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Quantifying and Explaining Implicit Public Guarantees for European Banks

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Abstract

This study provides estimation of public implicit guarantees over the period 1997 to 2012 using a rating-based model. The analysis focuses on a sample of 56 large listed European banks. It appears that the main element for determining the value of the public subsidy is the intrinsic strength of the bank. In addition, we bring evidence on the importance of the guarantor strength on the value of the implicit guarantee: a higher sovereign rating of a bank's home country leads to larger implicit subsidies for banks' debt. Our findings also suggest that the recently observed decrease in the value of implicit subsidies goes beyond the declining in European sovereigns' strength. Rather, it is consistent with the implementation of resolution regimes and practices moving from a "bail-out" resolution policy to "bail-in" recapitalization. Resolution schemes providing more explicit rules to treat banks' bankruptcies will reduce investors' expectations of public support.

Keywords: implicit subsidy, ratings, sovereign, resolution mechanism, bail-in.
JEL Classification: G21, G28, G33, G38

1 Introduction and summary

The financial crisis that peaked in 2008 brings into light a lot of financial system inadequacies, to be addressed by the financial regulators and academicians. In particular, it raised questions that were discussed only marginally before. Beyond the need to restructure the current regulatory framework in order to improve the liquidity and capital adequacy for financial institutions, governments had to approve and support large fiscal packages to prevent the risk of run-over of banks in the distressed financial system, acting as a "guarantor of last resort". Therefore, unprecedented amounts of public money have been injected in banking systems in order to prevent banks' failure. In turn, this highlights objectively the importance of "implicit guarantees" given by governments for the distressed financial system.

Public authorities' reaction to the crisis focuses on a particular characteristic of the banking system: the activity of certain banks is essential and irreplaceable for the whole economic activity, mainly due to their size and interconnections with other sectors of the economy. In other words, the estimated cost of liquidation for such "systemically-important" financial institutions is so high that public authorities can not overlook the funding needs of such banks in times of stress. Thus, the risk of default for financial institutions considered as "too-big-to-fail" or "too-interconnected-to-fail", can be reduced by the (near) certainty as the government will support them in order to avoid their bankruptcy and greater financial and social distress.

Therefore, support activities by government authorities provide significant advantages for these beneficiary banks. First, the expectation of public guarantee leads to an increase in the value of liabilities for beneficiary banks relative to non-beneficiary banks or corporate entities from other sectors. Second, they gain access to funding markets and to cheaper resources since the banks' effective risk exposure will be limited. Consequently, the risk premiums paid to investors in banks' debt do not reflect the losses they would have incurred in case of default of the bank. Therefore, this results in a funding cost advantage for beneficiary banks although the guarantee itself is "implicit". Our main objective is to

quantify the value of the implicit support for banks and to identify its major determinants. We test the degree to which the capacity and the willingness of the government and the existent regulations affect the value of implicit subsidies for a sample of 56 large European banks from 17 countries (European Union). We focus on European banks as our topic has a major interest in the new context of the creation of an Economic and Monetary Union in Europe.

To the extent that this subvention is tacit, there is no ex-ante commitment either a concrete evaluation method. Recent empirical literature focuses on American and Anglo-Saxon banks to analyze implicit subsidies for their risky debt. Divergences between estimates come from different evaluation methods used by the authors. Oxera (2011) analyzes the value of implicit subsidy for the British banks using a contingent claims model. The author calculates the expected amount that the government will need to inject in order to prevent the default of the bank as the drop in bank's future asset value beyond a given threshold. However, in a comparative study for different approaches, Noss and Sowerbutts (2012) conclude on an overestimation made with the contingent claims model in implicit guarantee evaluation.

In our paper, we employ a rating based approach, in order to implement both an assessment and an empirical framework, for implicit public guarantees. Our choice of empirical model is driven by several factors. Firstly, it allows for a forward-looking estimation of the government intervention that can not be taken into account in a size-based approach. Secondly, comparing with a contingent claims model, the use of a rating based approach allows us to account only for government subsidies and exclude for deposit or parental guarantees[1]. Although, the rating based approach avoids critics on dynamic modeling of banks' future asset value and their computed statistical distribution.

The rating data issued by Moody's is matched with annual balance-sheet and income-

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[1]The predicted value of the government intervention is calculated as the amount needed to insure the value of all liabilities of a bank. Thus it can also capture the deposits' explicit guarantees. Another constraint of the contingent claims approach is the modeling of the total assets value which supposes an estimation of the correlation between the assets of individual banks. However, this dataset is not available for academic studies.

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statement data from Bankscope. The paper quantifies the value of implicit guarantees for a sample of 45 large listed European banks from 17 counties over the period of 1997 to 2012. In the start of the financial crisis, more precisely from 2007 to 2009, huge amounts of public money were injected into the European banking systems. Our estimations confirm historical values of the implicit guarantees calculated as a spread between an intrinsic rating and a global rating (including government support) during these years. Therefore, as a first step of our empirical analysis, the paper explains why some banks receive greater implicit subsidies as compared to others.

As a second step of our empirical analysis, we test the extent to which the financial strength of guarantor (government) affect the value of implicit guarantees. Our approach is inspired by Estrella and Schich (2012). Compared to their work, we use some additional control variables in order to better explain the evolution of the dependent variable. Our intuition comes from recent tensions of sovereign debt markets that are at least consistent with both the evolution of their balance sheet structure and the reduction in the value of implicit subsidy. We quantify this as a "supply" effect for public subsidies.

Furthermore, recent decrease in the value of implicit subsidies for banks' risky debt is consistent with new regulatory and resolution practices that are to be implemented in the European countries. These coordination efforts anticipate the development of a cross-border resolution mechanism for bank failure within the European Banking Union. According to these practices, unsecured debt holders will incur losses in case of a bank failure (Schich and Kim, 2012). Thus, such debt holders anticipate weaker intervention and willingness from governments' to support risky debt of distressed banks. As a result, we expect that it will reduce the value of implicit guarantees and lower the banking system distortions. Our paper contributes to the literature by considering the simultaneous effect of 'demand' and 'supply' for the implicit public guarantees for banks' debt.

This paper is organized as follows: Section 2 provides background information about implicit public guarantees. Section 3 describes dataset and the methodology employed. Section 4 reports empirical analysis and the main results. Section 5 concludes.

2   Implicit public guarantees

In general, guarantees can be considered as "strategic" instrument since they provide consumer protection and stability, as well as facilitate access to market funds. If the pricing is appropriate, they can be efficient and thus, their existence does not induce a moral hazard problem. Moreover, for explicit guarantees, the insurer can elaborate transparent and balanced contracts with fair prices for the services that are provided. We cannot say the same about "implicit" guarantees. As the name indicates, there is no ex-ante legal and explicit commitment for these guarantees and in most of the cases the amount is not made public. Therefore there are no premiums paid in return to guarantees. Moreover, from an economic point of view, the fact that a bank can benefit from a government support without actually paying any corresponding fees, allows us to analyze these guarantees provided by governments as a subvention.

More precisely, the implicit guarantees could be defined by the expectation that the government will provide a bailout in case of financial distress. They represent a transfer of resources from the government to the benefit of banking sector in order to avoid bankruptcies. During the last financial crisis, this public support has been materialized by liquidity injections or repurchase of banks' risky assets. Moreover, the crisis highlighted that there was a public willingness to support especially "too-big-to-fail" (TBTF) or "too-interconnected-to-fail" financial institutions as these institutions threaten the stability of the financial system.

Although costly for governments and taxpayers, banks' public recapitalization could be justified by a simple (and 'rational') calculation. In the case of a crisis, a bank's bankruptcy will generate losses which may be well above the cost of an ex-ante public punctual support. This fact is based on the assumption that the government will not allow large banks to fail since their failure would cause significant disruption to the whole economic activity. Therefore, these implicit guarantees become a real source of moral hazard, being one of the most significant distortion of financial activity.

At a first view, implicit guarantees are a good response to shocks and panic as they allow banks to continue their activity and avoid disastrous effects on the economic activity. But in analyzing more carefully the effects of this public support, offered to banks, they turned out to be very dangerous. There are several perverse effects that should be mentioned. First,the crisis highlighted that several categories of investors, from the low-risk debt holders (senior debt holders) to subordinated debt-holders, took benefit from the public guarantees even though initially public support was not addressed to investors but rather to customers (taxpayers) protection. Second, this distortion affected market discipline as investors had no longer the incentive to supervise banks risk-taking behavior. Third, after the crisis, an even larger problem emerged. Banks who took advantage of public subsidies became "too-systemically important-to-fail" as they enjoyed the funding cost advantages induced by government protection that reduced both the probability of default and risk premiums paid to investors. This created competitive distortions among financial and non-financial corporations. Therefore, the problem of TBTF become even worse (Haldane, 2012). Forth, the existence of these implicit guarantees highlight fiscal risks. The implicit subsidies are not budgeted and moreover, they are not subject to the same fiscal framework. Finally, one of the most evident adverse effect of these public bail-outs was the excessive risk transferred to government finances.

Due to the subprime crisis episode, market participants view this implicit government guarantee phenomena more as a reality than a myth. Policy makers agreed on the problematic effects of these implicit subsidies and established a reform agenda which shall lead to the dissolution of the banks-sovereign debt nexus. Basel III framework is being adopted in Europe through the Capital Requirements Directive IV (CRD IV). Beyond the strengthen capital and liquidity requirements, CRD IV demand additional capital buffers for banks considered as systemically important. In Europe, additional measures to reduce the implicit guarantees will be taken within the Economic and Monetary Union project. Decisions on supervision and resolution will be centralized and harmonized at a European level. The main actor in this process will be the European Central Bank.

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Therefore, it is essential to quantify and analyze these distortions in order to understand their real effect and to better adapt future policy measure.

3 Quantifying implicit public guarantees for large European banks

As the name "implicit" indicates there is no established measure for the public implicit guarantees. Empirical studies and methodological reflection for quantifying implicit guarantees for banks' debt experienced a new dimension after Lehman Brothers default in 2008 and most of the following literature focused on British and the US banks. Early literature measured the implicit guarantees as a funding cost difference between a privileged bank and a non privileged bank or financial corporation (Kwast and Passmore (2000), Soussa (2000), Baker and McArthur (2009)). Later literature looks up both to quantify the value of implicit guarantees and to analyze their effect on funding cost.

