"Keeping It Personal" or "Getting Real"? On the Drivers and Effectiveness of Personal versus Real Loan Guarantees

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Abstract

Little is known about the drivers and effectiveness of personal versus real loan guarantees provided by firms. This paper studies a dataset of 477,209 loan contracts granted over the 2006-2014 period by one Spanish financial institution consisting of several distinguishable organizational units. We uncover different reactions of personal and real guarantee requirements along key bank, loan, bank-firm relationship and firm characteristics. Personal guarantees are mostly driven by the economic environment as reflected in firm conditions, while real guarantees are mostly explained by loan characteristics. In response to higher capital requirements imposed by European authorities in October 2011, personal guarantees requirements increased significantly more than their real counterparts. But both personal and real guarantees can discipline firms in their risk-taking. (119 words)

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1. Introduction

Loan contracts often embed borrower's guarantees to mitigate the pervasive asymmetric information problems present in financial markets (see the original theoretical contribution by Stiglitz and Weiss, 1981).[1] In this respect, collateral plays an important part in many debt contracts.

While some loans are collateralized with *real* obligations, other loan contracts rely on *personal* guarantees. Real guarantees are firm's assets, such as real estate, financial or movable assets, that the lender can subsequently sell in the case of borrower's default. In contrast, personal guarantees refer to third parties' contractual obligations (e.g., firm's managers or official institutions) to make payments if the borrower defaults. They are typically based on the present and future net worth of these third parties. By definition, this type of guarantee is outside the firm itself and hence, there will be a low correlation between the firm's performance and the associated amount recovered after default. The values of these two kinds of guarantees can therefore evolve in very different ways. For instance, the price of real estate (which can be posted as real collateral) can be completely orthogonal to the net worth of managers in the firm (who can pledge a personal guarantee). As such, it is expected that at least some of the salient determinants of these two kinds of guarantees will be different.

The empirical literature so far has focused its attention on the determinants of the use of real guarantees or collateral (e.g., Jiménez, Salas, and Saurina, 2006; Berger, Frame and Ioannidou, 2011). Yet, mainly due to data limitations, little is still known about the determinants of personal guarantees usage and in general, about the differences between personal and real guarantees.

[1] The theoretical literature illustrates that posting collateral protects against the two traditional types of asymmetric information, i.e., adverse selection (Bester, 1985; Besanko and Thakor, 1987) and moral hazard (Boot, Thakor, Udell, 1991). Empirical studies have widely confirmed the important role of reducing adverse selection and moral hazard as key drivers behind collateral use (e.g., Cole, Goldberg, White, 2002; Berger, Espinosa-Vega, Frame, Miller, 2011; and Bellucci, Borisov, Giombini, and Zazzaro, 2015).

We break new ground by studying the determinants of the use of personal and real guarantees and the differences between the two types of guarantees. Then, we analyze a unique experiment on the preferences for personal or real guarantees in the context of increasing banks' capital requirements. Finally, we analyze the consequences of the use of these types of guarantees for firms' risk-taking. To address these questions, we use a unique and proprietary dataset of 477,209 loan contracts granted over the 2006-2014 period by a Spanish financial institution and its ten subsidiaries or recently acquired banks.

We document that personal guarantees are mostly driven by the economic environment as reflected in firm conditions, whereas real guarantees are mostly explained by loan characteristics. The granting of personal and real guarantees further responds differently in several important dimensions. For example, personal guarantees are typically employed in short and medium-term loans, whereas real collateral is increasingly prevalent at longer maturities. We also find that a higher loan amount increases the likelihood of real collateral use significantly more than it increases personal guarantees usage. Thus, long-term large loans typically involve real guarantees, as it may be harder for firm managers to collateralize these loans with their net worth, because this tends to be more uncertain than the value of real assets. We also find that real collateral requirements are more likely for larger firms and previously refinanced firms but less likely for more leveraged firms, and that the distance between branch and bank headquarters increases the probability of pledging real or personal guarantees almost equally.

We further analyze the impact of a Europe-wide regulatory policy shock in October 2011 that increased bank capital requirements. We find that though the pledging of both types of collateral increase, personal guarantees become especially more widespread, possibly because the most prevalent type of personal guarantee possesses two important advantages for the bank. First, in case of default it can be executed faster than real guarantees.

Second, it offers higher coverage ratios. This change in collateral policy clearly reflects a growing concern about fulfilling capital requirements in an era of scarce capital.

Finally, we analyze the effects of guarantees usage on risk-taking by firms. We find that firms reduce the volatility of their earnings in the three-year period after being granted loans with either personal or real guarantees. This effect is larger for personal guarantees during the 2006-2007 expansion period, but similar across both types of guarantees during the 2008-2011 recession period, when the use of guarantees overall increased. As personal guarantees often involve managers' net worth, they will internalize potential losses imbuing them with risk aversion in their investment and management in general. However, it could prevent managers to invest in certain projects and ultimately affect the firm profitability, especially if the banks overuse personal guarantees.

Even though personal and real guarantees have very different properties,[2] only a handful of recent papers treat them separately. Brick and Palia (2007) and Calcagnini, Farabullini and Giombini (2014) for example explore the differential effects of personal versus real collateral on the loan rate, while Pozzolo (2004), Voordeckers and Steijvers (2006), and Ono and Uesugi (2009) – like our paper – study their differential determinants. The first paper studies 52,000 bank credit lines that were granted in Italy between 1992 and 1996 and finds differences along relationship characteristics and firm risk in collateralization outcomes. The second paper studies a sample of 234 credit files in a large Belgian bank between 2000 and 2003, while the third paper accesses a 2002 Survey of the Financial Environment which covers 1,700 Japanese firms to investigate not only the determinants of the

[2] Udell (2015) makes a related point about *outside* (assets provided by someone outside the firm) versus *inside* (assets pledged by the firm) collateral. Recent papers focus on how changes in the law that facilitate real collateralization leads to an increase in borrowing and performance of firms (e.g., Calomiris, Larrain, Liberti, and Sturgess, 2015; Campello and Larrain, 2015; Cerqueiro, Ongena, Roszbach, 2015 a,b).

use of personal and real guarantees but also the relation between collateral usage and monitoring efforts by lenders.

In contrast to these three studies, we assess many more possible drivers of personal and real collateralization, i.e., bank, loan, bank-firm, and firm characteristics, and distinguish between different types of personal and real guarantees and across different time periods. We also aim to understand the differential effects of these drivers on the probability of requiring either personal or real guarantees and to study how the type of guarantee affects firm risk-taking. This comprehensive analysis is only made possible thanks to the uniquely large and detailed data set we have access to.

The remainder of paper proceeds as follows. Section 2 describes the main features of our dataset. Section 3 explains our empirical regression model and the variables used. Section 4 shows and explains the empirical results obtained. Section 5 provides evidence on the guarantee policies in the event of a recapitalization. Section 6 shows evidence on the relationship between the use of guarantees and the firm risk taking. Section 7 contains several robustness tests and extensions. Section 8 concludes.

2. Dataset

Our proprietary dataset comes from a Spanish financial corporation and its subsidiaries or acquired banks. It contains information on 477,209 loans granted between February 2006 and November 2014. Besides the standard loan characteristics (size, date of origination, maturity, interest rate…), the dataset contains information on the existence (or not) of a guarantee and the amount covered by the guarantee relative to the loan size. Information on guarantees includes the type of guarantee, either personal or real, and also a number of subtypes.

For all loan contracts, we map firm location (by zip code) to both bank branch and headquarter locations. There are 5,117 zip codes and 3,200 municipalities where firms obtain loans (see Panel A of Table 1) and 1,088 municipalities with bank branches. Zip codes with firms in our dataset

represent almost half of all the zip codes in Spain (i.e., 46 percent), while the branch zip codes represent almost three quarters (i.e., 71 percent) of all the zip codes in towns with more than 10,000 inhabitants. As shown in Panel B, the distribution of loans varies significantly across zip codes and municipalities.

< Insert Table 1 here >

Descriptive statistics on firm characteristics are shown in Table 2, Panel A. The average firm obtains 7.48 loans from the bank during the 2006-2014 sample period, ranging between 1 and 2,419. The average firm has total assets of 5.69 million euros, its leverage ratio − defined as total debt relative to total assets − is 75.72 percent, whereas the average return on equity (ROE) is 2.89 percent. Additionally, the dataset contains information on whether loans are granted to previously refinanced firms (27 percent of all the sample loans). Our dataset contains information on all the other bank-firm contracts. We observe that 30 percent of the firms had other types of contracts with the bank (i.e., credit cards, credit lines, or other loans) when the loan was granted. This variable is used as a proxy for relationship lending, due to the implied effect of diminishing informational asymmetries. The organizational distance − both physical and in terms of traveling time − between bank branch and headquarters is relatively large, pointing towards a relevant source of asymmetric information. This reflects the distance between the different provinces in Spain and the financial center, located in Madrid. The maximum distance (above 2,589 km) is due to the fact that the Canary Islands are far away from the Iberian Peninsula.

< Insert Table 2 here >

Panel B of Table 2 contains descriptive statistics on the contract characteristics. Average loan maturity is higher than one year (i.e., 18.42 months) but there are a considerable number of short-term loans, as the median maturity (3.95 months) reveals. Contrary to Jiménez, Salas, and Saurina (2006), who use loans with a maturity higher than one year and

split the sample in two groups depending on the loan maturity (1-3 years and more than 3 years), we consider all the loans in the sample after treating potential rollovers.[3] The average loan size is around 100,000€ but it varies substantially ranging from 550€ to 3,000,000€, showing the wide heterogeneity of firms and loan types in the sample.

Personal guarantees are more used than real guarantees in our sample. While 35 percent of the loans carry a personal guarantee, only 8 percent of them have a real guarantee. Among the personal guarantees, the ones associated to the firm itself (e.g., firm's managers) are more widespread, while the ones associated with other institutions are much less frequent. In terms of real guarantees, the most common ones are mortgages. As Panel C shows, for loans with personal guarantees, the ones associated to the firm present an average coverage of 163 percent, relative to loan size, whereas it is 100 percent for guarantees associated with other institutions. For those loans with real guarantees, mortgage guarantees cover, on average, almost 100 percent of the loan size, while financial asset-based guarantees cover a much lower percentage of the loan size (61 percent, on average).

