemic implications, of employing bail-in in small jurisdictions with high interconnectedness between bank and non-bank financial institutions.

Apart from these few cases, literature has not delved into the implementation of bail-in in emerging markets which represent the gap this paper aims to fill.

On the basis of the literature examined, we, therefore, develop the following hypothesis regarding bail-in credibility:

- H1.* If bail-in regulation is deemed credible, the yield spread between bailinable and non-bailinable bonds would be higher for banks located in emerging countries with a framework for the bail-in of creditors with respect to that of banks located in emerging countries without such framework.

This hypothesis supports the view according to which bail-in rules, where enforced, are deemed credible by investors who ask for a higher return compared to bondholders excluded from bail-in. The resulting spread is thus higher than that between bailinable and non-bailinable bonds of banks located in emerging countries not subjected to bail-in rules as investors in bailinable debt would not require a higher risk premium than that required for seniority.

H2. If bail-in regulation is not deemed credible, the yield spread of banks located in emerging countries with a framework for the bail-in of creditors is not different from that of banks located in emerging countries that do not abide by bail-in rules.

This hypothesis is in line with the view that bail-in rules are not deemed credible by investors who do not ask for a higher return compared to bondholders excluded from bail-in. The resulting spread is, therefore, comparable to that between bailinable and non-bailinable bonds of banks located in emerging countries not subjected to bail-in rules as bail-in rules are not a driver of the spread for both cases. Bail-in prescriptions and market participants' expectations are, therefore, misaligned and this may result in a disorderly application of the bail-in tool.

The academic debate about bail-in applicability further develops in branches investigating the measures that may encourage or dampen the application of the bail-in tool. Some argue that the enforcement of bail-in regulation to borderline cases, like the Indian and Polish cases abovementioned, could be the solution to the credibility issues suffered by bail-in. However, as prescribed by the principle of proportionality, the application of the bail-in tool should account for the institutional environment, strength of market discipline, supervisory capacity, and business model of bank in a given country. Otherwise, the application of the bail-in may turn out as inappropriate and may have material consequences to the economic and social fabric of the area where the banks are located.

Bank size, for example, represents a bank-specific key driver for bail-in implementation which regulators should account for before enforcing the bail-in tool. Some scholars believe that the application of the bail-in tool to medium-sized banks could enhance the credibility of the bail-in tool by investors (Philippon and Salord, 2017); however, it could also hide important side-effects.

Fernando Restoy, chairman of the Financial Stability Institute, labels as the "middle class" the set of medium-sized banks that are systematically relevant and operate a retail-oriented business model, mostly funded with capital and deposits. These banks are deemed too large to be liquidated under normal insolvency proceedings, as they will generate severe adverse systemic effects, but also too small to issue large amount of bailinable liabilities that may guarantee the smooth and ordered application of the bail-in tool. These banks are also unfamiliar with bailinable instruments and the access of their market could result economically unfeasible (EBA, 2016). As a result, medium-sized banks might lack the sufficient loss-absorbency capacity required for the bail-in to be applied smoothly. The number of these banks could potentially be relevant as between the largest groups and the smallest banks there is a wide range of intermediate cases that consists with banks that struggle to tap the market of bailinable liabilities and whose capital structure is not coherent with a smooth application of the bail-in tool. Moreover, as regulator's efforts are channeled towards building a bailinable environment and framework for systemically important groups, such banks and their investors suffer great uncertainty regarding their treatment in case of crisis.

Such uncertainty leads, therefore, regulatory authorities to apply suboptimal crisis management techniques, such as in the Indian and Polish cases, and foster the debate about size as crucial determinant of the success or failure of a bail-in strategy, which should, therefore, be accounted when studying the credibility of bail-in rules in a given country.

On the basis of the considerations about how bank size might affect bail-in applicability, we, therefore, develop the following hypothesis regarding the relationship between bank size and bail-in expectations:

H3. If bail-in regulation is deemed credible then the yield spread between bailinable and non-bailinable bonds would be higher for small rather than large banks.

This hypothesis draws from the abovementioned Polish and Indian cases of misapplication of bail-in to small banks to suggest that their bailinable investors may recognize the uncertainty surrounding the crisis management of small banks and may, therefore, anticipate the resulting confused action of the regulatory authority by requiring higher risk-premia than those required by bailinable investors of larger banks. The risk of an unsuited bail-in would indeed outweigh that of a large and equipped bank that may eventually further resort to public support in case of crisis depending on the country-specific governmental attitude. The precautionary view of bailinable investors of small banks is the result of the prudence which is required by market participants when they operate in small jurisdiction where there is a high degree of interconnectedness between bank and non-bank financial institutions (Havemann, 2019) and the misuse of crisis management techniques may expose to potential unintended systemic implications.