We are focusing on the European banks as they represent an interesting case study for several reasons. The first reason is linked to the essential role that banks and the whole banking sector plays in the European economic activity. The structure of European banking sector represents a key element in our analysis. The second reason emerges from the interactions that were observed during the last years between banking and public debt (bank-sovereign debt nexus). Lastly, the study of implicit government guaranties is essential in the context of a restructuring regulation and for the implementation of a centralized supervision and resolution framework at a European level. The issue of the creation of a Monetary and Banking Union stimulates more interest in studying the distortions characterizing European banking systems.

Two main estimation methodologies can be distinguished in the literature: one based on observed data (*Funding advantage model*) and another one based on assumptions and previsions on the future value of banks' assets.

The first one - the funding advantage model - estimates the implicit subsidy as a reduc-

tion in the cost of funding due to public protection in distress. Within this model, a size or/and a rating based approach are employed. The size approach is quite simple since it compares funding costs between small and large banks. The rating based model takes into account ratings assigned to different types of debt and compares the advantages between supported and not supported debt in order to estimate the value of implicit subsidies. Using a rating based approach, Haldane (2009, 2010, 2012) quantifies implicit guarantees for world's 29 biggest banks between 2007 and 2009 to $700 billion. Only six English banks received approximately $46 billion of public funds in 2010[2]. In terms of the funding cost advantage, public guarantees for TBTF banks are estimated at about 56 basis points (bp) during the crisis period (Li and al., Moody's 2011). In a more extensive study, Ueda and di Mauro (IMF, 2012) highlight an increased advantage of the public support between 2007 (60 bp) and 2009 (80 bp).

The second model - the contingent claims model - uses data on observed credit default swaps (CDS)/assets and equity price to make assumptions on the future value of CDS/assets taking into account a distress period. The difference between the observed and the estimated value of CDS provides a measure of the expected government support (Li, Qu and Zhang, 2011). In analyzing banks' assets, the amount of public resources needed to prevent a bank failure is evaluated as the shortfall in asset value compared to a given threshold[3]. Using this approach, Oxera (2011) evaluates the annual amount of implicit government guarantees for English banks to be more than $120 billion. However, this last method requires the modeling of the future distribution of banks' assets, thus it is very sensitive to modeling assumptions. Moreover, during higher stress periods, assumptions on the distress threshold may be violated. Noss and Sowerbutts (2012) estimates show that this method leads to very significant variations in the value of implicit subsidies from year to year. This can be explained by the very high volatility of equity prices during 2007-2008 driven by high levels of investor risk aversion during that period. This affects the distribution of banks' equity which leads to an over-estimation of the value of implicit guarantees.

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[2] £40 billion (Noss and Sowerbutts, 2012)

[3] This threshold is given by the future value of the capital requirements ratio. A set of assumption is to be made under this approach (Oxera, 2011).

In our analysis, we chose a rating based model to estimate the value of implicit public guarantees for our sample of European banks. We exploit the fact that rating agencies provide rating for several types of liabilities for each bank.

3.1   Methodology

The choice of the rating based methodology is based on the advantages that this approach has relative to other models. First, compared to the size based approach, ratings allow for a more complex estimation. Ratings are forward-looking appreciations including several factors, taking into account both specific and systematic dimensions [4]. Thus, the rating model has the advantage of a better assessment of the risk as it is already incorporated in Moody's judgment and a forward-looking evaluation of the likelihood of receiving government protection. Second, relatively to a contingent claims approach, the rating model allows for a more transparent implementation. The modeling of banks' assets is based on strong assumptions and at the same time, requires the estimation of a correlation between different assets held by an individual bank in order to determine the distress threshold. But such data is not publicly available. Therefore, the rating approach allows to avoid critics on the assessment of the future value of assets and its distribution. Third, both markets and regulators rely heavily on the assessments provides by rating agencies[5]. What it really matter is that ratings are used in pricing debt instruments, this they affect bond spreads (Resti and Sironi, 2005)[6].

We do not deny or overlook the error assessments that underestimate the systemic component of risk ahead to the last financial crisis (Casey, 2009). Rating agencies are continuously intensifying their efforts to improve the rating methodology and the transparency of their assessments in order to enhance their credibility.

In our study, we are going to apply our analysis to a sample of 56 large listed banks

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[4]The size based model includes no relative appreciation of banks risk besides the size effect, thus it considers that only large banks can benefit from public guarantees.

[5]Moreover, ratings are largely used in bond pricing as an appraisal on the involved risk

[6]They bring evidence on the relationship between corporate bonds and credit ratings.

from 17 countries (European Union)[7] We exploit different ratings provided by Moody's to each bank of our sample. more precisely, we use the rating assigned to debt supported by the government, also called *Global rating*, and a second rating that describes the intrinsic strength of the issuer and corresponds to the non-supported debt (*Intrinsic rating*). Therefore, the implicit subsidy provided by government is computed as the difference in number of notches between the intrinsic and the global rating[8]. We compute the spread between the two ratings for each bank i at each period t. Therefore, the calculated value of implicit guarantee of a bank represents an assessment of expected government support. Appendix B reports a detailed description of the evolution of implicit government guarantees. The results based on this method show a significant evolution from 2007 to 2009 when public guarantees reach historical values. Since 2010 the value of public subsidies declined from their peak, however they persist. The below figure illustrates the evolution of the value of implicit guarantee provided to European banks.

Figure 1: Implicit guarantees for European banks
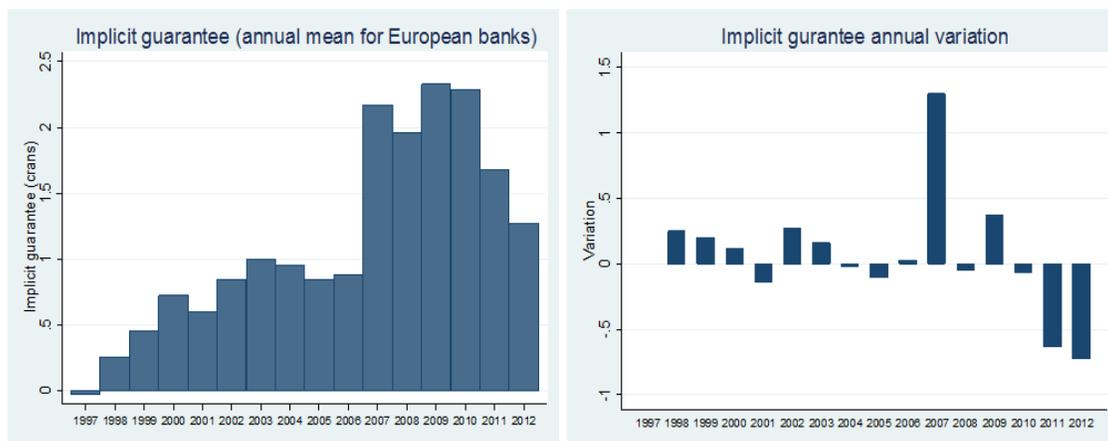
Notes: a (left) Average implicit guarantee for European banks. Annual mean values. b (right) Implicit guarantee annual variation. Average for European banks.

From an econometrical point of view, the nature of our analysis itself suggests that cross section estimations could be problematic for endogeneity reasons. The main sources

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[7]The list of banks by country is reported in Appendix A.

[8]The notches difference is calculated in this sense according to the numerical scale. According to this, intrinsic rating is higher than the global rating as it involves a higher risk of default. Fragile banks have higher numerical values.

of endogeneity that can bias our estimates generally fall under three categories: omitted variables, simultaneity and measurement errors (Wooldridge, 2002). For our analysis, we consider that the most disturbing source of endogenity could be the omitted variables. We can explain this issue by the implicit nature of our dependant variable, the public subsidy. For this reason, several econometrical specifications will be tested. Finally, used fixed effects panel approach for a sample of Europeans banks corrects for the endogeneity bias. Furthermore, this econometric specification allows us to account for possible bias from correlations among the unobserved effects and the observed country heterogeneity.

3.2 Data

Among the three main rating agencies, financial ratings assigned to banks vary significantly. We retain Moody's ratings for reasons of data availability and rating methodology transparency[9]. Therefore, we retain two main ratings issued by Moody's: an "all-in" rating accounting for global strength of the bank and a "stand-alone" rating describing banks' intrinsic strength. Both represent an assessment of banks' ability to meet its commitments on time, but only the second one excludes all external support. Thus, the difference between these two ratings measured in number of notches represents our value of expected implicit public guarantee for banks' debt. We use ratings for a sample of 56 large listed European banks from 17 countries in order to quantify the value of implicit public guarantees over the period of 1997 to 2012[10]. In reasons of different starting dates on which European banks have been rated, we further use an unbalanced panel of 709 observations.

In order to use the ratings described above in our empirical analysis we assign numerical values to each qualitative assessment. The *Long-Term Deposit Rating* (foreign currency) counting for the global rating, rated from Aaa to C3. We assign numerical values from 1 to 25, with 1 accounting for the highest rating (Aaa). The intrinsic rating designed by the

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[9]Our choice is based on studies of Van Roy and Vespro (2012) and Tarashev and Packer (2011) analyzing different methodologies used by the three major rating agencies, Moody's, Fitch and Standard&Poor's. We dispose of larger database with Moody's than the two others rating agencies.

[10]Figure 4 in Appendix B reports ratings' distribution

Bank Financial Strength Rating excludes all external support[11]. This rating's scale runs from A to E. We assign numerical values from 1 to 20 for this rating, with 1 denoting the best quality intrinsic capacity (A) [12]. Appendix B defines and describes the main ratings for banks.

We also use sovereign ratings, again, provided by Moody's. They serve as an explanatory variable in our second section and represent an assessment of the sovereigns' ability to provide support to banking sector in time of distress. It also provides general control for macroeconomic environment of our sample of countries. The scale for sovereign ratings is the same as for the global rating, varying from Aaa to C3. Numerical value of 1 is considered as the best quality of public debt (Aaa) denoting higher capacity of support.

Besides rating database manually collected from Moody's, accounting data is used in order to explain banks' structure and their business model. Balance-sheet and income statement data on an annual base is taken from Bankscope. Explanatory and control variables are explicitly described in Table 1 in Appendix A.