Table 3 shows the correlation among the dependent and explanatory variables. Correlations among explanatory variables are overall quite small, except the high positive correlation (50 percent) between the size of the loan and the maturity. Regarding the unconditional correlations between explanatory variables and guarantees dummies, a higher organizational distance is associated with a higher likelihood of posting real and personal guarantees. We also observe that loans with higher size and higher maturity are positively correlated with the likelihood of having personal and real guarantees. In contrast, having other types of contracts is negatively related to having guarantees. At the firm level, higher leverage, being

[3] We consider as a rollover loans with less-than-1-year maturity, granted immediately after another short-run loan matures (next day), with the same amount, maturity and in the same bank office than a previous loan. In a subsequent exercise we examine whether this strategy to detect rollovers affects the results by analyzing loans with more-than-1-year maturity and find that it does not.

previously refinanced, lower total assets, and a smaller ROA all imply a higher likelihood of having to post real and personal guarantees.

< Insert Table 3 here >

3. Empirical Framework and Model Hypotheses

In this section we first describe our empirical setting and the variables employed in the analysis. We then describe and explain the hypotheses tested.

3.1. Empirical Framework and Model

We postulate the following empirical regression framework, where the existence/absence of personal or real guarantees (1/0) in a given loan contract *i*, denoted as G_i, is regressed on several sets of variables, including information on the bank, loan, bank-firm and firm characteristics, plus sector, bank, year, and province fixed effects:

$$G_i = \alpha + \beta_1 B_f + \beta_2 L_i + \beta_3 BF_{f,t} + \beta_4 F_{f,t} + \theta_s + \mu_b + \gamma_y + \delta_p + \varepsilon_i \quad (1)$$

where *b* denotes the bank granting the loan to firm *f* operating in sector *s* and located in province *p*. Both bank-firm and firm characteristics refer to the month before the loan is granted (*t*). The subscript *y* denotes the year in which the loan is granted and so, the term γ_y refers to the use of year fixed effects. Standard errors are clustered at the firm level. Each set of measures in equation (1) contains the variables detailed below:

B: Bank characteristics

- Branch-Headquarter Distance (organizational distance): Distance between the bank branch and the headquarters, measured in either the logarithm of kilometers or minutes.[4]

[4] Other papers study the effect of the physical distance (i.e., distance between the borrower and lender) on the use of guarantees. For instance, Bellucci, Borisov, Giombini, and Zazzaro (2015) find that more distant borrowers from the branch experience higher collateral

L: Loan characteristics

- Loan Maturity: Logarithm of the loan maturity in months at origination.
- Size: Logarithm of the loan amount in Euros.

BF: Bank-Firm characteristic

- Any Other Type of Contract: Dummy that equals one if the firm has other type of outstanding contracts with the bank (i.e., credit cards, credit lines, or other loans) when the loan is granted, and equals zero otherwise.

F: Firm characteristics

- Total Assets: Logarithm of firm total assets in Euros.
- Leverage: Ratio of firm total debt relative to total assets.
- ROE: Firm return on equity.
- Refinancing: Dummy that equals one when the firm is refinanced, and equals zero otherwise.

Our setting is similar to Jiménez, Salas, and Saurina (2006) in that we focus on collateral determinants, with the important difference that we are able to distinguish the type of guarantee pledged. Brick and Palia (2007) and other authors propose a simultaneous determination between collateral and loan interest rates. Recently, Mosk (2014) has shown that collateral decisions are prior to both interest and non-interest rate decisions in loan contracts. Our study also controls for variables such as borrower risk and loan characteristics that are important in setting interest rates.

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requirements. We focus on organizational distance because the loans in our banks are decided at different hierarchical levels. Large loans granted to large firms are formalized in the main office in the province, region, or even in the bank national headquarters when the size of the loan/firm is high. Thus, a measure of physical distance to the deciding branch does not only reflect the real proximity but also the characteristics of the firm and loan size.

3.2. Hypotheses

Banks can take decisions in centralized or decentralized ways. In the first case, the bank avoids delegation and agency costs. It favors the use of hard information and a more formal communication between the headquarter and the branches. Decentralized decisions taken at the branch level imply more autonomy in the loan granting process (i.e., assessment, approval, pricing…) but deviations from the bank practices should be explained. This second method favors the use of soft information collected at the branch level.

Both approaches imply organizational diseconomies (Stein, 2002) in the form of efficiency losses compared to the situation where there are no informational asymmetries; e.g., branches can have more information than the headquarters about the loan. They can also bring potentially conflicts of interest; e.g., in a decentralized setup, credit decisions rely on the branch managers' career prospects and their profit-based remuneration.

In the same vein, Berger, Miller, Petersen, Rajan, and Stein (2005) argue that large banks are subject to organizational diseconomies. In our view, these diseconomies can induce headquarters to require guarantees based on hard information. For this reason, as the distance between the branch and the headquarter increases, the latter would be more tempted to prefer real guarantees requirements in loan contracts over personal guarantees.

Hypothesis 1: The use of personal guarantees increases less than that of real guarantees when the branch-headquarter (organizational) distance increases.

Loan characteristics are likely to affect differently the type of guarantee required. As Table 2 reports, our sample consists of loans that range from less than one month of maturity to 226 months (almost 19 years). The banking literature (see Boot, Thakor, and Udell (1991) among others) argues that the longer the maturity, the most likely that the bank will request collateral to align the borrower and the lender incentives.

There are however no studies that investigate the impact of maturity on the different types of guarantees use. Figure 1 shows the evolution of the type of guarantees by maturity. We observe different patterns for personal and real guarantees in terms of loan-to-maturity. Essentially, the use of personal guarantees is high up to 8-10 years, when they start to decline over time. In contrast, real guarantees simply increase with the maturity of the loan.

Personal guarantees depend on the firm's manager's present and future wealth. This can be a disadvantage for the bank especially in the case of long term loans, where there is more uncertainty in both the state of the economy and the financed project. This uncertainty affects the entrepreneur's wealth, suggesting the use of real instead of personal guarantees for long term loans. In contrast, in the short and medium run, personal guarantees can become more tangible, based on the assets of firm managers. Indeed Figure 1 shows that real guarantees are more prevalent for loans with maturity higher than 10 years. For short-term (less-than-one-year) loans, more than 50 percent of the loans do not have guarantees (with personal being more frequent than real), whereas personal guarantees are very common in medium-term loans (reaching 60 percent of the loans in the 2-10 year maturity range). Thus, we expect personal guarantees to be typically employed in short and medium-term loans, where the uncertainty on the manager wealth is typically lower. However, real collateral is expected to be increasingly prevalent at longer maturities.

< Insert Figure 1 here >

A similar argument can be made with loan size: As loans become larger in size, the ability of personal guarantees covering a default is more uncertain. Banks will thus likely resort to real collateral in the context of sizable loans. In addition, the execution of personal guarantees in large loans can damage the managers' ability to pursue further entrepreneurial activities. In the context of bank-firm relationships, banks would then prefer not to place this extra-weight on companies.

Hypothesis 2: Personal guarantees are less preferred than real guarantees to collateralize large and long-term loans.

The theoretical literature on moral hazard shows that when lenders observe borrowers' credit quality, low-quality borrowers obtain loans with collateral and high-quality borrowers obtain loans without having to pledge collateral (Boot, Thakor, and Udell, 1991). By and large, the empirical literature confirms these theoretical insights (Jiménez, Salas, and Saurina, 2006).

In their analysis of credit lines' collateralization and types of collateral employed, Voordeckers and Steijvers (2006) classify personal guarantees as the ones offering the highest level of protection. According to the authors, this is due to the information asymmetry in the borrower-lender relationship. In fact, with personal guarantees the lender receives explicit claims on personal assets and/or future borrower's wealth. So, the likelihood of suffering personal losses for the borrower is much higher in the presence of personal guarantees. For this reason, we expect the bank to require personal guarantees when the economic conditions of the firm and/or the overall economy deteriorate.

Hypothesis 3: Personal guarantees are more likely to be pledged than real guarantees as the firm creditworthiness worsens.

The sample period includes a unique event that enables us to analyze the bank's preferences towards personal or real guarantees when more demanding capital standards are set. The European Banking Authority (EBA) announced new regulatory capital requirements following the stress tests conducted in October 2011. In particular, large banks were required to have a minimum 9 percent Tier 1 capital ratio. One of the channels to reduce the Risk Weighted Assets (RWAs) was the use of guarantees. In fact, the EBA highlights the usefulness of the improvement in collateral and guarantees as a mitigating measure to reduce the RWAs.[5] For that reason,

[5] See detailed information on the impact of the use of guarantees and collateral on the reduction of RWA (page 13):

we expect an increase in the use of both real and personal guarantees after the bank announced its commitment to reduce RWAs. But, would the bank prefer the use of personal or real guarantees?

On the one hand, the capital reduction based on real guarantees could be higher as most of the personal guarantees are related to the firm itself, and are not supported by official institutions that would minimize to a larger extent the capital consumption (see Table 2, Panel B). On the other hand, the coverage ratios are much higher for personal guarantees, as Table 2, Panel C shows. Interestingly, the personal guarantees coverage ratio increases substantially after October 2011 (see Figure 2). As a result, the loss given default should decrease after such increase in the coverage ratio of personal. Moreover, the coverage ratio of all types of guarantees seems to the limited at 100 percent, except in the case of personal guarantees. According to the information available for the period 2012-2014, most of the personal guarantees (more than 80 percent) are in the form of *póliza de afianzamiento mercantil*. This specific type of guarantee has a clear advantage over other types of guarantees: it can be rapidly executed through judicial orders. Indeed, Figure 3 reveals an important structural break in October 2011: after that date, guarantees are substantially more prevalent, especially in the form of personal guarantees.

< Insert Figures 2 and 3 here >

Hypothesis 4: Both personal and real guarantees are used to improve and sustain regulatory capital requirements, but personal guarantees are preferred to real guarantees.

We next turn to the effects of guarantees on firms' risk taking behavior. Collateral is often presented as a tool to mitigate firms' moral hazard. However, some theoretical studies have pointed out that riskier borrowers are more likely to pledge collateral (Inderst and Mueller, 2007). Some

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http://www.eba.europa.eu/documents/10180/15956/Finalreportrecapitalisationexercise.pdf/87602d3f-ec8d-4788-9aa8-fae0f28f4c23.

empirical papers have confirmed this so-called lender-based theory of collateral (Berger, Frame and Ioannidou, 2011). Surprisingly, to our knowledge, no studies have looked at the earnings stability of firms engaging in secured loans following collateral granting; let alone distinguishing between earnings stability implied by personal versus real guarantees.