H4. If bail-in regulation is deemed credible then the yield spread between bailinable and non-bailinable bonds is higher for large rather than small banks located in emerging countries with a framework for the bail-in of creditors.

This hypothesis is in line with the principle of proportionality that posits the application of bail-in to banks equipped to grant its smooth implementation but contrasts with the abovementioned cases of misapplication of bail-in registered in some emerging countries.

3. Data and methodology

The purpose of the paper is to empirically address the question about whether it is appropriate or not to implement bail-in regulation in emerging countries. We thus focus on the crucial assumption for bail-in regulation to take hold in a country, namely its credibility among investors that is measured in literature using the yield spread between bailinable and non-bailinable bonds. By comparing the yield spread between banks located in emerging markets that have adopted a regulation for bail-in and that of banks located in emerging markets without such framework, we are indeed able to provide evidence about investor's bail-in expectations and, therefore, inferring about its implementation.

A higher yield spread for banks located in emerging countries equipped with bail-in rules would mean that bailinable investors have deemed such rules credible therefore asking for a higher risk premium with respect to investors excluded from bail-in. Such spread would, therefore, result higher compared to the spread between bailinable and non-bailinable investors of banks located in emerging countries without a framework for the bail-in as their only driver is represented by seniority. Thus, a correct pricing of bail-in rules would prevent from the adverse repercussions, highlighted in the literature review, in terms of bank operativity, market discipline and bail-in application. Conversely, no difference between the yield spread of banks located in emerging countries with a framework for the bail-in and the spread of banks located in countries which lack such rules would instead suggest that, where enforced, bail-in rules are not deemed credible by investors who do not reprice bond yields, therefore, causing an alignment of the yield spread between bailinable and non-bailinable bonds amid countries adopting bail-in regulation and those which do not. Such scenario would thus not play in favor of an implementation of bail-in regulation in emerging countries due to the likelihood of occurrence of the abovementioned adverse implications related to bail-in rules mispricing.

To build up the sample for the empirical analysis we developed the following selection strategy. We first use the Bank Regulation and Supervision Survey (BRSS) [1] to identify the countries which have implemented bail-in regulation and those which did not. Question 18 of Section 11 of the survey required each jurisdiction about whether there is a framework in place to enable the bail-in of creditors. Among all the 160 respondent jurisdictions we selected those classified as emerging markets according to their inclusion in the MSCI Emerging Market Index.

We thus run the Fixed Income Search command on Bloomberg to select the active and matured non-bailinable bonds issued by banks located in the resulting emerging countries. We select bonds with available yield to maturity data in the time window January 2016–December 2019 in line with the period required by the World Bank survey. Non-bailinable bonds include “secured”, “senior secured” and “asset-backed” bonds. We then select the active and matured bailinable bonds issued by the resulting banks. Bailinable bonds include “senior unsecured”, “senior preferred”, “senior non-preferred”, “senior subordinated”, “subordinated” and “junior subordinated” bonds.

For those banks that do not display any bailinable bond, we match their non-bailinable bonds with the available bailinable bonds issued by a bank comparable in terms of total assets. Bank size is indeed often used to assume a bank’s crisis management technique; therefore, the expected loss-exposure reflected in the bailinable bonds’ yields of the comparable bank should resemble that embedded by the yields of the original bank.

As a result, each bank included in the sample has at least one bailinable bond and one non-bailinable bond. The same procedure is then replicated on Thomson Reuters Eikon to further supplement the database.

The sample selection procedure provided a database of 22 bonds for Chile, 11 for Czech Republic, 3 for Greece, 4 for Hungary, 23 for Poland, 36 for Russia and 3 for Turkey as regards emerging countries that have a framework for the bail-in in force. Concerning emerging countries that do not have a framework for the bail-in in place, the final sample resulted in 2 bonds for China, 95 for India, 3 for Malaysia, 138 for South Africa and 27 for South Korea. [Table 1](#) shows the list of banks and respective bonds used in this study divided by whether the country in which they are located have a framework in place for the bail-in or not.

Then, the empirical strategy develops as follows. In line with [Giuliana \(2019\)](#), we create two portfolios of bonds: the “average bailinable bonds” and the “average non-bailinable bonds”. In particular, the weekly yield to maturity of the “average bailinable bonds” portfolio is the average of the yields of all unsecured bonds for each bank and each date. The “average bailinable bonds” portfolio summarizes the information about “senior unsecured”, “unsecured”, “senior subordinated”, “subordinated” and “junior subordinated” bonds. Correspondingly, the weekly yield to maturity of the “average non-bailinable bonds” portfolio is the average of the yields of all secured bonds. The “average non-bailinable bonds” portfolio summarizes the information about “secured”, “senior secured” and “asset-backed” bonds. As a result, we obtain for each bank and each date an average bailinable and non-bailinable bond of which we compute the yield spread.