4 Empirical analysis and main results

This section proposes an analysis which aim is (1)to determine how banks' characteristics could explain differences in the value of implicit guarantees received from the public authority, (2) to examine to what extent implicit guarantees can be explained by the economic environment and the capacity of support of governments and (3) to investigate if proposals and measures of crisis resolution took at a national level can explain the evolution of implicit subsidies.

We are going to analyze the "demand effect" for these implicit guarantees. We will further test if the willingness of the government to support the debt of the bank is stronger

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[11]For ours ample of large listed banks, external support describes governmental support. It was already empirically proved in the literature that the governmental support is the most important type (Schich and Kim, 2012). Our sample of banks is composed of large institutions (holdings) for which parental support could not be considered.

[12]The greatest value, 20, corresponds to a weakest intrinsic strength of a bank. The two rating scales are mapped. Details in Appendix B, table 4

than the regulatory constraint.

4.1 Why certain banks receive greater implicit subsidies?

In general, ratings are opinions about the creditworthiness of a corporate, reflecting both quantitative risk assessments and a subjective evaluation of a rating agency on the expected amount of losses that the entity could incur in the future (Moody's Investors Service, 2007, 2011). However, there is no explicit rule or formally detailed methodology that can explain financial, non-financial or sovereign ratings.

A common practice of main rating agencies is to assess quantitative coefficients to different rating criteria and thus compute an average score that serves as rating. For example, in the case of banks, for the Financial Strength rating, Moody's takes into account several factors as: the risk positioning, the financial fundamentals, and operating and environmental factors. However, the numerical coefficient assessed to each of these factors can vary among banks globally in several important ways. Moreover, the analyst's interpretation of such metrics provides further insight and analysis and putting a subjective sense in the rating process.

Our main intuition is that precisely this subjective evaluation of banks' strength could contain additional information about the probability of receiving public support in time of distress. It concerns also a subjective appreciation on the future benefit of the rated bank. In this section, the paper tries to explain why some banks receive greater implicit guarantees from public authorities, as well as which are the non-explicit factors that cause the release of the public guarantees for some banks and not for others.

In an initial step, we test for the possibility of non-linearities in the relation between the two classes of ratings precised previously. Therefore, our intuition is that the value of one notch of spread is not the same for all banks. It depends rather on the intrinsic strength of the bank[13] and therefore on the rank of the rating as high-quality, investment

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[13]This brings us back to the idea that a spread of one notch for a bank classified as investment bank and a bank ranked as speculative hasn't the same value

or speculative[14].

Intuitively, the implicit guarantee should be a negative function of the bank capitalization as banks with a higher loss-absorbency capacity (high capital ratio) will be more stable (Kashyap and Stein (2010)) since better capitalized banks will need (ask) a weaker public intervention in times of distress (BCBS, 2011). Thus, the funding structure is essential as it represents an important source of information on bank's stability. Nevertheless, asset structure is indispensable for bank risk assessment (Hau and al., 2012). For example, bank's liquidity is revealed as an important factor for bank loss assessments during the crisis as they faced funding stress. The amount of liquid assets brings an evaluation of bank's capacity to meet its maturities using its liquid resources (Moody's (2013)). As intrinsic rating captures the data on banks' balance-sheet structure, taking it as a control variable allows us to eliminate the initial state of bank's risk. So, we are going to explain the implicit guarantees by estimating the intrinsic risk of the bank. Moreover, we notice that we cannot consider for a linear relationship between the values of implicit guarantee (IG) and of the intrinsic rating (IR) as the rating spread is not the same for banks in the same rating class[15]. For this reason, we take the squared term on intrinsic rating as an explanatory variable (IR^2).

Furthermore, after regressing the value of implicit guarantee on "initial" risk state (the intrinsic strength - BFSR), we explain why the value of implicit guarantees varies within banks in our sample [16]. Relative to the insurance market, where we can observe supply and demand of insurance contracts, we can consider that the intrinsic risk of the bank represents the "demand" for implicit public guarantees.

Our econometrical specification posits that the implicit guarantee for the bank i at the time t is given by:

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[14]The rating scale is presented in Table 2 in Appendix A. Bellow Baa3/C+ are speculative grade. Above are investment grade banks

[15]There is no linear relationship between implicit guarantees and intrinsic rating. In 2011, for example, both BNP Paribas and Banco Bilbao Vizcaya Argentaria had an intrinsic value equal to B- (5 in numerical value). However, the implicit guarantee varies for these two banks: BNP Paribas has an implicit guarantee estimated at 2 notches and Banco Bilbao Vizcaya Argentaria has only one notch.

[16]After eliminating the initial state effect linked to the intrinsic risk of the bank, we can consider for a "pure" government guarantee.

$$IG_{it} = \alpha_1 IR_{it} + \alpha_2 IR_{it}^2 + \alpha_3 Crisis + \alpha_4 X_{it} + v_{it} \tag{1}$$

$$v_{it} = \alpha_i + \epsilon it \tag{2}$$

where IR is the Intrinsic strength of the bank i at time t and it is discribed by the Intrinsic rating (BFSR).$Crisis$ is a binary variable that controls for global crisis or\ and sharp changes in the value of our explanatory variables. It takes the value 1 for the crisis period, 2007-2012 (0 otherwise). We consider X a vector of control variables that can affect the value of implicit guarantees. It accounts for other implicit factors that can have a direct effect on public guarantees for banks: the balance-sheet size, the systemic importance of the bank, liquidity and also the business model of the bank. The residual term includes time invariant bank specific effect α_i and a random error term ϵ_{it}.

[Insert Table 9]

Table 9 in Appendix D reports the results of fixed effects estimations. Column 1 reports results from our baseline regression explaining the implicit guarantees with the intrinsic rating of the bank. This is a quadratic specification. Taking into account this estimation, the implicit guarantee can be presented as:

Figure 2: Estimated value of implicit guarantees
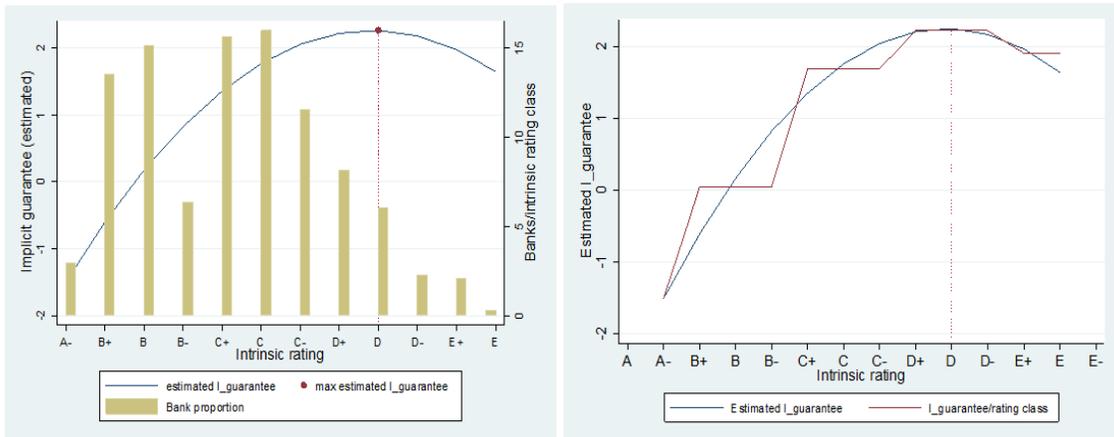
Notes: 1a (left): Implicit guarantee and intrinsic ratings distribution 1b(right): Implicit guarantee by IR (blue line) and by classes of IR (red line). Source: Moody's ratings and author calculations.

It turns out that the implicit guarantee is an increasing and concave function of the intrinsic strength of the bank. Thus, the amount of support provided by the government depends on what the intrinsic strength of the bank is. The maximum of the estimated function corresponds to an intrinsic rating of D (ie. numerical value of 10). This means that banks being rated beyond D receive fewer public guarantees in absolute value than banks with a better quality of intrinsic strength. This also means that the guarantor (sovereign) has no incentive to support the banks with weaker intrinsic strength as the associated risk of default is too high. The function between implicit public guarantees and the intrinsic strength of banks is confirmed by the estimation that takes into account the risk class to which each intrinsic rating belongs.

Second and third columns report the results for estimations of banks' liquidity on both asset and liability sides on the value of implicit guarantee[17]. We find that assets' liquidity is not a significant explanatory variable for the value of the implicit guarantee. However, market liquidity described by the amount of short-term liabilities can explain the value of implicit guarantee. Moreover, results in column 9 show that government intervened to bailout banks that met both solvency and liquidity problems. The business model of banks is significant only during the crisis. The estimated coefficient of the interaction variable *Business model x Crisis* is negative and highly significant showing that public authorities did take into account the nature of banks' activities when providing support (column 8). A higher level of commercial activity of the bank ("traditional" activity of lending and deposits collection) increased the probability of receiving protection from the government as it looked froward to protect taxpayers.

Other bank characteristics could definitively influence public authority decision to intervene in order to avoid a bank's default. The size of the bank (column 5) and even more its' systemic importance (column 6) could be essential elements for the distribution of public implicit guarantees. Banks' interconnections proved to be a trigger point for negative shocks during the crisis so for systemically important institutions there is a stronger probability

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[17]We analyze both asset and liabilities liquidity. Asset liquidity is described by the amount of liquid assets that can be easily sold out in time of crisis. Liquidity on liabilities side represents the short-time market funding

of government support than for medium and small banks. Therefore, for banks categorized as TBTF or TITF, the default risk is reduced by the quasi-certainty that the government will support banks in order to avoid bankruptcy.

Theses results highlight that the intrinsic strength of banks represents the principal factor to take into consideration when analyzing the probability of government intervention to support banks in distress. Our findings bring support to new prudential rules imposing banks to use more stable funding and reduce leverage. We also bring evidence on the importance of short term market funding reduction in decreasing the implicit support offered by governments.

4.2   Alternative regressions

Since each point in the empirical distribution of our dependent variable (Implicit guarantee) is calculated as a spread of two ratings, our data is intrinsically integer valued. In that case, it would be reasonable to use a Poisson regression for our empirical analysis applied to a sample of European banks.