Our setting allows us to analyze the different behavior for risk taking behavior of personal versus real guarantees. From a technical point of view, a personal guarantee leads to the transformation in the nature of the firm responsibility. In short, a limited responsibility firm becomes an unlimited responsibility firm if a loan is backed by personal guarantees. Additionally, it is important to understand the context of real guarantees in Spain. Before 2008 the foreclosure of mortgages was a "rare" phenomenon in Spain (see Figure 4). As a result, real guarantees did not work as a proper incentive to reduce firms' risk appetite. For this reason, personal guarantees should in principle reduce the risk-appetite to a larger extent. In fact, according to Mann (1997), the 'implicit value' of personal commitments acts as a disciplining device that limits the borrower's risk preference incentives, surpassing that of business collateral.

< Insert Figure 4 here >

Hypothesis 5: Both personal and real guarantees mitigate the firms' risk appetite. Personal guarantees are more effective as they lead to an unlimited responsibility.

4. Drivers of Real and Personal Guarantees

Table 4 shows the benchmark results. It provides evidence on the effects of bank, loan, bank-firm and firm characteristics on the use of personal and real guarantees. The first two columns show results when personal guarantees are the dependent variable (1/0), whereas columns 4 to 5 contain results for real guarantees. Columns 1 and 4 exclude the loan characteristics, as they could potentially be jointly determined with the use

of guarantees (and hence would therefore be "bad" controls). However, results confirm that their inclusion does not change the results. For this reason, we include loan characteristics in the remaining specifications. Columns 3 and 6 report the economic impact of each variable on the use of personal and real guarantees, respectively. The economic impact is obtained as the product of one standard deviation in the corresponding explanatory variable times its estimated coefficient relative to the unconditional mean of the dependent variable.

< Insert Table 4 here >

Besides indicating the use (or not) of a guarantee associated to a given loan, our dataset also contains information on the established amount for each type of guarantee. Thus, in Table 5 we study the effect of the aforementioned variables on the coverage ratio (guarantee value divided by loan size). Table 5 has a structure analogous to Table 4. The coefficients are around a hundred times higher than those of the benchmark regressions, which rely on the discrete dependent variable. This indicates that the real guarantees in the form of mortgages cover, on average, around 100 percent of the loan size as it is shown in Panel C of Table 2. Since results are similar to Table 4, we will only comment on the differences.

< Insert Table 5 here >

Table 6 shows the percentage of the R-squared explained by each group of variables associated with results reported in Table 4 (first and second columns) and Table 5 (third and fourth columns). The first (second) and third (fourth) columns refer to the explanatory power of each group of drivers on personal (real) guarantees and their coverage ratio, respectively. Let us now discuss the role of each of the variables in turn.

< Insert Table 6 here >

4.1. Bank and Bank-Firm Characteristics

There is not a full consensus on the role of organizational distance on collateral. Jiménez, Salas, and Saurina (2009) for example find that the use of collateral is higher for loans granted by local lenders than by distant ones. However, Meles, Sampagnaro and Starita (2013) find that distant branches – those with more difficulties to obtain soft information and site-specific information from headquarters – are more likely to receive collateral than local ones. We find unambiguously, as shown in Tables 4 and 5, that a higher organizational distance increases the likelihood of pledging both personal and real guarantees.[6] However, the economic impact is higher in the case of real guarantees, partially supporting the idea that real guarantees are easier to collect and report to headquarters (recall Hypothesis 1 which will tested more formally later). These results do not support the lender-based view of Inderst and Mueller (2007). According to this perspective, local banks (i.e., banks with short organizational distance) attract local borrowers. Local banks have superior information but they cannot use this information to set local borrower loan's interest rates because of competition constraints and the existence of an outside option (i.e., the borrower can go to a distant lender). To overcome these constraints, local banks require collateral to exploit their informational advantages. In addition, our results also challenge Berger and Udell (2002), who argue that the larger the organizational distance, the more likely the loan is processed using transactional lending technologies. According to their view, transactional lending implies that loans are granted to safe and highly transparent borrowers, which are less likely to be collateralized. In contrast, our findings support the idea that the organizational distance favors the use of collateral.

Another important dimension determining the use of guarantees is relationship lending. The existence of a bank-firm relationship would in principle imply less asymmetric information and hence, less collateral (see

[6] Similar results are obtained using minutes instead of kilometers to measure the distance.

theoretical studies by Boot and Thakor, 1994, and empirical work by Berger and Udell, 1995, Degryse and Van Cayseele, 2000, and Bharath, Dahiya, Saunders, Srinivasan, 2011, among others). As a result, the broader scope of a firm-bank relationship implies better information and hence less collateral. When the loan information is not included in the regression (i.e., columns 1 and 4 of Table 4), we document a negative and significant effect of our relationship lending proxy (which is the existence of other bank-firm contracts) for both types of collateral. However, when loan characteristics are included, the effect of relation lending turns out to be non-significant in both cases. Similar results are obtained in Table 5.

4.2. Loan Characteristics

Table 4 introduces loan maturity as one of the drivers of both personal and real guarantees. The coefficients are positive and significant in both cases. However, it is larger in statistical and, principally, in economic terms in the case of real collateral, confirming Hypothesis 2: as loans become longer-term, e.g., mortgages, banks rely more on tangible real assets than in more uncertain real guarantees.

We also introduce loan size –in logarithms– as a potential driver of guarantees requirements. We hypothesize that a larger loan amount would in principle go hand in hand with real collateral more than personal guarantees. In the second case, the bank may realize that high requirements on personal guarantees may lower the entrepreneur's wealth to repay the loan and subsequently impair her ability to sustain future enterprises. In fact, Table 4 shows that the effect of the loan size on the likelihood of posting guarantees is statistically significant only in the case of real guarantees. Additionally, the magnitude of the coefficient is three times larger for the real guarantees. Thus, in the presence of large loans, the bank prefers to request real collateral to seize the real assets in case of default. Thus, our results seem to support Hypothesis 2 also from the loan size-guarantees request perspective. Similar conclusions can be obtained from

Table 5 that relies on the coverage ratio instead of the use (or not) of a particular type of guarantee.

4.3. Firm Characteristics

The moral hazard literature documents that when lenders can observe a borrower's credit quality, low/high quality borrowers obtain loans with/without collateral (Boot, Thakor, and Udell, 1991). In line with this theory, we document that collateral increases as the credit quality deteriorates. This result appears to be true for the four measures of credit worthiness employed in this study: total assets, leverage ratio, profitability and the refinancing dummy. Higher total assets / lower leverage / higher ROE / absence of refinancing loans all imply less personal and real guarantee requirements, with two interesting exceptions. Higher firm size impacts only on personal guarantees, whereas higher profitability only reduces real guarantees. Overall, firm characteristics suggesting higher creditworthiness imply lower collateral requirements (in line with Berger and Udell, 1990 and 1995 and Jiménez, Salas, and Saurina, 2006).

Table 5 shows one difference with respect to the impact of variables on coverage ratios: now we obtain different significant signs for the effect of total assets across types of guarantees. It is negative for personal guarantees, whereas it is positive for real guarantees. This implies that in the case of personal guarantees, the banks tend to require higher coverage ratios to small firms. In contrast, in terms of real guarantees smaller firms are required lower coverage ratios. This is consistent with the results in Ang, Lin and Tyler (1995), who find that business owners often pledge personal assets and wealth in business loans. Thus, the creditworthiness effect dominates in the case of personal guarantees. However, this result is not sufficient to support Hypothesis 3 that will be formally tested in section 4.6.

4.4. Common Economic Variables

Although not reported in Table 4, the magnitude of the year fixed-effects coefficients can help us to understand the use of personal and real guarantees over the sample period. These coefficients reflect the effects of economic variables that are common to all the firms and loans granted over the sample period (see Jiménez, Salas, and Saurina, 2006, analysis of macro factors impacting collateral requirements). Figure 5 depicts the coefficients for the year effects estimated from equation (1) using as dependent variables dummies that denotes the existence of personal and real guarantees in a given loan. We observe that there is a sharp increase in the magnitude of the coefficients corresponding to the personal guarantees after 2011. This effect could be due to the Spanish economic and financial crisis, but also to the requirements of European banks to have a minimum 9 percent Tier 1 capital ratio. In a later section we assess whether the increase in the use of personal guarantees obeys more to the former or the latter argument.

< Insert Figure 5 here >

4.5. Explanatory Power of Drivers across Types of Guarantees

Table 6 shows that the most important group of variables explaining personal guarantees are the year fixed-effects (63.31 and 80.49 percent, for guarantee dummies and coverage ratios, respectively) that proxy for overall economic conditions. Relevant second order effects are firm and loan characteristics, together with the bank dummies. The results are very different for real guarantees. In this case, loan characteristics exhibit a crucial role (57.96 and 56.97 percent, for guarantee dummies and coverage ratios, respectively), followed by the sector dummies (23.50 and 23.89 percent, respectively).

The prevalent role of loan characteristics for the use of real guarantees is due to the fact that most of the long-maturity / large-size loans require real guarantees, a relation which is weaker for personal guarantees. The higher

contribution of economic-related variables for personal guarantees implies a clear anti-cyclical factor behind the use of personal guarantees, as shown in Figure 5.

4.6. Formal Test of Hypotheses 1-3

We next turn to the differential effects of several groups of variables on the use and coverage of both personal and real guarantees. To analyze the differential effects of the variables, we first fit two different models separately on the same data, one based on personal guarantees and the other on real guarantees. We store the estimation results and then, we estimate the simultaneous covariance of the coefficients (i.e., cross-model covariances) to test the cross-coefficients hypothesis that the common coefficients are equal. If this is the case, they would exhibit similar effects on personal and real guarantees. As the two estimations rely on the same estimation sample, the standard errors obtained from the simultaneous estimation are identical to those obtained for each individual regression.

This analysis enables us to carry out a formal test of Hypotheses 1 - 3. Columns (1) and (2) in Table 7 show the results of tests for cross-model hypotheses based on linear combinations of cross-model coefficients for guarantee use and coverage ratio, respectively.

< Insert Table 7 here >

In terms of Hypothesis 1, the first row of Table 7 shows that there is no statistical difference in the impact of organizational distance across collateral types. As a result, we do not find enough evidence to support Hypothesis 1. The likelihood of using personal and real guarantees increases similarly with organizational distance.

For the guarantee-usage regression, we obtain significant differential effects in terms of loan maturity, confirming that real collateral is increasingly prevalent at longer maturities, fully in agreement with Hypothesis 2. The loan size and total assets tests are negative and significant, confirming that banks prefer to require real instead of personal guarantees to large firms

and for large loans. This may reveal larger uncertainty about the firm's owners/managers ability to pay back the loan when this is large.

Personal guarantees are also more frequently used in more leveraged firms, whereas they are more frequent for smaller firms. These results support Hypothesis 3, stating that banks tend to use personal guarantees as the firm creditworthiness worsens. However, in the presence of a previously refinanced firm, real guarantees are preferred, probably due to the doubts on the manager capacity to pay the debts in the case of a potential default.