Thus, to allow the comparison of the yield spread between banks located in emerging countries which adopt a framework for the bail-in with that of banks located in emerging countries without such framework, we create a dummy variable that takes value 1 if the yield spread belongs to a bank located in an emerging country with a framework for the bail-in of creditors, and 0 otherwise. A positive estimate would indicate that, where enforced, bail-in rules have been reflected by market participants into a wider yield spread between bailinable and non-bailinable bonds with respect to the same spread of banks located in emerging countries without a framework for the bail-in whose only driver is represented by seniority. The correct pricing of bail-in rules would, therefore, support the implementation of the bail-in regulation in emerging countries. Conversely, a negative or close to zero estimate would signal a misalignment between market expectations and bail-in provisions, where enforced.

Country	Total assets (in billions of USD)	Bank name	N° secured	N° unsecured	Bank name	Total assets (in billions of USD)
<i>Countries with a bail-in framework</i>						
Chile	59.2	Banco Santander-Chile	2	20		
Czech Republic	12.9	Hypotecni Banka as	5	1	J & T Banka as	6.3
Czech Republic	15.0	Raiffeisenbank as	4	1	Air Bank as	5.0
Greece	70.6	Alpha Bank AE	1	2		
Hungary	4.1	OTP Mortgage Bank Ltd	3	1	MKB Bank Zrt	6.5
Poland	5.0	PKO Bank Hipoteczny SA	11	1	Idea Bank SA	5.5
Poland	3.2	mBank Hipoteczny SA	10	1	Bank Pocztowy SA	1.9
Russia	223.6	Bank VTB PAO	12	2		
Russia	94.0	Gazprombank AO	2	8		
Russia	2.8	KB Del'taKredit AO	4	8		
Turkey	2.7	Aktif Yatirim Bankasi AS	1	2		
<i>Countries without a bail-in framework</i>						
China	6.7	Bozhou Yaodu Rural Commercial Bank Co Ltd	1	1		
India	2.5	AU Small Finance Bank Ltd	3	1		
India	18.3	IDFC First Bank Ltd	84	3		
India	1.7	Jana Small Finance Bank Ltd	1	3		
Malaysia	16.6	BIMB Holdings Bhd	1	2	AFFIN Bank Bhd	16.9
South Africa	99.9	Standard Bank of South Africa Ltd/The	3	135		
South Korea	200.0	Kookmin Bank	4	23		

Note(s): This table displays the number of secured and unsecured bonds for each bank in both emerging countries with and without a bail-in framework. If a bank does not have both secured and unsecured bonds, the missing instruments are replaced by those of a comparable bank in terms of total assets

Table 1.
List of banks

This result would suggest credibility concerns about bail-in rules that would not support for the implementation of such regulation in emerging countries due to the adverse implications that may stem from this situation as highlighted in the literature review section. For the analysis, similarly to Crespi *et al.* (2019), we employ a fixed effects panel data regression:

$$Spread_{ijt} = \alpha_i + \gamma_1 Bailin_{ijt} + \gamma_2 Issuance_{ijt} + \gamma_3 Bank_{ijt} + \gamma_3 GDP_{jt} + \vartheta_t + \mu_{ijt}$$

Where: $Spread_{ijt}$ is the dependent variable, namely the yield spread between bailinable and non-bailinable bonds of bank i , in country j , at time t . The variable $Bailin_{ijt}$ is a dummy that takes value 1 if the yield spread belongs to a bank located in an emerging country with a framework for the bail-in of creditors, and 0 otherwise. $Issuance_{ijt}$ is a vector of control

variables at portfolio level that checks for seniority, currency, amount issued and time to maturity of the issuances used to create the bailable and non-bailable portfolios for each bank. $Bank_{ijt}$ is a vector of control variables at bank level that checks for size, measured by the natural logarithm of total assets; capitalization, measured by the ratio between Tier1 and Total Assets; risk, measured by the ratio between NPLs and Total Assets; business model, proxied by the ratio between Total Deposits and Total Assets; and profitability, measured by the return on assets. GDP_{jt} is the percentage of gross domestic product of each country. θ_t identifies the time fixed effects. α_i captures portfolios fixed effects in order to control for unobservable, time invariant, bonds characteristics that could influence the yield spread. Moreover, in one specification of our model we substitute both portfolio and time fixed effects with the interaction of the two in order to further account for time-varying portfolio unobserved heterogeneity [2]. Standard errors are clustered at bank level. Table 2 shows the definition and descriptive statistics of all the variables used in the model