The Poisson regression model considers the equality between the conditional mean and conditional variance of the dependent variable. According to our model, the mean and the variance of the Implicit guarantee should be the same within each cluster of banks. We test this assumption using a negative binomial distribution which allows for over-dispersion in the dependent variable. We first implement a Poisson regression to our empirical model. Table 11 in Appendix D reports results for the Poisson regression equivalent to the econometric specification (1a). Estimated coefficients confirm previous results on the impact of intrinsic risk of the banks on the expected public guarantee for banks' debt. The chi-squared "goodness-of-fit" tests whether the model fits our data. The paper concludes that the model fits reasonably well our data as the test is not statistically significant (Prob>chi2(582) above the threshold of 0.05). In the next step, to check for over-dispersion parameter alpha, we will estimate the same model using a negative binomial distribution. Results are reported in Table 6 in Appendix. The over-dispersion alpha coefficient suggests that negative binomial

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regression does not fit the data as well as the Poisson regression, thus the preferred model for the robustness check for our fixed effects model is the Poisson regression.

[Insert Table 11]

However, this approach will be considered as a robustness check for the fixed effects model, used previously for several reasons. First, Implicit guarantee distribution involves also negative values. Thus, in order to run Poisson regressions for our sample we must ignore those negative values[18]. Second, by comparing the amount of variance of Implicit guarantee explained by the main predictor, the Intrinsic rating, we notice that the R^2 for the fixed effect model is greater than the one for the Poisson model. This means that the fixed effects can explain better the variation of the implicit guarantee for each of the alternative regressions.

4.3 Interconnections between banks and sovereign debt. Implications on implicit government guarantees.

The financial and sovereign crisis highlighted a very special feature of the European financial system and put a spotlight on the link between bank and sovereign debt. In particular, two main sources of the interactions between bank risky debt and sovereign debt should be discussed. The first one is given by the structure of banks' assets. In times of distress, banks tend to increase their exposure to sovereign debt in order to preserve the value and the liquidity of their assets. The crisis put a sharp spotlight on banks' asset structure, especially on the exposure on domestic but also on other European countries debt. Meanwhile, the second source of interactions comes from public authorities' capacity to support banks' risky debt. Responding to 2007 financial crisis, governments acted as a "guarantor of last resort" of the banking system. Thus, governments' reaction to shocks boosted public debt and destabilized the budgetary policy. Hau and al. (2012) show that

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[18]Negative values can appear between 1998 and 2002 for banks like Bank Polska Kasa Opieki SA (Poland), Bankinter SA (Spain), BRE Bank SA (Poland), OTP Bank Plc (Hungary). This negative spread can be explained by the fact that ratings were revised at different dates. For short periods, the numerical value corresponding to the intrinsic rating was lower than the value for the global rating. In total there are 19 negative observations that we have to exclude from the analysis.

sensitivity of long-term bank ratings changes to sovereign rating changes depend upon economic cycle and countries' economic conditions.

Our study contributes to the literature on interactions between banking and sovereign debt in a way that it analyzes the extent to which sovereign strength influences the value of implicit public guarantees offered to banks. For this purpose, we use country ratings in order to explain recent fluctuation in the value of implicit guarantees as it captures both the strength of the domestic government and the economic conditions. These factors could be essential for the "supply" effect of implicit public guarantees.

An important breakpoint can be observed in the evolution of sovereign debt rating in 2009 when several European countries were downgraded by the main rating agencies. Their downward reevaluation could induce additional risk firstly for the banking sector and secondly for the whole economic activity by the fact that weakened financial capacity of European governments might affect the ability to guarantee banks' debt. Therefore, the value of expected guarantees could be reduced.

Thus, the framework, proposes to test the impact of sovereign strength, beyond the effect that is already taken into consideration by the intrinsic strength of banks, on implicit subsidies. The econometric specification in a panel setting is:

$$IG_{it} = \beta_1 IR_{it} + \beta_2 IR_{it}^2 + \beta_3 Soverg_{it} + \beta_4 Crisis + \beta_5 (Crisis * Soverg_{it}) + \beta_6 X_{it} + v_{it}^{'} \quad (3)$$

$$v_{it}^{'} = \beta_i + \epsilon_{it} \quad (4)$$

Where $Soverg$ is the rating for the domestic country of the bank i at the period t, X a matrix of control variables[19] and v_{it} the residual term that can be decomposed into an individual time-invariant fixed effect $\beta_i^{'}$ and a random effect ϵ_{it}.

Results are reported in Appendix E. Column (1) in Table 13 provides the results of esti-

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[19]The vector of predictors X contains: banks' business model, size and systemic importance. We also integrate the cross-variable Business-model x Crisis.

mating the Implicit guarantee on both intrinsic risk of the bank (IR) and financial strength of the guarantor (*Soverg*). As indicated, the negative and highly significant coefficient of the sovereign rating suggests that the strength of the guarantor is an important determinant of implicit guarantees for banks' debt. The main justification for this result is that the governments under distress (corresponding to a higher numerical value associated to ratings) will have a weaker capacity to support the banking system. As a consequence, the expected value of public support will decrease by $\beta_3=0.421$ notches when sovereign rating is downgraded by one notch[20]. Moreover, the interaction variable, denoting the influence of sovereign ratings on implicit guarantees during the crisis, confirms the previous results (last column). However, comparing to Ueda and di Mauro (2012), we control for any possible variation of the initial intrinsic value of banks' balance-sheet due to anticipations on public interventions.

[Insert Table 13]

The results presented in the second column in the Table 13 show that, apart from the main variables already discussed above, the size of the bank's balance-sheet represents an essential element in defining expectations of public interventions. The implicit public guarantees provided to banks in distress vary with the banks' balance-sheet structure and business model, but also with the capacity of the guarantor (the government) to support banks in times of distress: the implicit guarantee for banks' debt is higher, the stronger the financial strength of the government. Therefore, sovereign downgrades, observed especially in 2009 and 2010, explain the reduction of implicit government guarantees offered to the banking sector.

This result has also important policy implications. The existence of such interconnections between bank and public debt represent a considerable source of contagion especially for negative shocks. This was a key element in the European sovereign crisis when a two-way transmission channel brought to the fore. In order to avoid market distortions and to limit the doctrine of implicit public support in case of financial distress, both national and supra-national efforts should be made. A first recommendation will be to make these

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[20]And so the numerical value of the sovereign rating is increasing by one.

public guarantees more explicit and to harmonize fee setting structures across European countries. Hence, premium charges on such guarantees should take into account the borrowers' intrinsic risk and also governments' own creditworthiness. But European banks have rather an internationalized activity. Therefore, the harmonization of such solution should also have across-border dimension. Another recommendation concerns recent efforts made at a European level to move from a "bail-out" resolution policy to a more "bail-in" strategy. This issue will be treated in next section.

4.4 New resolution regimes and their impact on implicit guarantees.

We previously showed that the value of implicit public guarantees depends on both the intrinsic risk of the bank and the support capacity of the government. Thus, the recent drop in the value of the implicit guarantees can be partially explained by budgetary imbalances of European countries and sovereign ratings downgrades. However, the observed decline in the value of our dependent variable could be consistent with recent projects of resolution regimes that were adopted in several European countries.

"If the crisis has taught a single lesson, it is that the too-big-to-fail problem must be resolved", declared the ex-U.S. Federal Reserve Chairman Ben Bernanke, in 2010. European supervisory authorities became aware of this issue and of the excessive government support offered to banking systems during the crisis. Since then, both national supervisory authorities and European committees fixed objectives on resolution regimes' implementation.

A resolution mechanism is supposed to establish a priority order for debt and shareholders in case of liquidation, while improving the capacity of the banking system to absorb losses and taxpayers' protection. This initiative embodies the major consequence of an absence of resolution instruments for policymakers during the crisis and massive public support for their domestic banks during the financial crisis, materialized in an inefficient market discipline (Marquez et al., 2013). Therefore, our intuition is that the reduction of the implicit government guarantees recorded from 2009 goes beyond the sovereign ratings

downgrades, and highlights the potential negative impact of the current efforts of resolution mechanism issued within the European countries. The insight founds on investors' anticipation on lower (and limited) public interventions to rescue banks in times of severe disturbances as a result of more stringent legislation.

The adopted propositions differ according to banking system development and its composition but also to historical structural factors. Between 2009 and 2012 several European countries advanced the implementation of resolution regimes for the purpose of reduction the public support accorded to banks in distress through so-called "bail-out". They propose a transition from "bail-out" (banks' recapitalization by public support) to "bail-in" (banks' recapitalization by shareholders and creditors funds mobilization) practices. The key elements of these national frameworks embody resolution regimes and higher capital standards for systemically important banks. Table 14 in Appendix F shows the major advancements on such resolution schemes implementation for European countries. To implement the impact of resolution regimes on implicit guarantees public in our empirical framework, we introduce a dummy variable called *Resolution−mechanism*. Having a resolution regime in place or a proposition of future implementation of such a mechanism in a country j at the period t, is translated by a value one of our control variable, *Resolution-mechanism*$_{jt}$[21]. We postulate the following equation:

$$
\begin{aligned}
IG_{it} = {} & \delta_1 Y_{it} + \delta_2 Resolution - mechanism_{jt} \\
& + \delta_3 (Soverg_{jt} * Resolution - mechanism_{jt}) + \delta_4 Crisis + \delta_5 S_{jt}) \\
& + v_{it}^{"}
\end{aligned}
\tag{5}
$$

$$
v_{it}^{"} = \delta_i + \epsilon_{it}
\tag{6}
$$

Where Y_{it} represents a vector of characteristics[22] of t bank i at time t and S_j a vector of structural factors characterizing the supervisory and regulatory framework in country

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[21]For Germany for example, it takes the value 1 from 2010 to 2012 and 0 otherwise. For Denmark, *Resolution−mechanism* is 0 for 1997-2007 and 1 for 2008-2012 as the Danish Financial Stability Act was implemented in 2008. More details in Appendix E (Table 14).

[22]The vector of banks' characteristics, *Y*, includes the banks' Intrinsic rating and it squared value, but also the banks' size and systemically-importance.

j. We added these control variables in our econometric specification in order to count for country specific factors that could influence the implementation of resolution mechanism and so the probability of government intervention in time of stress for banks. v'_{it} is the error term which includes country specific effects δ_i and random error ϵ_{it}.