Statistical results on coefficient differences are in general consistent with the differences in terms of economic impact implied by Tables 4 and 5 (differences between columns in (3) and (6) in those tables).

5. Use of Personal and Real Guarantees to Improve Capital Ratios

On October 26, 2011, the EU reached an agreement that European banks should increase their capital buffers by the summer of 2012. In particular, large banks were required to have a minimum 9 percent Tier 1 capital ratio. This measure, coordinated and implemented by the EBA, was pursued to enhance the quality and quantity of capital of banks in order to withstand shocks in a reliable and harmonized way. As a result of this measure, virtually all banks had to revise their capital policy and take operative measures to improve their common equity standards. Indeed, many banks had to resort to recapitalizations, either with public aid or through the private markets.

We now analyze the implications of this policy shock on the usage of guarantees in loan contracts. Given the needs for capital, banks would tend to demand more guarantees in loan contracts in order to hedge against potential losses derived by loan defaults. This structural break is revealed in Figure 3, as explained above. After October 2011, most loans were

collateralized, in contrast to all the previous years.[7] In order to further understand this shift in the bank policy concerning guarantees, we perform the following experiment. We estimate equation (1) using a 3-month window before and after the shock on the same set of explanatory variables as in equation (1) with the exception of the year fixed effects. Additionally, we add to the specification a proxy for the overall economic risk, as measured by the 5-year sovereign CDS spread. We include a dummy called policy shock that takes the value 1 after October, 27, 2011, the day after the policy change was announced, and equals 0 otherwise. Results are shown in Table 8, with the use of guarantees and coverage ratios as dependent variables. The table also shows the differences across coefficients (personal v/s real guarantees) and a test in which the null hypothesis states that both coefficients are the same.

< Insert Table 8 here >

Columns (1) and (2) in Table 8 show that the use of personal and real guarantees is significantly more widespread after the policy shock, with personal guarantees increasing substantially more (column (3)). This is also the case for coverage ratios, as shown in columns (4) to (6). The remaining coefficients remain substantially the same as in Tables 4 and 5, with the exception that loans granted to previously refinanced firms imply a more frequent use and a higher amount of real guarantees. In turn, a higher sovereign CDS implies higher personal and real guarantees, with the effect being economically larger for personal guarantees.

In Table 9 we show the percentage of R-squared explained by each set of variables in the regressions shown in Table 8. Half of the variation in both the use and coverage ratio of personal guarantees is explained by the policy shock. Bank dummies explain around 20 percent, firm characteristics explain around 9 percent and the CDS spread explains almost 8 percent.

[7] We have repeated the estimation of equation (1) for the pre-October 2011 period to discard that the results in Table 4 are driven by the policy event. We find that these new results are consistent with those reported in Table 4.

Results for real guarantees stand in stark contrast, as the policy shock only explains around 3 percent. Again, loan characteristics explain most of the variations in real guarantees and the associated coverage ratios (more than 54 percent), with the sectorial dummies explaining around 20 percent and the province dummies more than 9 percent.

< Insert Table 9 here >

< Insert Figure 6 here >

Our results are in agreement with Hypothesis 4 and speak clearly about the effects of the policy shock on the use of guarantees associated with loan contracts: while the banks reacted increasing both types of guarantees after the policy shock, the use of personal guarantees became substantially more prevalent. Figure 6 shows that the shift towards personal guarantees did not come from a change in the average maturity or in the average size. The use of guarantees instead enhanced banks RWA position and led to the improvement of their capital standards due to the higher coverage ratios offered by this guarantees, as shown in Figure 2. Banks may have also resorted to this type of guarantee due to the more rapid collateral execution in front of the judge. In an age of turmoil following the financial crisis – with credit to the private sector declining in Spain – banks relied on personal guarantees to hedge their capital position. We turn now to the effect that collateral requirements had on banks' risk taking behavior.

6. The Use of Guarantees and Firm Risk Taking

In this section we analyze whether guarantees contribute to mitigate firms' moral hazard through risk-taking reductions. Risk-taking is measured as the standard deviation of the annual firm's industry-adjusted ROE, obtained as the difference between the firm's ROE in a given year and the firms' average in the same industry. To identify changes in risk-taking patterns, we compute the difference between the three-year risk-taking measure following the first time when the firm pledged guarantees, and the three-year risk-taking measure prior to that event. We require that

guarantees cover every single day during the three years following the guarantee setting. Otherwise, we drop these loans/firms from our analysis.

Table 10 shows the results of the experiment determining potential changes in firms' risk taking behavior. Coefficients represent the change in risk-taking of firms that pledged guarantees (treatment group) for the first time: personal (columns (1-3)) and real (columns (4-6)) guarantees in excess of the average risk-taking change of the corresponding control group. The control group consists of firms with similar size, profitability, and risk profile that got the loan the same year as the corresponding firm in the treatment group but did not have guarantees during the three years following the granting of the loan. We form buckets along the size, profitability, leverage, and refinancing dimensions in order match firms according to these variables. We consider three size buckets following the European Commission classification.[8] The three size buckets include micro and small firms (less than €10 million of total assets), medium-sized (total assets between €10 and €43), and large firms (more than €43 million of total assets). The three profitability and leverage buckets correspond to the three terciles implied by the distribution of the two variables. We define two additional buckets depending on whether firms have been refinanced or not at the date in which the loan is granted. Finally, we organize the firms in a total of 316 buckets for all potential combinations of the previous dimensions.

The risk-taking change for each firm in excess of the average risk-taking change in the corresponding control group is then regressed on a constant variable. Standard errors of the corresponding regressions are clustered at the bucket level. We observe that both personal (column 1) and real guarantees (column 4) lead to a reduction in firms' risk taking. Given that the firms in the two groups are heterogeneous, we cannot conclude whether

[8] The following link contains the SMEs definition, according to the European Commission, based among other characteristics, on the amount of total assets:
http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm

the decrease in risk taking is higher in the presence of real or personal guarantees. For that reason, we compute the economic effect of the treatment group. This effect is obtained as the estimated coefficient for the treatment group relative to the average standard deviation of the firm's industry-adjusted ROE for the treatment group before the event. The second row in Table 10 shows that the impact on firm's risk taking of personal and real guarantees is of similar magnitude.

< Insert Table 10 here >

Guided by Figure 4 we analyze the differential effect of real guarantees before and after 2008. To understand the role of the financial crisis on personal guarantees, we repeat the analysis for the same sub-periods for personal guarantees. We observe that before the subprime crisis, personal guarantees (column 2) exhibit a significant decline in risk-taking, unlike real guarantees (column 5). The economic effect also confirms that personal guarantees led to a higher decrease of risk taking compared to the one caused by real guarantees for the pre-2008 period. This could be explained by the transformation in the nature of the firm responsibility in the presence of personal guarantees. Additionally Figure 4 reveals the low amount of mortgage foreclosures occurring before the subprime crisis. However, in the post 2008-2011 analysis, both types of guarantees (columns 3 and 6) contribute to diminish risk-taking by a comparable magnitude. This can be related to the increase in the mortgage foreclosures after 2007, which may have represented an incentive to reduce the risk appetite in the case of loans guaranteed with collateral. Our results then provide partial support for Hypothesis 5, stating that both personal and real guarantees mitigate the firm's risk appetite, with personal guarantees being more effective.

As shown in the previous section, the October 2011 policy shock implied a significant increase in the use of real collateral and, especially, personal guarantees. To assess the differential policy impact on risk-taking by firms around the policy episode, we compare the risk-taking behavior of the firms that secured their loans with guarantees for the first time after October

2011, with those that secured their loans before October 2011. Unfortunately, since computing the ROE standard deviation requires three years of data and our sample finishes in 2014, we can only look at short-windows with only few observations. In this case, the treatment group consists of firms that pledged personal guarantees or real collateral by the first time in the six months following the recapitalization date. The control group consists of firms that pledged personal or real guarantees for the first time in the six months prior to that date. Results in column (7) reveal a positive and significant differential in risk-taking by firms that had loans secured with personal guarantees after the policy shock. As shown before, the proportion of loans with personal guarantees increases remarkably around that date. This may have led to less selective decisions on the firms pledging personal guarantees after the policy event.

The increase in the use of personal guarantees following the policy shock can be positive in terms of financial stability since banks can now hedge defaults coming from riskier firms. However, the use of personal guarantees implies that the risk ultimately relies on firm managers and this could penalize their current business, as well as second opportunities to sustain future enterprises. This result highlights that guarantees can also have costs, which are associated to its overuse. Finally, we repeat the previous analysis but on the basis of the average of the industry-adjusted ROE instead of the standard deviation. Concretely, to identify changes in profitability patterns, we compute the difference between the three-year average ROE following the first time where the firm pledged guarantees and the three-year average ROE prior to that event. Unreported results point towards a non-significant statistical effect in the equivalent regressions to those reported in Table 10. However, in economic terms, the average decrease in profitability following the first use of guarantees after 2008 is non-negligible and accounts for more than 15% of the average ROE.

7. Robustness Tests and Extensions

In this section, we perform robustness exercises along three dimensions: collateral requirements based on loan maturities, complementarity v/s substitutability between personal and real guarantees and specific types of real and personal guarantees.

7.1. Analysis based on loans with longer and shorter maturities

Our sample includes all loans granted by the parent or subsidiaries independently on the maturity at origination. To guarantee that the shorter-term loans were not part of a rollover scheme, we excluded some of the shorter-term loans in the original sample. Nevertheless, one may argue that some of the short-term loans that remain in the sample could be still part of such a scheme. To show that results are not driven by the large amount of loans with maturity lower than 1-year, we split the sample in two subsamples: loans with maturity at origination lower than one year and loans with maturity equal or higher than one year.

For comparability, columns 1 - 3 of Table 11 contain the benchmark (all-maturities) results for personal and real guarantees for the whole sample of loans. Columns 4 - 6 are equivalent to the three previous columns but for the loans with a maturity lower than 1-year at origination. Columns 7 - 9 show analogous information for loans with more than one year maturity.

< Insert Table 11 here >

Noteworthy results emerge from Table 11. For short-run loans, we observe a negligible impact of distance, leverage, and profitability on the use of real collateral. On the contrary, relationship lending and firm size now exhibit negative and significant coefficients. This could be due to the fact that firm characteristics are less relevant in short-term loans. Only the firm size and the refinancing indicator play a relevant role here, with the magnitude of the second one being much lower than in the baseline analysis. The results obtained for personal guarantees are in general terms in agreement with the ones of the baseline analysis.