The expected signs of the issuance-level controls are as follows. Seniority should be negatively related to the yield spread as the lower the seniority the higher the loss absorption capacity, especially on a gone concern, which should, therefore, increase the concerns about bail-in implementation, namely the yield spread. However, despite traditional subordinated debt is the most exposed in case of bail-in, it is always meant to bear the losses in case of crisis unlike above-ranked debt, i.e. unsecured senior debt or deposits not protected by guarantee, which may face a higher risk as its exposure depends on the severity of the crisis and the following extent of application of the bail-in tool. The expected sign of the currency of denomination should capture investor's currency preferences. The amount issued should be negatively related to the yield spread as banks that place larger issuances can benefit from lower costs of funding, due to better economies of scale (Crespi *et al.*, 2019), and are probably large enough to expect public bailouts in case of crisis which would eventually reduce bail-in expectations, namely the yield spread. Time to maturity might have a positive effect on the yield spread as higher yields are offered to bonds with longer redemption horizons (Zaghini, 2014), yields that inevitably embed a higher probability to incur into bail-in.

The expected signs of the bank-level controls are as follows. Bank size may have a positive effect on the yield spread as the bail-in tool has been designed for large institution whose disordered resolution could trigger systemic implications (Restoy, 2016). Therefore, higher bail-in expectations should be embedded into securities' prices of investors of larger banks. However, the recent cases of misuse of the bail-in tool to address small banks' crises, especially in the emerging countries, raise some doubts about the sign of the estimated coefficient for bank size. Capitalization should have a negative effect on the yield spread as a higher capital base strengthens bank's resilience, therefore, lowering bail-in expectations. Bank risk is expected to have a positive effect on the yield spread as toxic assets jeopardize bank stability, therefore, increasing bail-in expectations. Bank business model should have a negative effect on the yield spread as traditional banking does not match the complexity of the capital structure required by bail-in rules to be applied smoothly (Restoy, 2018). Profitability should exert a negative impact on the yield spread as a higher profitability means higher efficiency, therefore, indicating that the bank is viable and lowering the bail-in expectations (Sironi, 2003). However, a higher profitability can be also associated with a higher bank risk-appetite that may jeopardize bank stability and raising bail-in expectations (Flannery and Sorescu, 1996).

Finally, the impact of the GDP growth on the yield spread is ambiguous. Bail-in, indeed, has proved to work efficiently in developed countries with respect to the Spanish case of Banco Popular Español so, as a result, higher GDP growth should be associated to higher bail-in expectations. However, the recent cases of misapplication of bail-in in some emerging countries may have threaten investors in bailable debt, therefore, biasing the relationship as also lower levels of GDP growth may be associated to wider yield spreads.

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max	Expected sign
Spread	The yield spread between the “average bailinable bonds” and “average non-bailinable bonds” portfolios	3,120	0.0228	0.0535	-0.0504	0.3975	
Bail-in	A dummy valued 1 if the country in which the bank is located has a framework for the bail-in in force, 0 otherwise	3,120	0.6285	0.4832	0	1	
Size	The natural logarithm of bank’s total assets	3,120	10,635	1,270	7,071	12,429	Ambiguous
Roa	Return on assets	3,120	0.8204	0.1189	-0.8668	17,147	Ambiguous
T1_Ta	The ratio of Tier 1 capital to total assets	3,120	0.0844	0.0240	0.0039	0.1479	-
Npl/Ta	The ratio of non-performing loans to total assets	3,120	0.0429	0.0670	0.0056	0.3318	+
Dep/Ta	The ratio of total deposits to total assets	3,120	0.6138	0.1167	0.3578	0.8952	-
Senior	Dummies indicating the principal seniority of the bonds included in the bailinable and non-bailinable portfolios	3,120	4,611	2,650	1	9	Ambiguous
Currency	Dummies indicating the principal currency of the bonds included in the bailinable and non-bailinable portfolios	3,120	7,568	3,963	1	13	Ambiguous

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

(continued)

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max	Expected sign
Amount	Average amount issued by issuances included in the bailinable and non-bailinable portfolios	3,120	19,284	12,305	1	39	–
Tenor	Average time to maturity of the issuances included in the bailinable and non-bailinable portfolios	3,120	11,280	8,234	3,132	33	+
GDP	Percentage of GDP growth	3,120	2,998	2,203	0.153	7,471	Ambiguous

Source(s): Bloomberg & Thomson Reuters Eikon (2016–2019). This table reports the definitions and the descriptive statistics of all variables used in the study

Table 2.