Table 15 in Appendix reports results for our estimations. The main result of this empirical analysis is that, beyond the "demand" (intrinsic strength of the bank) and the "supply" effect (public authority's capacity to support banks in distress), we measure the willingness of public authority to support banks in distress. The estimated coefficient δ_2 displayed in the column (2) highlights the negative impact of resolution regimes on the value of implicit guarantees. This means that investors expect lower public support for banks' debt in countries where efforts to implement a resolution mechanism were already made. Moreover, results presented in column (2) indicate that potential interactions between the sovereign rating and the introduction of resolution mechanism reduce significantly the implicit guarantees for bank debt during the crisis. Nonetheless, this could be associated to consequences of turbulent times for banking and sovereign debt and policy reactions.

[Insert Table 15]

A significant drop in the value of implicit guarantee for Danish banks is observed in 2011. This could be explained by the implementation of a system for winding up distressed banks. Danish government decided to apply haircuts to senior creditors and thus two banks were in default[23]. Consequently, the government decision seemed to be efficient as it reduced investors' anticipations on the amount of state support. However, impact on implicit guarantees is conditional to a high level of transparency and credibility of public authorities' actions.

In a next step we control precisely for the legislative and regulatory structure in each country of our panel. We intend to eliminate any confusion on the pure impact of resolution practices on implicit subsidies and also to test for implicit guarantee sensitivity to national banking systems' structure. Thus, we account for several variables, country specific charac-

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[23] Amagerbanken went down on 6 February, and Fjordbank Mors on 26 June.

teristics that are not considered in rating agencies assessments neither in resolution regimes. We test initially the impact of restrictions on bank activities (column 4)[24] as diversified and big banks are likely to enjoy more public subsidy than small banks. Secondly, we test if the ability of private agents to monitor and discipline banks has an additional impact on implicit guarantees (column 5). After that the supervisory power (column 6) effect is introduced in the regression and, finally, the level of protection on creditors[25] (column 7).

From these four main structural and legislative factors, Market discipline, Supervisory power and Creditors rights are econometrically significant in explaining the variation of public guarantees. Weaker values of Market discipline indicate better transparency and private monitoring. Thus, the estimated coefficient being positive and highly significant, indicates that in countries with improved transparency and a better capacity of private monitoring, weaker public support for banking system is granted in time of financial stress. Regarding the estimated coefficient for Supervisory power, it predicts that powerful supervisory national systems reduce implicit public interventions and imposes rather bail-in practices through shareholders and creditors mobilization. Higher values for this variable suggest greater intervention and sanction power of the supervisor, reducing expectation that public authorities will provide a bail-out if banks are in distress. Each of these factors does not interfere with the effect of public effort to implement a resolution scheme as it is shown by the estimated coefficients in each alternative regression.

To conclude this last section of our empirical analysis, the willingness of European governments seems to affect significantly the amount of implicit guarantees for banks' debt. This intervenes as an additional effect to the banks' demand for support and the guarantor capacity to provide this financial support. Historical structure of each national banking system also accounts for the distribution of public guarantees, however it does not fit in the effect of resolution practices which remains unquestionable.

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[24]*Restrictions on bank activities, Market discipline* and *Supervisory power* are structural indexes provided by Barth, Caprio et Levine (2001 ab, 2003).

[25]This index issued by La Porta and al. (1997, 1998) aggregates different creditors rights: protection of existing creditors in case of reorganization, hierarchy in distribution of rights in case of bankruptcy, restrictions imposed to creditors etc. It is ranged on a scale from zero to four.

The issue presented in this section has an increased interest under the current circumstances of coordination and harmonization of national supervisory authorities at European level. As the first pillar of the future Banking Union, the European Central Bank should be the unique supervisor for European banks. New stress tests and regulatory standards are to be implemented in order to ensure a better capitalization and liquidity for banking and financial system. Obviously, the main objective is to immunize governments against bank risks. In this way, the cost of rescuing will also affect investors and not only taxpayers. This unfinished business could weigh heavily on the willingness of European governments to support their banking systems in case of high stress. For instance, as regulatory mechanisms are not permanently defined[26], public guarantees persist, however, their value is continuously decreasing.

The institutional advances at the European level should be based on a sure and credible national background in order to be productive. Without a strict national legislation that gives priority to bail-in and limit governments' willingness to support their national banking system, public guarantee may persist along with system distortions and moral hazard phenomenon.

5   Conclusion

The increased interest for implicit public guarantees for bank risky debt emerged especially from the reaction of governments to financial stress, starting from 2007. Massive amounts of public resources were "offered" to banking systems in order to avoid spillovers and a worst degradation for banks' funding structure and also for the whole economic activity. However, these injections were very controversial given their impact on public debt and taxpayers.

Our study quantifies the value of public subsidies for a sample of large listed European banks using a rating based approach. We evaluate the expectation of a government support

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[26]In UK reform progress called Vickers and at European level, the ongoing project Liikanen (2012).

to avoid banks' bankruptcy using Moody's ratings. For our sample of European banks, the implicit guarantee represents on average, one notche saving for the period 1997 to 2007. During the crisis (2007-2012), the average advantage is assessed at 2.6 notches. This value represents the rating uplift due to the probability of a future government support.

We bring evidence about the likelihood of government subsidies and the fact that they are composed of several elements: the strength of the bank, the probability that it will be rescued by the government in case of possible bankruptcy and the legislative and resolution mechanisms that will be activated if a bank fails. Our methodology allows to precisely estimate the influence of each of these factors. In the first section we analyze the extent to which certain banks receive more public support than others. We notice that implicit guarantes are not linear function of the intrinsic risk of the bank. Moreover, for banks with a weaker intrinsic strength (worse than rating of D on the scale proposed by Moody's for the BFSR) the government has no longer incentive to intervene as they are too risky. Additional factors that could set off the government intervention to save banks in distress are: the balance-sheet size and the systemic importance of the bank, and moreover, during the crisis, its business model. Thus, during the crisis, even banks with lower share of commercial activity, the so-called investment banks-oriented universal banks, received important amounts of public support. This distortion had some important policy and regulatory implications.

Higher amounts of public resources were injected in European banking systems from 2007 to 2009. However, starting from 2010 the estimated value of implicit guarantees is weaker. In the second section, we prove that the value of implicit guarantees depends also on the characteristics of the guarantor (government). The reduction in the value of implicit guarantees matches with the decreasing strength of European governments during the sovereign crisis that started in 2010. We thus conclude that the value of implicit public guarantees decreases with the strength of the bank and increases with the strength of the guarantor.

Although, beyond the direct impact of the financial strength of the guarantor (sovereign)

to support bank debt, there is a new dimension of the "supply" of implicit guarantees related to the willingness of the government to intervene in order to avoid banks' bankruptcy. We demonstrate that new regulatory and resolution schemes proposed by the national European supervisors go beyond the declining financial strength of the sovereign and significantly reduce the probability of future bail-outs for banks. In future research, we intent to integrate measures that will be adopted in the second half of 2014 at a European level: the Single Resolution Mechanism (SRM).

Our results bring significant evidence on the main determinants of implicit subsidies offered to banks. Banks are bailed out if their balance sheet is weakened in time of distress; however sovereign financial strength is essential in supporting the domestic banking system. The regulatory and resolution measures under implementation could weigh heavily on the willingness of European governments to support their banking systems in case of high stress. Moreover, they promote shareholders and creditors capitalization in order to restore market discipline by aligning bank funding costs more closely with risks. Credit rating agencies recently integrate the resolution process as a key element in their rating methodology in order to better assign the assumptions of government support. Recent ratings revisions cite regulators' substantial efforts to reduce (remove) the uplift corresponding to the implicit public support.

There may be a distance to travel before public implicit subsidies will be eliminated, although turning them into more explicit guarantees can reduce distortions and moral hazard and also improve market discipline. The regulatory framework should focus on system's externalities since the most subsidized institutions are those who cause negative externalities to others.

In order to give more relevant values for implicit guarantee, they should be "converted" in funding interest rate advantage. However, bonds rates for each bank in our sample are not publicly available, only aggregated indexes for European banks are available which are not relevant for our study. We hope that future research will develop and use more appropriate data in order to estimate the debt funding rate advantage due to implicit guarantees and

so, bring concrete evidence on this issue.

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6 Appendix

6.1 Appendix A

Table 1: Description of variables

Variables	Definition
Intrinsic rating (IR)	Or "stand-alone" rating, it corresponds to the intrinsic risk of the bank. It is described by the Bank Financial Strength Rating provided by Moody's and excludes all external support. Source: Moody's BFSR, (Moody's (2010))
Global rating (GR)	Also called "all-in" rating, it accounts for the global strength of the bank including the expected punctual support for the government (source: Moody's Long-term Rating (in foreign currency))
Business model	Ratio (Total customer loans+Total customer deposits)/Total assets (Martel and al. (2012), Gambacorta and van Rixtel (BIS, 2013) (source: Bankscope)
Liquidity	Ratio of Liquid assets to Short-term borrowings (source: Bankscope)
Crisis	Binary variable (1 for crisis period from 2007 to 2012 and 0 otherwise)
Size	log(total assets)
Dummy Eurozone	Binary variable that equals 1 for country members of the Eurozone and 0 otherwise
Systemic banks	Binary variable (1 if the banks is G-SIBs and 0 otherwise) (G-SIB classification cf Financial Stability Board (FSB, 2012))
Sovereign rating (SR)	The government rating evaluating the strength of public debt (source Moody's ; Moody's (2012))
Resolution mechanism	Binary variable (1 if there is already a proposition or a resolution mechanism in the country and 0 otherwise)
Restriction on banks' activities	This index measures the extent to which a bank can both engage in securities, insurance, and real estate activities and own non-financial firms. It can potentially range from 4 to 16, with higher numbers indicating greater restrictiveness.(Barth, Caprio and Levine,2001 ab, 2003, 2008, 2013).
Supervisory power	Structural index evaluating the supervisor's intervention and sanction power (Barth, Caprio and Levine, 2001 ab, 2003, 2013). For our sample, it takes values between -1.8 and 1, with higher values indicating greater power.
Market discipline	Measures the ability of private agents to supervise the banking sector. It assesses the quality of information provided by the banks, the deposit insurance scheme and the role of subordinated debt in bank funding structure (Barth, Caprio and Levine, 2003, 2013). It takes values between -0.43 and 1.46. Lower values correspond to greater transparency of the activity.
Creditors rights	Structural index for each European country that aggregates different creditor rights (rights in bankruptcy situation or in a business reorganization, etc). It ranges from 0 to 4.