Results for medium/long-run loans reveal important differences across guarantee types in terms of loan and firm characteristics with respect to the baseline analysis. First, real collateral usage increases with maturity whereas the opposite is true for personal guarantees. Second, not only personal but also real guarantees are less frequent for larger firms. Third, previously refinanced loans only increase the use of real collateral. This confirms that in firms having experienced refinancing, real guarantees cast less doubts than personal guarantees regarding expected losses implied by potential future defaults. Fourth, a higher scope of relation increases the likelihood of personal guarantees but reduces that of real collateral. A possible explanation for this difference is that a better knowledge of the firm may imply a higher reliance on personal guarantees. Additionally, it suggests that relationship lending is only relevant for longer maturity loans.

In sum, we find that higher firm's creditworthiness –measured by higher total size and lower leverage – reduces the probability of personal guarantee requirements significantly more than for real collateral across loan maturities. Companies are also significantly more likely to post real collateral in medium/long run loans if they are refinanced but the opposite occurs in short-term loans, probably due to the lower uncertainty on managers' wealth. Finally, for medium/long run loans, a higher distance increases the likelihood of real collateral requirements significantly more than personal guarantees, in agreement with Hypothesis 1.

As a final point of this subsection, we elaborate further on the relation between maturity and the use of the different types of guarantees. For the whole sample of loans, we found that higher maturity increased the use of both real and personal guarantees, but the increase was higher for real collateral. Table 11 shows that excluding less-than-one-year loans, the sign for personal guarantees switches to significantly negative. This raises the possibility of a non-linear relation between maturity and guarantees. Indeed, adding the square of maturity as an additional variable to the benchmark specification -unreported-, we do obtain that the relation

between maturity and personal guarantees usage is concave. This relation suggests that personal guarantees are typically employed in short-to-medium-term loans but not in long-term loans. A potential explanation is that it may be harder for firm managers to collateralize these loans with their net worth, because this tends to be more uncertain than the value of real assets.

7.2. Dealing with Loans with Both Personal and Real Guarantees

Around 13,500 loans in our sample include both personal and real guarantees. We now examine whether this duplicity of guarantees affect to our results. To test the robustness of our results including this simultaneity of guarantees, we include in equation (1) a dummy for the use of the other type of guarantee. . Table 12 shows the results. Columns 1 and 3 report the benchmark results for personal and real guarantees, in the interest of comparability. Results in column 2 (4) show that when the loan has a real (personal) guarantee there is a significantly lower probability of additionally having a personal (real) guarantee. Thus, although some loans have the two types of guarantees, they are really substitutes. The remaining results are basically unchanged when we account for the use of both types of guarantees.

< Insert Table 12 here >

7.3. Specific Types of Real and Personal Guarantees

Both personal and real guarantees include several sub-types of guarantees, with potentially very different characteristics. For instance, the personal guarantee can be provided by the firm itself or by other institutions, generally a Government-based institution. Column 1 of Table 13 corresponds to the baseline specification for personal guarantees. Columns 2 and 3 in Table 13 explore the differences across guarantees provided by the firm and by other institutions, respectively. In our database, the number of loans with this second type of personal guarantee is low (1,520 loans) but still offers interesting results. As expected, given that the vast majority of

personal guarantees are provided by the firm, the results in column 2 are almost identical to the benchmark estimates (column 1). In contrast, when another institution provides the guarantee, firm risk should not affect the use of this type of personal guarantee. This is exactly what we observe in column 3, where only loan characteristics affect guarantees provided by other institutions.

< Insert Table 13 here >

As for real guarantees, these can take the form of mortgages, or other assets. The latter sub-type is less frequently used; i.e., 8,319 loans with this versus 32,687 loans guaranteed by mortgages. The results corresponding to the use of mortgages as real guarantees are in column 5, while column 6 reports those associated with real guarantees in the form of other assets. Column 4 corresponds to the baseline specification (column 4 in Table 4) for all real guarantees. Results for mortgages are completely in agreement with the baseline results. This is due to the fact that most of the real guarantees are mortgages.

However, there are significant differences between the two sub-types of real guarantees. Besides differences in the magnitude of the coefficients, we observe some relevant differences across the two types of real guarantees. An important difference underlies the size of the firm, as larger firms are more likely to use mortgages in the form of collateral but less likely to use other assets such as cash, stocks,… This is probably due to the nature of the loans. In turn, firm profitability and distance do not exhibit any significant effect with guarantees based on other assets.

8. Conclusions

This is the first comprehensive paper dealing with the different determinants and effectiveness of personal versus real guarantees. Based on a unique dataset containing information on the different kinds of guarantees granted, we first uncover significant differences related to the drivers of personal versus real guarantees. In sum, personal guarantees are

mostly driven by economic conditions, while real guarantees are mostly explained by loan characteristics. The requirements of real and personal guarantees respond differently to loan characteristics (maturity and loan size) and firm characteristics (size and leverage). In particular, higher maturity and higher loan and firm sizes make real collateral requirements more likely while the opposite occurs as firm's leverage increases in case that the firm is not refinanced.

Secondly, we analyze the effects of a policy shock, whereby European authorities required more capital to European banks in October 2011. In response to this policy event, banks increased especially personal guarantees requirements. Since the latter guarantees offered higher coverage ratios and their process for the execution in case of default is quite fast, banks may have decided to focus on personal guarantees. We find that this regulatory policy implied a permanent shift in bank collateral strategy, reflecting a growing concern with fulfilling capital requirements throughout the business cycle.

Finally, we document that both personal and real guarantees lead to a decline in risk-taking behavior by firms, assuaging, at least partially, moral hazard concerns by banks. From a policy perspective, this would call for a more widespread use of guarantees in loan contracts in order to reduce excessive risk-taking on the side of firms. Interestingly, the October 2011 policy episode induced banks to increase lending against personal guarantees as a result. Therefore, policies aimed at improving banks' capital standing or, in general, increasing lending against guarantees can have the positive effect of reducing risk-taking in the real sector of the economy. However, despite the effectiveness of guarantees, its overuse could also have associated with a higher cost in the form of lower profitability, since it could prevent managers' investments in forthcoming projects.

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Table 1: Descriptive statistics on the loan activity at zip code and municipality level and the characteristics of each municipality

Panel A of Table 1 contains information on the number (No.) of zip codes and municipalities (muni.) with firms and bank branches in our sample, which spans from February 2005 to September 2014, joint with its representativeness over the whole country. Panel B of Table 1 contains descriptive statistics (mean, standard deviation, median, minimum, and maximum) of the loan activity by zip code and municipality. Inh.: inhabitants.

Panel A

	Units	Total
No. ZIP codes with firms	-	5,117
No. ZIP codes with branches	-	1,662
No. ZIP codes with firms/No. ZIP codes (in the Country)	%	45.63
No. ZIP codes > 10,000 inh. with branches/No. ZIP codes > 10,000 inh. (in the Country)	%	71.02
No. municipalities with firms	-	3,200
No. municipalities with branches	-	1,088
No. municipalities with firms/No. municipalities (in the Country)	%	39.41
No. muni. > 10,000 inh. with branches/No. muni. > 10,000 inh. (in the Country)	%	65.80

Panel B

	Units	Mean	SD	Median	Min	Max
No. received loans by ZIP code	000	0.35	0.52	0.13	0.00	5.19
No. granted loans by ZIP code	000	0.81	1.08	0.40	0.00	6.03
No. of received loans by municipality	000	1.76	6.00	0.24	0.00	33.42
No. of granted loans by municipality	000	4.23	11.11	0.61	0.00	47.33
No. of firms receiving loans by municipality	000	0.21	0.74	0.03	0.00	4.67

Table 2: Descriptive statistics on firm and loan characteristics

Panel A of Table 2 contains descriptive statistics (mean, standard deviation, median, minimum, and maximum) of several firm characteristics: number of loans granted, balance-sheet related characteristics (total assets, leverage, and ROE), the use of refinancing, the use of other type contracts (including other loans) with the bank when the loan was granted and the distance between the branch granting loan and the bank headquarters. Panel B of Table 2 contains descriptive statistics of several loan characteristics: maturity, loan size, and guarantees. Panel C of Table 3 reports descriptive statistics of the coverage ratio for those loans with guarantees. Guarantee's information refers to the use of personal and real guarantees and each subtype of guarantees: personal guarantees provided by the firm or by other institutions and real guarantees in the form of mortgage or financial assets.

Panel A	Units	Mean	SD	Median	Min	Max
No. Loans	-	7.48	31.09	2	1	2,419
Total Assets	000,000 Euro	5.69	11.28	2.07	0.32	93.60
Leverage	%	75.72	23.32	78.65	16.35	155.53
ROE	%	2.89	106.57	3.68	-898.77	581.88
Refinancing	0/1	0.27	0.44	0	0	1
Any Other Type of Contract	0/1	0.30	0.46	0	0	1
Branch-Headquarter Distance	Kilometers	433.83	366.34	416.02	0.00	2,589.55
Branch-Headquarter Distance Time	Minutes	334.99	610.53	246.92	0.00	4,601.73
Panel B	**Units**	**Mean**	**SD**	**Median**	**Min**	**Max**
Loan Maturity	Months	18.42	35	3.95	0.69	225.8
Loan Size	000 Euro	104.16	303.91	27.57	0.55	3,000.00
Personal Guarantees	0/1	0.35	0.48	0	0	1
Personal Guarantees - Firm	0/1	0.34	0.48	0	0	1
Personal Guarantees - Other Institutions	0/1	0.00	0.06	0	0	1
Real Guarantees	0/1	0.08	0.28	0	0	1
Real Guarantees - Mortgage	0/1	0.07	0.25	0	0	1
Real Guarantees - Financial assets	0/1	0.02	0.13	0	0	1
Real & Personal Guarantees	0/1	0.03	0.17	0	0	1
Panel C	**Units**	**Mean**	**SD**	**Median**	**Min**	**Max**
Personal Guarantees Coverage	%	163.29	94.58	100.00	0.01	1,300.00
Personal Guarantees - Firm Coverage	%	163.54	94.77	100.00	0.01	1,300.00
Personal Guarantees - Other Institutions Coverage	%	100.60	27.76	100.00	0.42	200.00
Real Guarantees Coverage	%	94.71	28.56	100.00	0.01	411.06
Real Guarantees - Financial Assets Coverage	%	60.68	41.90	57.67	0.01	411.06
Real Guarantees - Mortgage Coverage	%	98.73	20.03	100.00	0.09	393.43

Table 3: Correlations among the dependent and explanatory variables

This table contains the matrix of correlation among the dependent and explanatory variables. The first four variables represent the dependent variables. Variables [1] – [2] are dummy variables that take value one if the loan has personal and real guarantees, respectively. Variables [3] – [4] represent the coverage ratio of the personal and real guarantees, respectively. Variables [5] – [12] are the set of explanatory variables and are self-descriptive.