4. Empirical results

Table 3 reports the results of the regression model. Our findings indicate a positive and statistically significant relationship between the dummy (Bail_in) that discerns between emerging countries with and without a framework for the bail-in of creditors, and the spread between bailinable and non-bailinable bonds. In detail, the yield spread of banks located in emerging countries with a framework for the bail-in of creditors presents a bail-in premium of around 4–5 basis points with respect to the yield spread of banks located in emerging countries without such framework. This result corroborates hypothesis H1 about a wider yield spread for banks located in emerging countries that have adopted a framework for the bail-in. Moreover, the bail-in premium is in line with the calculations performed by other studies, such as Cutura (2021) who finds a bail-in premium of 10 basis points for a sample of European bank bonds, or Lewrick *et al.* (2019) who study a sample of global bank bonds and find a bail-in premium of 30 basis points that, however, varies significantly across economies and decreases substantially for countries where banks are more likely to receive government support (Standard & Poor's, 2019), such as Japan where the bail-in premium is just 2 basis points. As the countries included in our sample offer more government support to banks with respect to North America and Western Europe countries (Standard & Poor's, 2018), the economic magnitude of our results is in line with the bail-in premium indicated by literature. The explanation that literature provides for our result is that bail-in rules worsen the payoffs of unsecured bank creditors in case of failure and this lead them asking for higher risk-premia (Conlon and Cotter, 2014). As a result, bail-in regulation would add to seniority as driver of the yield spread between bailinable and non-bailinable bonds, therefore, making it higher for banks located in emerging markets with a framework for the bail-in of creditors compared to banks located in emerging countries without such framework. The repricing of bailinable bonds that widens the yield spread with respect to bonds excluded from bail-in further points out the credibility raised among investors by bail-in rules which eventually enhances both bank operativity and market discipline and finally ease the application of the bail-in tool. These benefits, therefore, support the application of bail-in regulation in emerging countries.

Regarding bank-level control variables: size, expressed by total assets, shows a negative and statistically significant relationship with the yield spread. The result corroborates

Variables	(1)	(2)	(3)
Bail-in	0.0456** (0.0187)	0.0568** (0.0186)	0.0493** (0.0181)
Size	-0.0198** (0.0063)	-0.0186** (0.0061)	-0.0188** (0.0061)
Roa	0.0072 (0.0092)	0.0090 (0.0073)	0.0072 (0.0075)
T1_Ta	-0.6050 (0.3972)	-0.5810 (0.3670)	-0.5801 (0.3660)
Npl/Ta	0.3941** (0.1520)	0.3541** (0.1250)	0.3660** (0.1280)
Dep/Ta	-0.1440*** (0.0447)	-0.1442*** (0.0414)	-0.1460*** (0.0428)
Senior	-0.0097** (0.0041)	-0.0116** (0.0043)	-0.0103** (0.0040)
Currency	0.0067*** (0.0014)	0.0075*** (0.0013)	0.0070*** (0.0013)
Amount	-0.0007 (0.0004)	-0.0010 (0.0005)	-0.0007 (0.0005)
Tenor	-0.0016* (0.0008)	-0.0021** (0.0008)	-0.0018** (0.0008)
GDP	0.0030 (0.0027)	0.0054 (0.0034)	0.0039 (0.0030)
Portfolio fe	Yes	Yes	No
Time fe	No	Yes	No
Portfolio*time fe	No	No	Yes
Cluster S.E Bank	Yes	Yes	Yes
Observations	3,120	3,120	3,120
R-squared	0.557	0.619	0.606

Note(s): This table shows the FE estimation results of the baseline model. The dependent variable is the yield spread between bailinable and non-bailinable portfolios. See Table 2 for the definition of the explanatory variables. The estimation period is January 2016–December 2019. Column 1 includes portfolios fixed effects. Column 2 includes portfolios and time fixed effects. Column 3 includes portfolios*time fixed effects. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are clustered at bank level and reported in brackets

Table 3.
Baseline model (OLS)

hypothesis H3 and indicates that bail-in expectations are higher among investors of small banks. The bail-in represents thus a major threat for bailinable investors of small and unequipped banks rather than for their peers from large banks as the latter may also count on public support in case of crisis and have a capital structure able to sustain this measure anyways. When pricing securities, bailinable investors of small banks account indeed for the potentially confused action by the regulatory authorities which stem in the uncertainty that burdens the crisis management of small banks and that may cause the misapplication of the bail-in tool like in the Polish and Indian cases. As actions speak more than words, the bail-in cases abovementioned are expected to further strengthen this relationship. Actual bail-ins, indeed, induce a stronger market reaction than the legal implementation of bail-in rules (Schäfer *et al.*, 2016). The coefficients of the return on assets (ROA) are almost equal to zero and do not indicate a statistically significant relationship with the yield spread. In contrast with the relationships suggested by literature, this result points out the minor role played by profitability in explaining the yield spread. Capitalization, measured by the ratio between Tier 1 capital and total assets, shows a negative and not statistically significant relationship with the yield spread. Higher capital buffers, indeed, reduce the probability of breaching the minimum