6.2 Appendix B

Ratings definition
Global rating: Moody's Long Term Deposit rating (foreign currency)

Bank Long-term Deposit ratings represent Moody's forward-looking opinion on a bank's ability to repay punctually its foreign currency deposit obligations. It also reflects the expected financial loss in the case of default. Bank Deposit Ratings do not apply to deposits that are subject to a public or private insurance scheme; rather, the ratings apply to uninsured deposits, but they may in some cases incorporate the possibility that official support might in certain cases extend to uninsured as well as insured deposits (Moody's Investors Service, 2013). Global long-term ratings scale provides 25 alpha-numerical values going from Aaa (highest quality) to C3 (lowest rating) (cf table below).

Table 2: Global Long-Term Rating Scale

Rating	Numerical value	Rating Class	Description
Aaa	1	High Grade	Obligations rated Aaa are judged to be of the highest quality and are subject to the lowest level of credit risk.
Aa1 Aa2 Aa3	2 3 4	High Grade	Obligations rated Aa are judged to be of high quality and are subject to very low credit risk.
A1 A2 A3	5 6 7	Upper medium grade	Obligations rated A are judged to be upper-medium grade and are subject to low credit risk.
Baa1 Baa2 Baa3	8 9 10	Lower medium grade	Obligations rated Baa are judged to be medium-grade and subject to moderate credit risk and, as such, may possess certain speculative characteristics.
Ba1 Ba2 Ba3	11 12 13	Non-investment grade (speculative)	Obligations rated Ba are judged to be speculative and are subject to substantial credit risk.
B1 B2 B3	14 15 16	Highly speculative	Obligations rated B are considered speculative and are subject to high credit risk.
Caa1 Caa2 Caa3	17 18 19	Substantial risks	Obligations rated Caa are judged to be speculative of poor standing and are subject to very high credit risk.
Ca1 Ca2 Ca3	20 21 22	Extremely speculative	Obligations rated Ca are highly speculative and are likely in, or very near, default, with some prospect of recovery of principal and interest.
C1 C2 C3	23 24 25	In default	Obligations rated C are the lowest rated and are typically in default, with little prospect for recovery of principal or interest.

Intrinsic rating: Moody's Bank Financial Strength rating (BFSR)

Moody's Bank Financial Strength Ratings (BFSRs) represent Moody's opinion of a bank's intrinsic safety and soundness. It does not take into account the probability that the bank will receive an external support. Thus, it is absent of any extraordinary support from public authority. Factors considered in the assignment of Bank Financial Strength Ratings include bank-specific elements such as financial fundamentals, franchise value, and business and asset diversification (Moody's Investors Service, 2013). Although Bank Financial Strength Ratings exclude the external factors specified above, they could take into account other risk factors in the bank's operating environment (for example the strength and prospective performance of the economy, the anticipated fragility of the financial system). Bank Financial Strength Ratings are expressed on an A to E scale and where appropriate a "+" or "-" specifies the intensity of the rating.

Table 3: Global Long-Term Rating Scale

Rating	Numerical value	Description
A	1	Banks rated A possess superior intrinsic financial strength.
A-	2	
B+	3	Banks rated B possess strong intrinsic financial strength.
B	4	
B-	5	
C+	6	Banks rated C possess adequate intrinsic financial strength.
C	7	
C-	8.5	
D+	10.5	Banks rated D display modest intrinsic financial strength.
D	12	Banks from this category could need exceptional external
D-	13	support.
E+	15	Banks rated E display very modest intrinsic financial strength.
E	18	There is a strong probability for these banks to ask for
E-	20	an external support in order to avoid bankruptcy.

Note: Where appropriate, a "+" modifier will be appended to ratings below the "A" category and a "-" modifier will be appended to ratings above the "E" category to distinguish those banks that fall in intermediate categories.

Table 4: Ratings' scales mapping

Intrinsic rating (BSFR)	Global rating
A	Aaa
A-	Aa1
B+	Aa2
B	Aa3
B-	A1
C+	A2
C	A3
C-	Baa1 - Baa2
D+	Baa3 - Ba1
D	Ba2
D-	Ba3
E+	B1 - B3
E	Caa1 - Ca

Notes: Mapping Moody's ratings as in Moody's rating Methodology (2011)

Figure 3: Ratings distribution
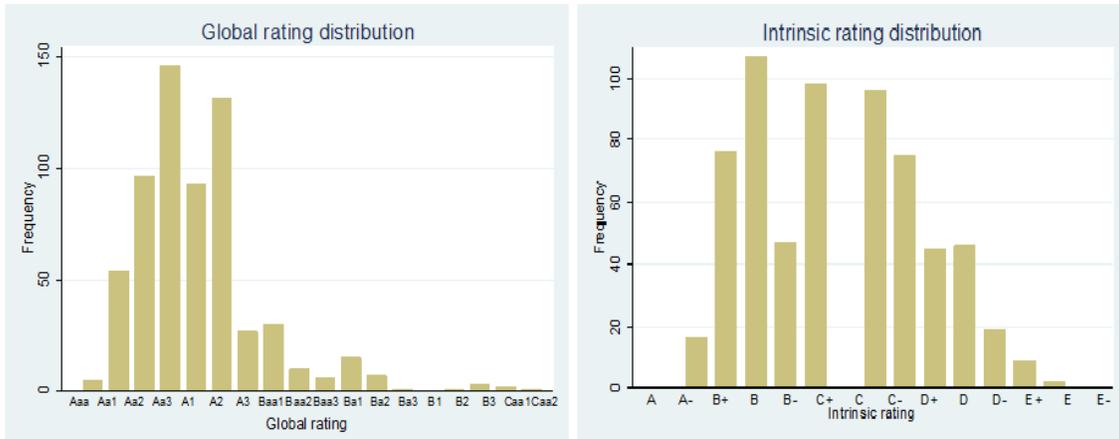
Notes: a (left) Global rating (Moody's Long term Deposit rating) frequency distribution. b (right) Intrinsic rating (Moody's Bank Financial Strength Rating) frequency distribution.

6.3 Appendix C

Table 5: Sample of European banks

Bank	Country	Control	Subsidiaries	Type
Erste Group Bank AG	AUSTRIA	Original	19	Investment and Trust Corporations
Oesterreichische Volksbanken AG	AUSTRIA	Original	112	Commercial Banks
Raiffeisen Bank International AG	AUSTRIA	Original	203	Savings Bank
Raiffeisenlandesbank Oberösterreich AG	AUSTRIA	Original	146	Commercial Banks
Dexia	BELGIUM	Original	95	Commercial Banks
Komercni Banka	CZECH REPUBLIC	Original	819	Bank Holding and Holding Companies
Danske Bank A/S	DENMARK	Original	44	Cooperative Bank
Jyske Bank A/S (Group)	DENMARK	Original	1117	Investment Banks
Sydbank A/S	DENMARK	Original	831	Savings Bank
Pohjola Bank plc	FINLAND	Partial	137	Commercial Banks
BNP Paribas	FRANCE	Original	2778	Bank Holding and Holding Companies
Crédit Agricole S.A.	FRANCE	Original	1111	Commercial Banks
Crédit Industriel et Commercial	FRANCE	Original	507	Cooperative Bank
Natixis	FRANCE	Original	151	Commercial Banks
Société Générale	FRANCE	Original	117	Bank Holding and Holding Companies
Commerzbank AG	GERMANY	Original	106	Investment Banks
Deutsche Bank AG	GERMANY	Original	249	Bank Holding and Holding Companies
Deutsche Postbank AG	GERMANY	Original	5336	Commercial Banks
DVB Bank SE	GERMANY	Original	144	Bank Holding and Holding Companies
Alpha Bank AE	GREECE	Original	86	Commercial Banks
Eurobank Ergasias SA	GREECE	Original	193	Bank Holding and Holding Companies
National Bank of Greece SA	GREECE	Original	66	Investment Banks
OTP Bank Plc	HUNGARY	Original	16	Specialized Governmental Credit Institution
Allied Irish Banks	IRELAND	Original	96	Commercial Banks
Bank of Ireland	IRELAND	Original	915	Commercial Banks
Banca Carige SpA	ITALY	Original	121	Commercial Banks
Banca Monte dei Paschi di Siena SpA	ITALY	Original	58	Commercial Banks
Banca Popolare di Milano SCaRL	ITALY	Original	36	Cooperative Bank
Credito Emiliano SpA	ITALY	Original	97	Commercial Banks
Credito Valtellinese Soc Coop	ITALY	Original	33	Commercial Banks
Intesa Sanpaolo	ITALY	Original	2121	Bank Holding and Holding Companies
UniCredit SpA	ITALY	Original	133	Commercial Banks
Unione di Banche Italiane Scpa	ITALY	Original	1199	Commercial Banks
ING Groep NV	NETHERLANDS	Original	12	Commercial Banks
Bank Polska Kasa Opieki SA	POLAND	Original	63	Commercial Banks
BRE Bank SA	POLAND	Original	25	Commercial Banks
ING Bank Slaski S.A. - Capital Group	POLAND	Original	126	Investment Banks
Powszechna Kasa Oszczednosci Bank Polsk	POLAND	Original	185	Commercial Banks
Banco BPI SA	PORTUGAL	Original	503	Commercial Banks
Banco Espirito Santo SA	PORTUGAL	Original	39	Commercial Banks
Banco Bilbao Vizcaya Argentaria SA	SPAIN	Original	29	Cooperative Bank
Banco de Sabadell SA	SPAIN	Original	79	Bank Holding and Holding Companies
Banco de Valencia SA	SPAIN	Original	291	Commercial Banks
Banco Popular Espanol SA	SPAIN	Original	125	Cooperative Bank
Banco Santander SA	SPAIN	Original	128	Cooperative Bank
Bankinter SA	SPAIN	Original	147	Commercial Banks
Nordea Bank AB (publ)	SWEDEN	Original	544	Commercial Banks
Skandinaviska Enskilda Banken AB	SWEDEN	Original	2957	Bank Holding and Holding Companies
Svenska Handelsbanken	SWEDEN	Original	46	Bank Holding and Holding Companies
Swedbank AB	SWEDEN	Original	732	Commercial Banks
Barclays	UNITED KINGDOM	Original	92	Commercial Banks
HSBC Holdings Plc	UNITED KINGDOM	Original	26	Bank Holding and Holding Companies
Investec Plc	UNITED KINGDOM	Original	559	Commercial Banks
Lloyds Banking Group Plc	UNITED KINGDOM	Original	14	Commercial Banks
Royal Bank of Scotland Group Plc (The)	UNITED KINGDOM	Original	95	Cooperative Bank
Standard Chartered Plc	UNITED KINGDOM	Original	1525	Commercial Banks