		Units	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
[1]	Personal Guarantees	0/1											
[2]	Real Guarantees	0/1	0.00										
[3]	Personal Guarantees Coverage	%	0.81	-0.03									
[4]	Real Guarantees Coverage	%	-0.02	0.95	-0.04								
[5]	Branch-Headquarter Distance	log	0.01	0.02	0.01	0.02							
[6]	Loan Maturity	log months	0.22	0.44	0.06	0.43	-0.02						
[7]	Loan Size	log	0.08	0.32	-0.03	0.31	-0.05	0.50					
[8]	Any Other Type of Contract	0/1	-0.19	-0.15	-0.14	-0.15	0.02	-0.29	-0.13				
[9]	Total Assets	log Eur	-0.17	-0.01	-0.15	-0.01	-0.02	-0.13	0.25	0.16			
[10]	Leverage	%	0.04	0.09	0.00	0.09	-0.09	0.04	0.04	-0.02	-0.05		
[11]	ROE	%	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	0.01	0.01	-0.03	0.03	
[12]	Refinancing	0/1	0.07	0.14	0.06	0.14	-0.03	0.04	0.01	-0.03	0.05	0.18	-0.02

Table 4: Determinants of the use of personal and real guarantees

This table provides evidence on the effect of bank, loan, bank-firm and firm characteristics on the use of personal and real guarantees. The dependent variable in columns (1)-(2) is a variable that equals 1 if the loan has a personal guarantee and 0 otherwise. In columns (4)-(5) the dependent variable is a dummy that equals 1 if the loan has real guarantee and 0 otherwise. Columns (1) and (3) report the results obtained from the estimation of equation (1) without loan characteristics while columns (2) and (5) contain the results obtained from the full specification and represent the baseline specifications. Finally, columns (3) and (6) report the economic impact of the baseline specification in percentage points, which is obtained as the product of one standard deviation in the corresponding explanatory variable times its estimated coefficient relative to the unconditional mean of the dependent variable. All regressions include sector, bank, year and province fixed effects. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Personal	Personal	Econ. Imp	Real	Real	Econ. Imp
	Guarantees	Guarantees	/ Mean	Guarantees	Guarantees	/ Mean
VARIABLES	(0/1)	(0/1)	(%)	(0/1)	(0/1)	(%)
Bank Characteristic						
Branch-Headquarter Distance (log km)	0.009***	0.007**	3.099	0.009***	0.005***	11.128
	[0.003]	[0.003]		[0.002]	[0.001]	
Loan Characteristics						
Loan Maturity (log months)		0.059***	19.247		0.078***	110.643
		[0.002]			[0.001]	
Loan Size (log)		0.007	3.294		0.021***	41.666
		[0.005]			[0.001]	
Bank-Firm Characteristic						
Any Other Type of Contract (0/1)	-0.032***	-0.005	-0.748	-0.040***	-0.002	-1.029
	[0.006]	[0.006]		[0.003]	[0.003]	
Firm Characteristics						
Total Assets (log eur)	-0.058***	-0.055***	-18.707	0.001	0.001	1.712
	[0.004]	[0.005]		[0.001]	[0.001]	
Leverage (%)	0.002***	0.002***	10.953	0.001***	0.001***	16.976
	[0.000]	[0.000]		[0.000]	[0.000]	
ROE (%)	-0.000	-0.000	-0.571	-0.000**	-0.000***	-3.373
	[0.000]	[0.000]		[0.000]	[0.000]	
Refinancing (0/1)	0.041***	0.040***	4.801	0.066***	0.066***	34.818
	[0.012]	[0.012]		[0.004]	[0.004]	
Sector FE	YES	YES		YES	YES	
Bank FE	YES	YES		YES	YES	
Year FE	YES	YES		YES	YES	
Province FE	YES	YES		YES	YES	
Observations	477,209	477,209		477,209	477,209	
R-squared	0.324	0.341		0.155	0.266	

Table 5: Determinants of the coverage of personal and real guarantees

This table provides evidence on the effect of bank, loan, bank-firm and firm characteristics on the coverage ratio of real and personal guarantees. The dependent variable in columns (1)-(2) is the coverage of personal guarantees, relative to the loan size. In columns (4)-(5) the dependent variable is the coverage of real guarantees, relative to the loan size. Columns (1) and (3) report the results obtained from the estimation of equation (1) without loan characteristics while columns (2) and (5) contain the results obtained from the full specification and represent the baseline specifications. Finally, columns (3) and (6) report the economic impact of the baseline specification in percentage points, which is obtained as the product of one standard deviation in the corresponding explanatory variable times its estimated coefficient relative to the unconditional mean of the dependent variable. All regressions include sector, bank, year and province fixed effects. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Personal Guarantees Coverage (%)	(2) Personal Guarantees Coverage (%)	(3) Econ. Imp / Mean (%)	(4) Real Guarantees Coverage (%)	(5) Real Guarantees Coverage (%)	(6) Econ. Imp / Mean (%)
Bank Characteristic						
Branch-Headquarter Distance (log km)	1.167**	1.085*	3.180	0.843***	0.503***	10.681
	[0.577]	[0.579]		[0.155]	[0.130]	
Loan Characteristics						
Loan Maturity (log months)		2.275***	4.579		7.703***	112.289
		[0.433]			[0.125]	
Loan Size (log)		-0.890	-2.451		1.813***	36.177
		[0.639]			[0.107]	
Bank-Firm Characteristic						
Any Other Type of Contract (0/1)	1.230	1.863	1.612	-3.974***	-0.228	-1.427
	[1.317]	[1.318]		[0.317]	[0.305]	
Firm Characteristics						
Total Assets (log eur)	-9.784***	-9.247***	-19.590	0.124	0.280**	4.295
	[0.630]	[0.763]		[0.129]	[0.115]	
Leverage (%)	0.320***	0.323***	11.267	0.060***	0.065***	16.296
	[0.033]	[0.033]		[0.008]	[0.008]	
ROE (%)	-0.001	-0.001	-0.094	-0.003**	-0.003***	-3.514
	[0.005]	[0.005]		[0.001]	[0.001]	
Refinancing (0/1)	8.736***	8.532***	6.327	6.783***	6.736***	36.177
	[2.161]	[2.119]		[0.468]	[0.419]	
Sector FE	YES	YES		YES	YES	
Bank FE	YES	YES		YES	YES	
Year FE	YES	YES		YES	YES	
Province FE	YES	YES		YES	YES	
Observations	477,209	477,209		477,209	477,209	
R-squared	0.340	0.340		0.150	0.254	

Table 6: Percentage of R-squared explained by each group of variables

This table contains the percentage of the R-squared explained by each group of variables employed in the regressions whose results are reported in Tables 4 and 5. Concretely, column (1) represents the percentage of the R-squared explained by bank, loan, bank-firm and firm characteristics, and sector, bank, year and province dummy variables according to the results obtained in column (2) of Table 4. Column (2) corresponds to the R-squared obtained in column (5) of Table 4. Finally, columns (3) and (4) correspond to the R-squared obtained in columns (2) and (5) of Table 5, respectively.

	(1)	(2)	(3)	(4)
	Personal Guarantees (0/1)	Real Guarantees (0/1)	Personal Guarantees Coverage (%)	Real Guarantees Coverage (%)
Bank Characteristic				
Branch-Headquarter Distance (log km)	0.06	0.24	0.06	0.23
Loan Characteristics				
Loan Maturity (log months) Loan Size (log)	8.19	57.96	8.40	56.97
Bank-Firm Characteristic				
Any Other Type of Contract (0/1)	3.80	2.98	2.48	2.93
Firm Characteristics				
Total Assets (log eur) Leverage (%) ROE (%) Refinancing (0/1)	8.24	6.70	5.94	7.10
Sectoral Dummies	2.69	23.50	0.68	23.89
Bank Dummies	9.23	1.36	6.49	1.31
Year Dummies	63.31	1.37	80.49	1.47
Province Dummies	4.48	5.89	3.03	6.09

Table 7: Differential effects of the determinants of the use and coverage of personal and real guarantees

This table provides evidence on the differential effects of several groups of variables on the use and coverage of personal and real guarantees. To analyze the differential effects of the variables we first fit two different models separately on the same data, one based on personal and the other on real guarantees. We store the estimation results and then, we estimate the simultaneous covariance of the coefficients of the two previous models (i.e., cross-model covariances) to test the cross-coefficients hypothesis that the common coefficients are equal and so, exhibit similar effects on personal and real guarantees. Thus, our aim is to compare the differential effects of different drivers of the use and coverage of guarantees on the two types of guarantees. As the two estimations rely on the same estimation sample, the standard errors obtained from the simultaneous estimation are identical to those obtained for each individual regression. Column (1) contains the results of tests for cross-model hypotheses based on linear combinations of cross-model coefficients obtained when the use of personal and real guarantees are regressed on the same explanatory variables. The results contained in column (2) correspond to the case in which we use the coverage ratio of personal and real guarantees. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

	(1) Guarantees (0/1)	(2) Coverage
	b[Personal] - b[Real]	b[Personal] - b[Real]
VARIABLES		
Bank Characteristic		
Branch-Headquarter Distance (log km)	0.001	0.582
	[0.003]	[0.585]
Loan Characteristics		
Loan Maturity (log months)	-0.019***	-5.427***
	[0.003]	[0.469]
Loan Size (log)	-0.014***	-2.703***
	[0.004]	[0.634]
Bank-Firm Characteristic		
Any Other Type of Contract (0/1)	-0.004	2.091
	[0.007]	[1.363]
Firm Characteristics		
Total Assets (log eur)	-0.056***	-9.526***
	[0.005]	[0.765]
Leverage (%)	0.001***	0.259***
	[0.000]	[0.034]
ROE (%)	0.000	0.002
	[0.000]	[0.005]
Refinancing (0/1)	-0.026**	1.796
	[0.013]	[2.188]
Sector FE	Yes	Yes
Bank FE	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes

Table 8: Use of Guarantees when the Bank Faces a Policy Shock

This table analyzes the impact of an exogenous policy shock on the use and coverage of personal and real guarantees. This policy shock refers to the need of bank recapitalization announced in October, 27, 2011. We estimate equation (1) using a 3-month window before and after the shock on the same set of explanatory variables as in equation (1) with the exception of the year fixed effects. Additionally, we add to the specification a proxy for risk of the whole economy measured from the 5-year sovereign CDS spread. We include a dummy called policy shock that equals 1 after October, 27, 2011, and equals 0 otherwise. Columns (1) and (2) report the results obtained when the dependent variables are the use of personal and real guarantees, respectively. Columns (4) and (5) contain the results obtained when the dependent variables are the coverage of personal and real guarantees relative to the loan size, respectively. Columns (3) and (6) contain the difference of common coefficients obtained in columns (1)-(2) and (4)-(5), respectively, and a test in which the null hypothesis states that both coefficients have similar effects on the corresponding dependent variables based on the same methodology used in Table 7. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Personal Guarantees (0/1)	Real Guarantees (0/1)	b[Personal] - b[Real] Guarantees (0/1)	Personal Guarantees Coverage (%)	Real Guarantees Coverage (%)	b[Personal] - b[Real] Coverage
Policy Shock						
Policy Shock (0/1)	0.404***	0.037***	0.366***	61.802***	3.652***	58.150***
	[0.011]	[0.004]	[0.012]	[1.842]	[0.444]	[1.880]
Bank Characteristic						
Branch-Headquarter Distance (log km)	0.011**	0.008***	0.003	1.043	0.659***	0.384
	[0.005]	[0.002]	[0.005]	[0.866]	[0.210]	[0.872]
Loan Characteristics						
Loan Maturity (log months)	0.042***	0.065***	-0.024***	0.674	6.474***	-5.800***
	[0.005]	[0.003]	[0.006]	[0.778]	[0.319]	[0.863]
Loan Size (log)	0.000	0.012***	-0.012**	-1.043	0.963***	-2.006***
	[0.004]	[0.002]	[0.005]	[0.678]	[0.193]	[0.695]
Bank-Firm Characteristic						
Any Other Type of Contract (0/1)	0.012	-0.009	0.021	-1.188	-0.942	-0.246
	[0.011]	[0.006]	[0.013]	[1.906]	[0.619]	[2.032]
Firm Characteristics						
Total Assets (log eur)	-0.055***	0.002	-0.056***	-8.571***	0.322	-8.893***
	[0.006]	[0.002]	[0.006]	[0.930]	[0.225]	[0.954]
Leverage (%)	0.002***	0.001***	0.001***	0.220***	0.054***	0.167***
	[0.000]	[0.000]	[0.000]	[0.043]	[0.013]	[0.045]
ROE (%)	-0.000	0.000	0.000	-0.008	0.000	-0.008
	[0.000]	[0.000]	[0.000]	[0.008]	[0.002]	[0.008]
Refinancing (0/1)	0.007	0.044***	-0.036***	-0.902	4.545***	-5.447***
	[0.011]	[0.006]	[0.013]	[1.894]	[0.603]	[2.015]
Sovereign and Bank Risk						
Sovereign CDS	0.001***	0.000**	0.001***	0.170***	0.008	0.162***
	[0.000]	[0.000]	[0.000]	[0.025]	[0.005]	[0.025]
Sector FE	YES	YES		YES	YES	
Bank FE	YES	YES		YES	YES	
Province FE	YES	YES		YES	YES	
Observations	30,205	30,205		30,205	30,205	
R-squared	0.339	0.203		0.271	0.186	

Table 9: Percentage of R-squared explained by each group of variables around the policy shock

This table contains the percentage of the R-squared explained by each group of variables employed in the regressions whose results are reported in Table 8. Concretely, column (1) represents the percentage of the R-squared explained by the distance, loan characteristics, relationship lending, firm, and industry, bank, year and province dummies variables according to the results obtained in column (1) of Table 8. Column (2) corresponds to the R-squared obtained in column (2) of Table 8. Finally, columns (3) and (4) correspond to the R-squared obtained in columns (4) and 5 of Table 8, respectively.

	(1) Personal Guarantees (0/1)	(2) Real Guarantees (0/1)	(3) Personal Guarantees Coverage (%)	(4) Real Guarantees Coverage (%)
Policy Shock				
Policy Shock	50.28	3.15	52.92	3.23
Bank Characteristic				
Branch-Headquarter Distance (log km)	0.30	0.35	0.28	0.30
Loan Characteristics				
Loan Maturity (log months) Loan Size (log)	4.42	54.28	1.09	54.25
Bank-Firm Characteristic				
Any Other Type of Contract (0/1)	0.77	3.19	0.90	3.31
Firm Characteristics				
Total Assets (log eur) Leverage (%) ROE (%) Refinancing (0/1)	9.02	6.35	8.72	6.72
Sovereign and Bank Risk				
Sovereign CDS	7.76	0.48	7.78	0.36
Sectoral Dummies	2.11	20.25	2.80	19.17
Bank Dummies	21.46	2.83	20.40	2.77
Province Dummies	3.88	9.14	5.12	9.90

Table 10: Risk Taking

This table shows evidence on the firm risk taking after the use of personal and real guarantees for the first time. Risk taking is measured as the difference between the standard deviation of the annual firm's industry-adjusted ROE three years after the first time in which the firm pledges guarantees and the standard deviation for the three years before that event. The coefficients represent the change in risk taking of firms that pledged guarantees (treatment group) by the first time in the form of personal (columns (1-3)) or real (column (4-6)) guarantees in excess of the average change in risk taking of the corresponding control group. The control group consists of firms with similar size, profitability, and risk that got the loan without guarantees the same year as the firm in the treatment group. The change in risk taking of each firm in excess of the average change of the firms in the corresponding control group is then regressed on a constant variable. The standard errors of the corresponding regressions are clustered at group-firm level, where each group corresponds to firms with similar characteristics in terms of the previously mentioned dimensions. Columns 1 and 4 report the results obtained for personal and real guarantees from the loans granted between 2006 and 2011 while columns 2-3 and 5-6 report the corresponding results for the two types of guarantees using the loans granted in two subperiods: 2006-2007 and 2008-2011, respectively. Finally, columns 7 and 8 contain the results obtained to study the evolution of the personal and real guarantees effectiveness on risk taking around the recapitalization event announced in October, 27, 2011. In this case the group of treatment consists of firms that pledged personal (column 7) or real (column 8) guarantees by the first time during the six months after that date while the control group consists of the firms that pledged personal or real guarantees by the first time during the six months before that date. The length of six months obeys to the sample time-span that ends in 2014 and to the method to calculate risk taking as it is obtained from the standard deviation of the three consecutive years before and after the event. Treatment Effect Economic Terms represents the economic effect defined as the estimated coefficient for the treatment group relative to the average standard deviation of the firm's industry-adjusted ROE for the treatment group before the event. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Personal	Personal (2006-2007)	Personal (2008-2011)	Real	Real (2006-2007)	Real (2008-2011)	Pers (nov11-apr12) vs Pers (sep11-apr11)	Real (nov11 - apr12) vs Real (sep11 - apr11)
Treatment Effect	-0.093***	-0.051**	-0.109***	-0.120***	-0.044	-0.145***	0.066*	0.019
	[0.019]	[0.026]	[0.017]	[0.031]	[0.050]	[0.029]	[0.034]	[0.107]
Treatment Effect Economic	-27%	-17%	-30%	-27%	-12%	-31%	19%	4%
Observations	7,033	1,891	5,142	2,729	670	2,059	499	80

Table 11: Disentangling effects on short- and long-term maturities

This table provides evidence on the differential effects of the drivers of the use of guarantees depending on the loan maturity. The dependent variables in columns (1) and (2) are the use of the personal and real guarantees for all loans in sample, and correspond to columns (2) and (5) of Table 4. The dependent variable in columns (4) and (5) are the use of personal and real guarantees for loans with maturity lower than one year. The dependent variable in columns (7) and (8) are the use of personal and real guarantees for loans with maturity larger than one year. Columns (3), (6) and (9) contain the difference of common coefficients obtained in columns (1)-(2), (4)-(5) and (7)-(8), respectively, and a test in which the null hypothesis states that both coefficients have similar effects on the corresponding dependent variables based on the same methodology used in Table 7. All regressions include sector, bank, year, and province fixed effects. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Personal Guarantees (0/1)	(2) Real Guarantees (0/1)	(3) b[Personal] - b[Real]	(4) Personal Guarantees (0/1)	(5) Real Guarantees (0/1)	(6) b[Personal] - b[Real]	(7) Personal Guarantees (0/1)	(8) Real Guarantees (0/1)	(9) b[Personal] - b[Real]
Bank Characteristic									
Branch-Headquarter Distance (log km)	0.007**	0.005***	0.001	0.007*	0.002	0.006	0.007***	0.014***	-0.007**
	[0.003]	[0.001]	[0.003]	[0.004]	[0.001]	[0.004]	[0.002]	[0.002]	[0.003]
Loan Characteristics									
Loan Maturity (log months)	0.059***	0.078***	-0.019***	0.076***	0.021***	0.055***	-0.091***	0.167***	-0.258***
	[0.002]	[0.001]	[0.003]	[0.010]	[0.004]	[0.011]	[0.004]	[0.002]	[0.005]
Loan Size (log eur)	0.007	0.021***	-0.014***	0.009*	0.006***	0.003	-0.003	0.096***	-0.099***
	[0.005]	[0.001]	[0.004]	[0.005]	[0.001]	[0.005]	[0.002]	[0.001]	[0.003]
Bank-Firm Characteristic									
Any Other Type of Contract (0/1)	-0.005	-0.002	-0.004	-0.010	-0.007**	-0.003	0.036***	-0.009***	0.045***
	[0.006]	[0.003]	[0.007]	[0.008]	[0.003]	[0.009]	[0.005]	[0.003]	[0.007]
Firm Characteristics									
Total Assets (log eur)	-0.055***	0.001	-0.056***	-0.039***	-0.003**	-0.036***	-0.086***	-0.026***	-0.061***
	[0.005]	[0.001]	[0.005]	[0.005]	[0.001]	[0.005]	[0.002]	[0.002]	[0.003]
Leverage (%)	0.002***	0.001***	0.001***	0.002***	0.000	0.002***	0.002***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ROE (%)	-0.000	-0.000***	0.000	-0.000	-0.000	0.000	-0.000	-0.000***	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Refinancing (0/1)	0.040***	0.066***	-0.026**	0.061***	0.021***	0.041***	-0.002	0.142***	-0.145***
	[0.012]	[0.004]	[0.013]	[0.014]	[0.004]	[0.015]	[0.005]	[0.004]	[0.007]

Sector FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	477,209	477,209	349,902	349,902	127,306	127,306
R-squared	0.341	0.266	0.443	0.050	0.161	0.339

Table 12: Dealing with the simultaneous use of personal and real guarantees

This table compares the baseline specification in equation (1) whose results are reported in columns (1) and (3) with an alternative specification of equation (1) where we control by the use of the other type of guarantee (columns (2) and (4)).