capital requirement thereby lowering market expectations over an imminent bail-in. Reversing the causal effect, instead, another possible interpretation suggests that the lack of bail-in credibility may lead unsecured debt holders not to absorb the unexpected losses thereby requiring banks to increase their capital buffers (Benink, 2018). Bank's risk, measured by the ratio between non-performing loans and total assets, shows a positive and statistically significant relationship with the yield spread. This result is easily explained as the pressure of non-performing loans is often burdening the banks' capital position thereby increasing its default probability. Bank's business model, measured by the ratio between deposits and total assets, shows a negative and statistically significant relationship with the yield spread. The bail-in tool is indeed more appropriate for banks whose capital structure allow for the involvement of class of creditors different from depositors. Further support to this interpretation is given by the results provided by the issuance-level control variable seniority. This variable, indeed, shows a negative and statistically significant relationship with the yield spread as the higher the seniority the lower the bondholder's expectations about being affected by the bail-in. Regarding the other control variables at issuance-level: the principal currency of denomination shows a positive and statistically significant relationship with the yield spread. The average amount issued shows a negative and not statistically significant relationship with the yield spread. This result could be symptomatic of state aid expectations discounted into yield spreads as larger issuances are usually offered by larger banks which are more prone to receive governmental support in case of crisis (Sironi, 2003). Contrarily with the expected sign, the average time to maturity shows a negative but statistically significant relationship with the yield spread. This result indicates that, as they are approaching maturity, bondholders increasingly consider the threat of the bail-in. Finally, the percentage growth of the GDP shows a positive but statistically not significant relationship with the yield spread. As its coefficient is also close to zero, this result indicates that the economic framework does not represent an obstacle to the implementation of the bail-in regulation.

5. Robustness tests

To test the reliability of our results on the relationship between bail-in regulation and the yield spread between bailinable and non-bailinable bonds, we first rerun our equation using the system GMM approach. Table 4 reports the GMM estimation results of our equation. The results further corroborate those of the baseline model. Specifically, the main variable of interest, namely the dummy Bailin, shows a consistent positive and statistically significant relationship with the yield spread along all specifications of the model. Moreover, the control variables both at bank and issuance level show a relationship coherent with that found in the baseline model.

It is plausible that differences among covariates at bank level between the treated and the control group may invalidate the results as the latter may not represent a valid counterfactual for the former. To reduce such bias, we run a propensity score matching (PSM) which harmonizes the sample making the treated and the control groups more homogeneous along bank characteristics. It, therefore, matches each bank in the control group with the bank in the treated group which has the closest score, namely the probability of being treated given its bank-specific characteristics. The score is first computed by a probit model and then the matching is performed using the nearest neighbor approach with a caliper equal to 0.02 and without replacement (see, e.g. Rosenbaum and Rubin, 1983). The caliper is the distance between treatment and control group scores which cannot be exceeded. The without replacement feature assures that each control observation is used no more than one time as a match for a treated observation. We then rerun our equation on the restricted sample. Tables 5 and 6 show the summary statistics of the pre-matched and matched sample of banks. The matching has significantly lowered the differences among key variables between the treated and control group of banks. Table 7 reports the PSM estimation results. Results are in line

Variables	(1)	(2)	(3)
Spread (-1)	0.3361*** (0.0652)	0.3582*** (0.0814)	0.3490*** (0.0740)
Bail-in	0.0207*** (0.0022)	0.0165*** (0.0027)	0.0159*** (0.0052)
Size	-0.0198*** (0.0009)	-0.0186*** (0.0022)	-0.0184*** (0.0026)
Roa	0.0101*** (0.0015)	0.0098*** (0.0017)	0.0115*** (0.0035)
T1_Ta	-0.5850*** (0.0946)	-0.6812*** (0.1881)	-0.7001* (0.3710)
Npl/Ta	0.5250*** (0.0393)	0.5362*** (0.0501)	0.5601*** (0.1170)
Dep/Ta	-0.1501*** (0.0081)	-0.1591*** (0.0153)	-0.1610*** (0.0173)
Senior	-0.0001*** (0.0004)	0.0003 (0.0004)	0.0004 (0.0006)
Currency	0.0052*** (0.0002)	0.0049*** (0.0003)	0.0050*** (0.0003)
Amount	-0.0005*** (0.0001)	-0.0004*** (0.0001)	-0.0005*** (0.0001)
Tenor	-0.0005*** (0.0001)	-0.0003*** (0.0001)	-0.0003*** (0.0003)
GDP	0.0023*** (0.0006)	0.0017*** (0.0004)	0.0018*** (0.0006)
Portfolio fe	Yes	Yes	No
Time fe	No	Yes	No
Portfolio* time fe	No	No	Yes
Cluster S.E Bank	Yes	Yes	Yes
Observations	2,372	2,372	2,372
Hansen	0.101	0.231	0.901