Notes:Banks are ranked by country.The sample contains the largest listed banks from extended European Union. The rank is provided by Bankscope on total assets. Source: Bankscope

Table 6: Number of institutions by type

Type of bank	No of banks
Commercial Banks	30
Bank Holding and Holding Companies	11
Savings Bank	2
Investment Banks	5
Specialized Governmental Credit Institution	1
Cooperative Bank	7
Total	56

Table 7: Global Systemically Important Banks - G-SIBs

Bank	Domestic country
BNP Paribas	France
Crédit Agricole S.A.	France
Société Générale	France
Deutsche Bank AG	Germany
UniCredit SpA	Italy
ING Groep NV	Netherlands
Banco Santander SA	Spain
Nordea Bank AB (publ)	Sweden
Barclays Bank plc	United kingdom
HSBC Holdings Plc	United kingdom
Royal Bank of Scotland Group Plc (The)	United kingdom
Standard Chartered Plc	United kingdom

Notes: This table shows systemically important banks from our sample. We count 12 G-SIBs from 28 publised by FSB (2012).
Source: FSB, "Update of group of global systemically important banks", Nov 2012

Table 8: Domestic Systemically Important Banks - D-SIBs

Bank	Domestic country
Erste Group Bank AG	Austria
Raiffeisen Bank International AG	Austria
Dexia	Belgium
Danske Bank A/S	Denmark
BNP Paribas	France
Crédit Agricole S.A.	France
Société Générale	France
Deutsche Bank AG	Germany
Commerzbank AG	Germany
Alpha Bank AE	Greece
National Bank of Greece SA	Greece
OTP Bank Plc	Hungary
Allied Irish Banks plc	Ireland
Bank of Ireland-Governor and Company of the Bank of Ireland	Ireland
UniCredit SpA	Italy
Intesa Sanpaolo	Italy
ING Groep NV	Netherlands
Banco Bilbao Vizcaya Argentaria SA	Spain
Banco Santander SA	Spain
Nordea Bank AB (publ)	Sweden
Skandinaviska Enskilda Banken AB	Sweden
Svenska Handelsbanken	Sweden
Swedbank AB	Sweden
Lloyds Banking Group Plc	United kingdom
Barclays Bank plc	United kingdom
HSBC Holdings Plc	United kingdom
Royal Bank of Scotland Group Plc (The)	United kingdom

We count 27 from 39 Domestically-important banks published by EBA (European Banking Authority) in January 2013.
Source: The EBA, "Recommendation on the development of recovery plans", Jan 2013

6.4 Appendix D

Table 9: Why some banks benefit from greater implicit guarantees (IG)? A fixed effects model.

VARIABLES	(1) IG	(2) IG	(3) IG	(4) IG	(5) IG	(6) IG	(7) IG	(8) IG	(9) IG	
Intrinsic rating (BFSR)	0.757***	0.911***	0.907***	0.907***	0.663***	0.577***	0.557***	0.603***	0.895***	
	(7.717)	(9.206)	(8.812)	(8.966)	(9.205)	(9.386)	(4.890)	(5.811)	(5.984)	
Intrinsic rating^2 (BFSR^2)	-0.0228***	-0.0330***	-0.0325***	-0.0325***	-0.0222***	-0.0160***	-0.0161**	-0.0214***	-0.0281***	
	(-3.616)	(-5.250)	(-5.075)	(-5.093)	(-4.245)	(-3.777)	(-2.336)	(-3.324)	(-2.759)	
Market liquidity (assets)		-0.00756								
		(-1.025)								
Market liquidity (liabilities)			0.0539*						-0.00576	
			(2.179)						(-0.741)	
LTD				-0.000224						
				(-0.208)						
Size					0.0839**					
					(2.453)					
Systemical importance						0.278***				
						(3.328)				
Crisis							0.830***	2.550***		
							(5.070)	(5.867)		
Business model								1.732***		
								(3.571)		
Business model*Crisis								-1.564***		
								(-3.852)		
Leverage									1.19e-06**	
									(2.324)	
Leverage*Liquidity									6.19e-08*	
									(1.797)	
Constant	-2.244***	-2.459***	-2.606***	-2.577***	-2.561***	-1.457***	-1.611***	-3.369***	-2.597***	
	(-6.380)	(-6.349)	(-6.651)	(-6.674)	(-4.881)	(-7.780)	(-4.112)	(-5.676)	(-5.325)	
Observations	709	709	709	709	709	709	709	709	709	
R-squared	0.477	0.519	0.510	0.510	0.397	0.382	0.528	0.626	0.553	
Number of id	56	56	56	56	56	56	56	56	56	56
r2_a	0.476	0.517	0.508	0.508	0.395	0.381	0.527	0.623	0.549	
F	81.73	57.67	58.36	59.77	14.6	211.3	61.19	51.04	53.3	

Notes: This table reports results for the regression of implicit guarantee on intrinsic strength of the bank and other banks' business model characteristics. We use a bank fixed effects model. The sample covers the period of 1997-2012 for 45 European banks. Systemic importance takes the value 1 of the bank is G-SIB our D-SIB (Tables D2 and D3 in Appendix). Business model is not statistically significant in normal times (1997-2007). Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Why some banks benefit from greater implicit guarantees? OLS model.

VARIABLES	(1) IG	(2) IG	(3) IG
Intrinsic rating (BFSR)	0.668***	0.658***	0.677***
	(9.110)	(8.968)	(9.327)
Intrinsic rating^2 (BFSR^2)	-0.0221***	-0.0216***	-0.0227***
	(-4.161)	(-4.061)	(-4.296)
Size	0.119**	0.0533	0.0870**
	(2.435)	(1.530)	(2.421)
GSIBs		0.180*	0.209**
		(1.753)	(2.206)
Universal bank		0.375**	
		(2.526)	
dummy Eurozone			0.208**
			(2.027)
GSIB*dummy Eurozone			
Constant	-3.085***	-2.288***	-2.851***
	(-4.515)	(-4.314)	(-5.070)
Observations	709	709	709
R-squared	0.405	0.405	0.403
r2_a	0.400	0.400	0.399
F	88.38	82.46	88.45

Notes: We run ordinary least squares (OLS) estimations as in fixed-effects model dummy variables are omitted as they are collinear with the dependent variable. Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Alternative Poisson regression

VARIABLES	(1) IG	(2) IG	(3) IG	(4) IG	(5) IG	(6) IG	(7) IG	(8) IG	(9) IG
Intrinsic rating (BFSR)	0.555***	0.660***	0.646***	0.659***	0.579***	0.568***	0.656***	0.493***	0.560***
	(17.77)	(15.30)	(15.07)	(15.26)	(18.07)	(17.74)	(15.26)	(15.38)	(12.50)
Intrinsic rating^2 (BFSR^2)	-0.0202***	-0.0265***	-0.0258***	-0.0263***	-0.0210***	-0.0207***	-0.0265***	-0.0183***	-0.0230***
	(-13.38)	(-11.49)	(-11.22)	(-11.38)	(-13.74)	(-13.49)	(-11.48)	(-12.13)	(-9.949)
Business model		-0.413***		-0.367***					-0.820***
		(-3.584)		(-2.754)					(-3.174)
Market liquidity (assets)			0.00536**	0.00216					
			(1.997)	(0.693)					
GSIBs					0.271***				
					(3.616)				
DSIBs						0.0964*			
						(1.820)			
Size							0.0429**		
							(2.061)		
Crisis								0.527***	0.0581
								(9.215)	(0.205)
Business model*Crisis									0.636**
									(2.224)
Constant	-2.427***	-2.370***	-2.786***	-2.455***	-2.610***	-2.535***	-3.226***	-2.367***	-1.866***
	(-15.98)	(-10.97)	(-14.08)	(-9.891)	(-16.18)	(-15.55)	(-9.862)	(-15.46)	(-6.396)
Observations	709	709	709	709	709	709	709	709	709
Pseudo R-sq	0.210	0.221	0.214	0.221	0.214	0.211	0.214	0.234	0.257

Notes: This table reports results for the Poisson regression of the implicit guarantee on intrinsic strength of the bank and other banks' business model characteristics. The sample covers the period of 1997-2012 for 56 European banks. z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Alternative Negative binomial regression

VARIABLES	(1) IG	(2) IG	(3) IG	(4) IG	(5) IG	(6) IG	(7) IG	(8) IG	(9) IG
Intrinsic rating (BFSR)	0.560***	0.660***	0.646***	0.659***	0.587***	0.656***	0.497***	0.560***	0.579***
	(16.96)	(15.30)	(15.07)	(15.26)	(17.21)	(15.26)	(14.82)	(12.50)	(12.31)
Intrinsic rating^2 (BFSR^2)	-0.0204***	-0.0265***	-0.0258***	-0.0263***	-0.0213***	-0.0265***	-0.0185***	-0.0230***	-0.0237***
	(-12.72)	(-11.49)	(-11.22)	(-11.37)	(-13.06)	(-11.48)	(-11.61)	(-9.949)	(-9.983)
Business model		-0.413***		-0.367***				-0.820***	-0.811***
		(-3.584)		(-2.754)				(-3.174)	(-3.114)
Market liquidity (assets)			0.00536**	0.00216					
			(1.997)	(0.693)					
GSIBs					0.289***				0.132
					(3.595)				(1.420)
Size						0.0429**			0.00184
						(2.061)			(0.0859)
Crisis							0.548***	0.0581	0.0272
							(9.093)	(0.205)	(0.0952)
Business model*Crisis								0.636**	0.655**
								(2.224)	(2.284)
Constant	-2.452***	-2.370***	-2.786***	-2.454***	-2.652***	-3.226***	-2.401***	-1.866***	-2.007***
lnalpha	-2.731***	-24.49	-33.15	-16.22	-2.724***	-16.21	-2.913***	-20.61	-16.84
Observations	709	709	709	709	709	709	709	709	709
r2_a	0.156	0.178	0.171	0.178	0.160	0.172	0.182	0.215	0.216

Notes: This alternative regression test the same econometric specification as the Poisson test (1a). lnalpha represents the dispersion coefficient for the predictive variables. The probability being above the cutoff (0.05), it means that there is no significant over dispersion and we should be using Poisson model rather than Negative binomial. z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6.5 Appendix E

Table 13: The sovereign - banks' debt nexus. Implications on public guarantees.