Note(s): This table shows the GMM estimation results of the baseline model. The dependent variable is the yield spread between bailinable and non-bailinable portfolios. See Table 2 for the definition of the explanatory variables. The estimation period is January 2016–December 2019. Column 1 includes portfolios fixed effects. Column 2 includes portfolios and time fixed effects. Column 3 includes portfolios* time fixed effects. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are clustered at bank level and reported in brackets

Table 4.
Two-step GMM

with those of the Ordinary Least Squares (OLS) and the Generalized Method of Moments (GMM) models. As the matching has reduced eventual biases due to samples' heterogeneity, the relationship between bail-in regulation and the yield spread between bailinable and non-bailinable bonds appears even stronger.

In addition, we perform further tests in order to disentangle the moderation effect played by two crucial covariates on the relationship between bail-in regulation and the yield spread. The variables in question are bank's size and country's GDP. Regarding the former, the application of the bail-in tool to medium and small banks is a very topical and much disputed topic in literature. Our baseline analysis has pointed out a negative and statistically significant relationship between bank size and the yield spread. This relationship unveils stronger bail-in expectations by investors in smaller banks. This result is supported by the recent cases of misuse of the bail-in tool in Poland and India and further points out the necessity of reviewing bail-in rules for middle and small banks (de Haan and Kakes, 2020).

We, therefore, re-estimate the baseline model differentiating between above and below the mean of bank size in order to reduce the heterogeneity in terms of total assets of our sample

and to further delve into the role of size as moderator of the relationship between bail-in regulation and the yield spread. Table 8 reports the OLS estimation results of our model split according to the average value of bank size. In line with the negative relationship outlined in the baseline analysis between bank size and the yield spread, these results point out a stronger impact of bail-in regulation on yield spreads for smaller banks. Higher bail-in expectations by investors of smaller banks corroborate our thesis about their higher concern for an imprudent employment of the bail-in tool, due to the uncertainty surrounding the crisis management of small banks, with respect instead to the expectation of bailinable investors of large banks that may count on a stronger capital equipment able to bear with the application of the bail-in or, alternatively, may also resort to public support in case of crisis.

	(1) Treatment	(2) Control	(3) Difference
Total Assets (natural logarithm)	9,569	9,471	-0.090***
Return on Assets	0.200	0.380	-0.180***
Tier One Capital over Total Assets	0.093	0.087	0.050***
Non-Performing Loans over Total Assets	0.057	0.045	0.012***
Total Deposits over Total Assets	0.656	0.511	0.145***

Note(s): This table shows average values for treated (column 1) and control (column 2) banks; column (3) shows the difference between column (2) and column (1). Bank-level variables are key ratios from Bloomberg Professional Service and Thomson Reuters Eikon

Table 5.
Summary statistics –
pre-match sample

	(1) Treatment	(2) Control	(3) Difference
Total Assets (natural logarithm)	10,537	10,669	-0.132*
Return on Assets	1	0.9631	0.0371
Tier One Capital over Total Assets	0.084	0.084	0
Non-Performing Loans over Total Assets	0.02	0.02	0
Total Deposits over Total Assets	0.603	0.625	-0.022

Note(s): This table shows average values for treated (column 1) and control (column 2) banks; column (3) shows the difference between column (2) and column (1). Bank-level variables are key ratios from Bloomberg Professional Service and Thomson Reuters Eikon

Table 6.
Summary statistics –
matched sample

Variables	(1)	(2)	(3)
Bail-in	0.0473** (0.0138)	0.0582** (0.0175)	0.0580** (0.0195)
Controls	Yes	Yes	Yes
Portfolio fe	Yes	Yes	No
Time fe	No	Yes	No
Portfolio*time fe	No	No	Yes
Cluster S.E Bank	Yes	Yes	Yes
Observations	1,066	1,066	1,066

Note(s): This table shows the PSM estimation results of the baseline model. The dependent variable is the yield spread between bailinable and non-bailinable portfolios. See Table 2 for the list and definition of controls. The estimation period is January 2016–December 2019. Column 1 includes portfolios fixed effects. Column 2 includes portfolios and time fixed effects. Column 3 includes portfolios*time fixed effects. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are clustered at bank level and reported in brackets

Table 7.
PSM weighted
regression

Variables	(1)		(2)		(3)	
	Above	Below	Above	Below	Above	Below
Bail-in	0.0359** (0.0144)	0.2020*** (0.0001)	0.0444** (0.0150)	0.3201 (0.1961)	0.0399** (0.0151)	0.1822** (0.0210)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio fe	Yes	Yes	Yes	Yes	No	No
Time fe	No	No	Yes	Yes	No	No
Portfolio*Time fe	No	No	No	No	Yes	Yes
Cluster SE Bank	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,575	545	2,575	545	2,575	545

Note(s): This table shows the OLS estimation results of the baseline model performed above and below the mean of bank size. The dependent variable is the yield spread between bailinable and non-bailinable portfolios. See [Table 2](#) for the list and definition of controls. The estimation period is January 2016–December 2019. Specification (1) includes portfolios fixed effects. Specification (2) includes portfolios and time fixed effects. Specification (3) includes portfolios* time fixed effects. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are clustered at bank level and reported in brackets

Table 8.

Above vs below the mean of Bank Size

The same analysis is then performed to dig deeper into the moderating role played by country's GDP to the relationship between bail-in rules and the yield spread. [Table 9](#) reports the OLS estimation results of our model split according to the average value of country's GDP. The baseline analysis has pointed out a positive but statistically not significant relationship between country's GDP and the yield spread. This preliminary result suggests that possibly GDP do not play a crucial role for the implementation of bail-in rules in an emerging country. However, our in-depth analysis has shown that the relationship between bail-in rules and the yield spread is stronger for countries with a higher GDP growth. As bailouts increase fiscal impact on government debt and deficit ([ECB, 2015](#)), countries with a higher developing economic framework are more likely to apply the bail-in tool if necessary, in order to relief public finances from being used to rescue ailing banks and instead channeling them towards economic growth. Thus, this result provides additional information regarding the implementation of a bail-in framework in an emerging country pointing out the importance of the GDP growth in easing this process.

Variables	(1)		(2)		(3)	
	Above	Below	Above	Below	Above	Below
Bail-in	0.0485*** (0.0103)	0.0062 (0.0348)	0.0680** (0.0232)	-0.0027 (0.0535)	0.0446** (0.0139)	0.0046 (0.0404)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio fe	Yes	Yes	Yes	Yes	No	No
Time fe	No	No	Yes	Yes	No	No
Portfolio*Time fe	No	No	No	No	Yes	Yes
Cluster SE Bank	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,089	2,031	1,089	2,031	1,089	2,031

Note(s): This table shows the OLS estimation results of the baseline model performed above and below the mean of country GDP. The dependent variable is the yield spread between bailinable and non-bailinable portfolios. See [Table 2](#) for the list and definition of controls. The estimation period is January 2016–December 2019. Specification (1) includes portfolios fixed effects. Specification (2) includes portfolios and time fixed effects. Specification (3) includes portfolios* time fixed effects. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are clustered at bank level and reported in brackets

Table 9.

Above vs below the mean of Country GDP

6. Conclusion

This paper takes on the research question posed by the GFDR about whether it is appropriate to apply regulation designed for advanced economies to developing countries by investigating the applicability of bail-in regulation in emerging countries as two recent controversial cases of bail-in in Poland and India have casted some doubts about the conditions for its smooth implementations with respect to the virtuous Spanish case of the Banco Popular Español. We thus focus on bail-in credibility as crucial assumption for a smooth and effective implantation of the bail-in framework. We gauge bail-in credibility by comparing the yield spread between unsecured (bailinable) and secured (non-bailinable) bonds of emerging countries with a framework for the bail-in with that of emerging countries without such framework. Our results point out that market participants of emerging countries with a framework for the bail-in of creditors positively embraced bail-in rules by reflecting them into the yield spread between unsecured (bailinable) and secured (non-bailinable) bonds. In addition, results indicate bank's size and country's GDP growth as crucial moderators of the relationship between bail-in regulation and the yield spread. Specifically, as regards the former, bail-in rules have been better embedded into the yield spread by investors in smaller banks. On the other hand, as regards country's GDP growth, the relationship between bail-in rules and the yield spread is stronger for countries with a higher GDP growth. In conclusion, our results draw important insights about bail-in implementation in emerging countries as the detected bail-in credibility among market participants reassures about the adverse implications related to the mispricing of debt instruments, whereas the distortions caused by the uncertainty regarding the crisis management of small banks point out a shortcoming that policymakers should account for when designing the bail-in regulation to be implemented.

Notes

1. The documentation about the survey is available at: <https://www.worldbank.org/en/research/brief/BRSS>.
2. The design of the dataset does not permit to the inclusion of portfolio fixed effects and their interaction with time to affect the estimation of the coefficient of the dummy variable Bail-in.

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Corresponding author

Giulio Velliscig can be contacted at: giulio.velliscig@uniud.it

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