VARIABLES	(1) IG	(2) IG	(3) IG (GSIBs)	(4) IG	(5) IG	(6) IG	(7) IG	(8) IG
Intrinsic rating (BSFR)	0.691***	0.726***	0.736***	0.369***	0.323***	0.407***	0.705***	0.394***
	(8.457)	(7.723)	(5.731)	(3.885)	(3.807)	(4.138)	(7.227)	(3.956)
Intrinsic rating^2 (BSFR^2)	-0.00924*	-0.0126**	-0.0182*	0.00426	0.00575	-0.000444	-0.0117**	-0.000272
	(-1.874)	(-2.443)	(-2.138)	(0.781)	(1.143)	(-0.0785)	(-2.196)	(-0.0484)
Sovereign rating	-0.420***	-0.396***	-0.275***	-0.480***	-0.338***	-0.427***	-0.391***	-0.403***
	(-5.693)	(-5.302)	(-3.624)	(-5.626)	(-2.600)	(-5.132)	(-5.767)	(-5.345)
Size		-0.00411	-0.176**			0.0117		
		(-0.0470)	(-2.511)			(0.179)		
Crisis				1.076***	1.373***	1.134***		2.223***
				(6.614)	(6.170)	(6.523)		(5.651)
Sovereign*Crisis					-0.123			
					(-1.543)			
Business model							0.222	1.168**
							(0.375)	(2.536)
Business model*Crisis								-1.141***
								(-3.338)
Constant	-1.494***	-1.505	0.738	-0.383	-0.477	-0.721	-1.698**	-1.680***
	(-3.485)	(-1.114)	(0.599)	(-0.789)	(-0.955)	(-0.735)	(-2.821)	(-3.306)
Observations	709	709	377	709	709	709	709	709
R-squared	0.587	0.598	0.674	0.683	0.687	0.708	0.594	0.713
Number of id	57	56	27	57	57	56	56	56
r2_a	0.586	0.596	0.670	0.681	0.685	0.705	0.592	0.710
F	78.26	66.85	53.72	62.53	54.93	44.81	45.64	65.94

Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Fixed effects model. Cluster by country.

6.6. Appendix F

Table 14: Overview of resolution regimes in European countries

Country	Legislation/Year	Administrative Authority Responsible for Restructuring	Comments
Austria	Supervisory Guidelines, 2012		Consultative document reports proposals to strengthen resolution powers. It focuses on large, internationally active banks.
Belgium	Financial Crisis Law, 2010		New resolution tools, such as transfer of part or all of the bank's rights and obligations, introduced.
Denmark	Danish Financial Stability Act, 2008		A government-owned winding-up company was established to acquire failed banks. Full guarantee to unsecured creditors and depositors.
	Amendment, 2011		Denmark was the first country to apply a haircut to senior creditors. Above-mentioned guarantee withdrawn. Separate fund called 'Winding Up Fund' established to fund resolution.
France	Financial and Monetary Code	Autorité de Contrôle Prudentiel	Power to operate a bank in resolution exercised through administrator appointed by ACP, which may exercise all powers of management.
Germany	Bank Restructuring Act, 2010 (entered into force on January 1, 2011)	Federal Financial Supervisory Authority (BaFin) and Financial Market Stabilisation Authority (FMSA)	Two new procedures were introduced for distressed institutions: a restructuring procedure and a reorganization procedure. BaFin's preventative prudential instruments were strengthened and extended. For example, BaFin was given the power to appoint a special representative to an institution during the early stages of a crisis. The assets and liabilities of a failed bank can be transferred to a bridge bank by the supervisor if voluntary restructuring and reorganization not expected to be successful.
Greece	Amendment of the Banking Act, 2011	Banque of Greece (BoG)	Comprehensive resolution tools such as bridge bank and purchase and assumption introduced. Resolution fund established within the Deposit and Insurance Guarantee Fund for funding resolution. In urgent cases, the procedure for submitting offers, the determination of the remuneration to be paid to the transferee credit institution and the transfer will be based on a temporary assessment by the BoG.
Ireland	Credit Institutions (Stabilization) Act, 2010		Various new resolution tools for Ministry of Finance with regard to banks receiving government support. Contract terms on subordinated bonds can be modified by Ministry of Finance.
	Central Bank and Credit Institutions (Resolution) Act, 2011. Amendment, 2013.		Resolution powers transferred from Ministry of Finance to the Central Bank. Credit institutions' resolution fund to be introduced.
Italy	Consolidated Banking Law BL	Bank of Italy	Regime based on special administration and compulsory administrative liquidation through appointment and supervision by the BoI of special administrator or liquidator. Shareholders can only be overridden under compulsory administrative liquidation.

Netherlands	Act on Special Measures for Financial Institutions, 2012	Dutch Central Bank (DNB) and Dutch Ministry of Finance (MoF)	The Dutch resolution framework was broadened to address the risks posed by systemically relevant banks. The resolution powers of the DNB are limited to licensed banks and do not apply to foreign branches of European Economic Area banks. The Dutch Intervention Act for Financial Institutions authorizes the DNB to adopt a Transfer Plan for the transfer of bank deposits, (other) assets and liabilities of a bank when the bank faces difficulties relating to solvency, liquidity or compliance with regulatory 'technical provisions' that cannot be reversed in a timely manner. However, the scope of application is not limited by an institution's size or systemic importance. Nevertheless, the systemic relevance is considered when selecting resolution options.
Portugal	Amendments to the resolution regime for credit and financial institutions, 2012		Resolution mechanisms for the orderly winding-down of banks, including early intervention and comprehensive tools, introduced, including total or partial sale of business and the setting up of a bridge bank. Resolution fund within the Banco de Portugal established, to be funded by the industry.
Spain	Law on Bank Restructuring and Credit Institution Equity Reinforcement, 2009		Fund for Orderly Bank Restructuring (FROB) established in June 2009 to facilitate bank restructuring. It is able to provide temporary financial support for the restructuring and resolution of banks in difficulties including partial transfer of assets of failed banks to a bridge bank.
	Royal Decree-law 24/2012	Bank of Spain and Bank Resolution Authority (FROB)	A new legal framework for bank resolution entered into force on August 31, 2012. The framework aims to improve the regime that had been in force since 2009, and takes into account the EU legislative proposal on the recovery and resolution of banks and investment firms. Support during the restructuring period may take the form of guarantees, loans, subordinated debt, or acquisition of assets or capital injections.
United Kingdom	Banking Act, 2009	BoE and HMT	Special Resolution Regime introduced in 2009. Comprehensive resolution tools such as temporary public ownership transfer to bridge bank, and insolvency procedure provided to the authorities. The Financial Services Act from 2010 asks banks to provide recovery and resolution plans. Under the Banking Act, the Financial Services Authority, in consultation with the BoE and the Treasury, makes the decision to put a bank into the SRR. The Treasury decides whether to put a bank into temporary public ownership, and the BoE, in consultation with the other authorities, decides which of the tools to use and implements the resolution.
Europe	Bank Recovery and Resolution Directive, 2013	European Central Bank	In June 2012, the European Commission published a draft Directive on recovery and resolution of credit institutions and investment firms. Within the EU, the recovery and resolution framework prioritizes resolution at group level under the leadership of a group resolution authority with strong coordination in the resolution college. Implementation of a Single Resolution Mechanism (SRM) at the European level.

Sources: FSB-"*Resolution of Systemically Important Financial Institutions –Progress Report", 2012;* FSB-"Thematic Review on Resolution Regimes", 2013; Schich and Kim (2012); European Council (2013); ECB (2011); EBA (2013); public information from central bank websites.

Table 15: The impact of resolution mechanisms on implicit public guarantees in European countries.

VARIABLES	(1) IG	(2) IG	(3) IG	(4) IG	(5) IG	(6) IG	(7) IG	(8) IG
BFSR	0.813***	0.723***	0.766***	0.407***	0.409***	0.381***	0.378***	0.503***
	(8.784)	(8.703)	(7.889)	(6.361)	(6.526)	(5.977)	(6.883)	(10.33)
BFSR^2	-0.0238***	-0.0102*	-0.0136**	0.00435	0.00482	0.00624	0.00599	-0.000680
	(-4.189)	(-1.902)	(-2.196)	(0.929)	(1.056)	(1.344)	(1.459)	(-0.198)
Resolution framework	-0.746***	-0.361*	-0.473**	-0.296	-0.341	-0.238	0.0745	-0.473**
	(-2.882)	(-1.847)	(-2.182)	(-1.401)	(-1.629)	(-1.106)	(0.361)	(-2.319)
Sovereign rating		-0.401***	-0.389***	-0.447***	-0.469***	-0.456***	-0.439***	-0.334***
		(-6.204)	(-5.820)	(-11.51)	(-12.43)	(-13.52)	(-13.00)	(-12.43)
Size			-0.00976					
			(-0.117)					
Restrictions on banks' activities				-0.00681				
				(-0.278)				
Market discipline					0.208**			
					(2.089)			
Supervisory power						-0.190***		
						(-3.963)		
Creditors rights							-0.188***	
							(-5.078)	
dummy Eurozone								0.00162
								(0.0166)
Constant	-2.501***	-1.663***	-1.616	-0.404**	-0.592***	-0.478***	-0.0256	-0.876***
	(-7.068)	(-4.385)	(-1.397)	(-2.438)	(-3.005)	(-2.809)	(-0.123)	(-5.839)
Observations	709	709	709	709	709	709	709	709
R-squared	0.492	0.590	0.604	0.554	0.558	0.565	0.593	0.523
Number of id	56	56	56	56	56	56	56	56
r2_a	0.491	0.588	0.601	0.551	0.555	0.561	0.590	0.520
F	59.51	86.46	49.41	140.9	142.8	147.4	140.1	174.2

Notes: The dependent variable is the implicit guarantee. Estimations include bank fixed effects. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$