VARIABLES	(1) Personal Guarantees (0/1)	(2) Personal Guarantees (0/1)	(3) Real Guarantees (0/1)	(4) Real Guarantees (0/1)
Bank Characteristic				
Branch-Headquarter Distance (log km)	0.007**	0.008***	0.005***	0.006***
	[0.003]	[0.003]	[0.001]	[0.001]
Loan Characteristics				
Loan Maturity (log months)	0.059***	0.081***	0.078***	0.084***
	[0.002]	[0.002]	[0.001]	[0.001]
Loan Size (log)	0.007	0.013***	0.021***	0.022***
	[0.005]	[0.005]	[0.001]	[0.001]
Bank-Firm Characteristic				
Any Other Type of Contract (0/1)	-0.005	-0.006	-0.002	-0.002
	[0.006]	[0.006]	[0.003]	[0.003]
Firm Characteristics				
Total Assets (log eur)	-0.055***	-0.054***	0.001	-0.005***
	[0.005]	[0.005]	[0.001]	[0.001]
Leverage (%)	0.002***	0.002***	0.001***	0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
ROE (%)	-0.000	-0.000	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]
Refinancing (0/1)	0.040***	0.059***	0.066***	0.070***
	[0.012]	[0.012]	[0.004]	[0.004]
Other Guarantees				
Real Guarantees (0/1)		-0.279***		
		[0.010]		
Personal Guarantees (0/1)				-0.104***
				[0.004]
Sector FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
Observations	477,209	477,209	477,209	477,209
R-squared	0.341	0.360	0.266	0.288

Table 13: Determinants of the use of specific types of personal and real guarantees

This table provides evidence on the effect of bank, loan, bank-firm and firm characteristics on the use of specific types of real and personal guarantees. The dependent variables in columns (1) and (4) are the use of the personal and real guarantees and correspond to columns (2) and (5) of Table 4. In columns (2) and (3) the dependent variables refer to the subtypes of personal guarantees: guarantees provided by the firm and guarantees provided by other institutions, respectively. In columns (5) and (6) the dependent variables refer to the subtypes of real guarantees: guarantees in the form of mortgage and guarantees in the form of financial assets, respectively. All regressions include sector, bank, year, and province fixed effects. The standard errors are clustered at firm level and given in parentheses. ***, **, and * denotes statistical significance at 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Personal Guarantees (0/1)	(2) Personal Guarantees - SME (0/1)	(3) Personal Guarantees - Other Inst. (0/1)	(4) Real Guarantees (0/1)	(5) Real Guarantees - Mortgage (0/1)	(6) Real Guarantees - Financial Assets (0/1)
Bank Characteristic						
Branch-Headquarter Distance (log km)	0.007**	0.007**	0.000	0.005***	0.005***	0.001
	[0.003]	[0.003]	[0.000]	[0.001]	[0.001]	[0.001]
Loan Characteristics						
Loan Maturity (log months)	0.059***	0.056***	0.004***	0.078***	0.076***	0.004***
	[0.002]	[0.002]	[0.000]	[0.001]	[0.001]	[0.001]
Loan Size (log)	0.007	0.007	0.001***	0.021***	0.016***	0.006***
	[0.005]	[0.005]	[0.000]	[0.001]	[0.001]	[0.001]
Bank-Firm Characteristic						
Any Other Type of Contract (0/1)	-0.005	-0.005	0.000	-0.002	-0.001	-0.002
	[0.006]	[0.006]	[0.000]	[0.003]	[0.003]	[0.001]
Firm Characteristics						
Total Assets (log eur)	-0.055***	-0.054***	-0.000	0.001	0.004***	-0.003***
	[0.005]	[0.005]	[0.000]	[0.001]	[0.001]	[0.001]
Leverage (%)	0.002***	0.002***	0.000	0.001***	0.001***	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ROE (%)	-0.000	-0.000	0.000	-0.000***	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Refinancing (0/1)	0.040***	0.040***	0.000	0.066***	0.065***	0.005***
	[0.012]	[0.012]	[0.001]	[0.004]	[0.003]	[0.002]
Sector FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Observations	477,209	477,209	477,209	477,209	477,209	477,209
R-squared	0.341	0.338	0.016	0.266	0.273	0.026

Figure 1: Types of Guarantees by Maturity

Figure 1 reports the proportion of new loans granted with personal guarantees, real guarantees and without guarantees by loan maturity. Loans are grouped into buckets of one year (i.e., 0-1 year maturity, 1-2 year maturity, 2-3 year maturity and so on).

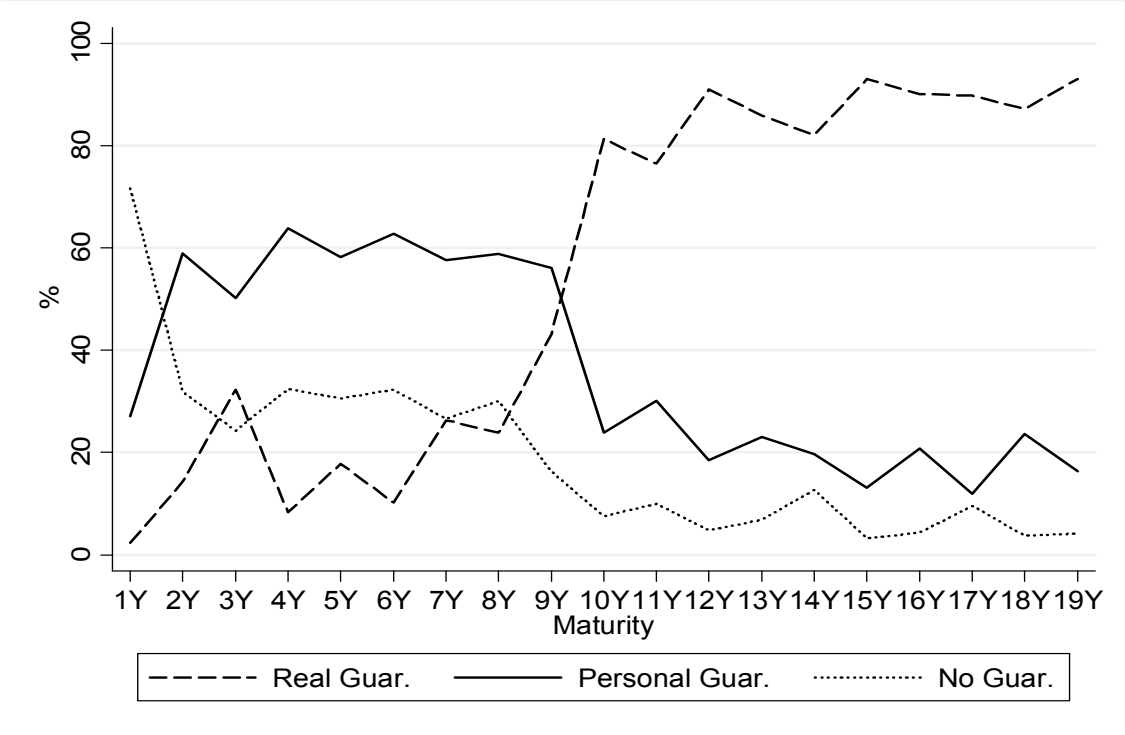

Figure 2: Coverage Ratio around the Policy Shock

Figure 2 reports the change in the coverage ratio of new loans granted with personal or real guarantees around an exogenous policy shock. This policy shock refers to the need of bank recapitalization announced in October, 27, 2011. The top panel reports the average coverage ratio for new loans with personal and real guarantees using a 3-month window before and after the shock. The bottom panel breaks down the coverage ratio around the policy shock by subtypes of personal (i.e., guarantees provided by the firm and guarantees provided by other institutions) and real (i.e., guarantees in the form of mortgage and guarantees in the form of financial assets) guarantees.

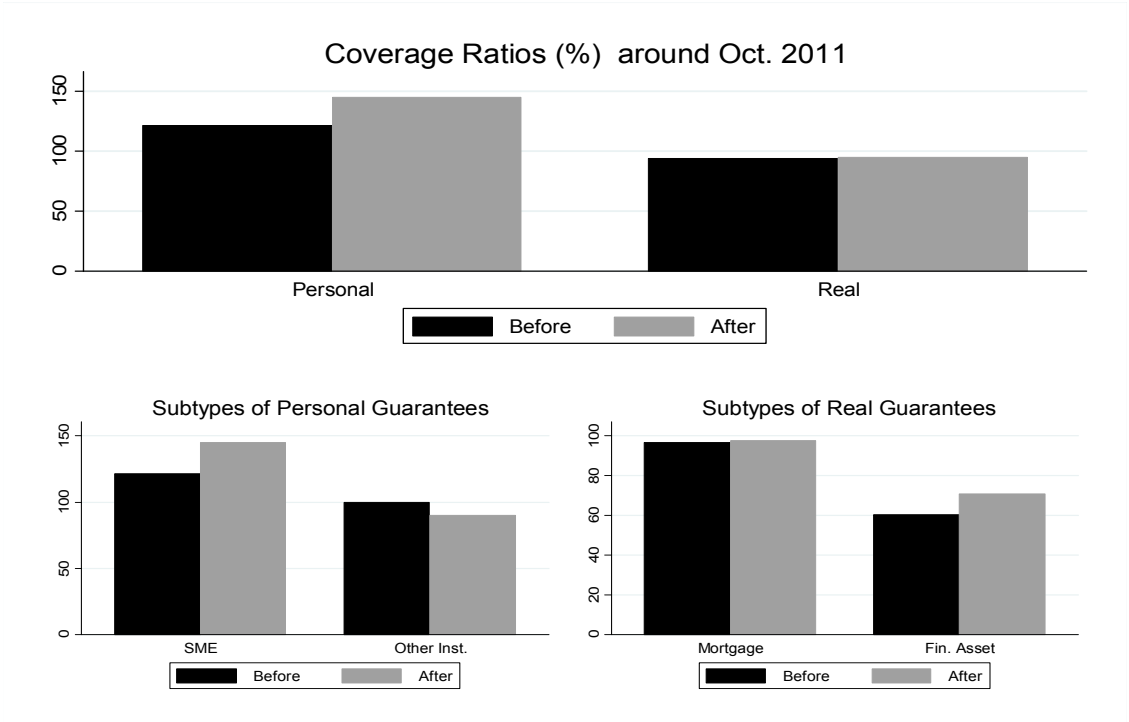

Figure 3: Evolution of loans by types of guarantees

Figure 3 depicts the evolution of new loans granted with personal guarantees, real guarantees, and without guarantees. The sample spans from February 2006 to September 2014.

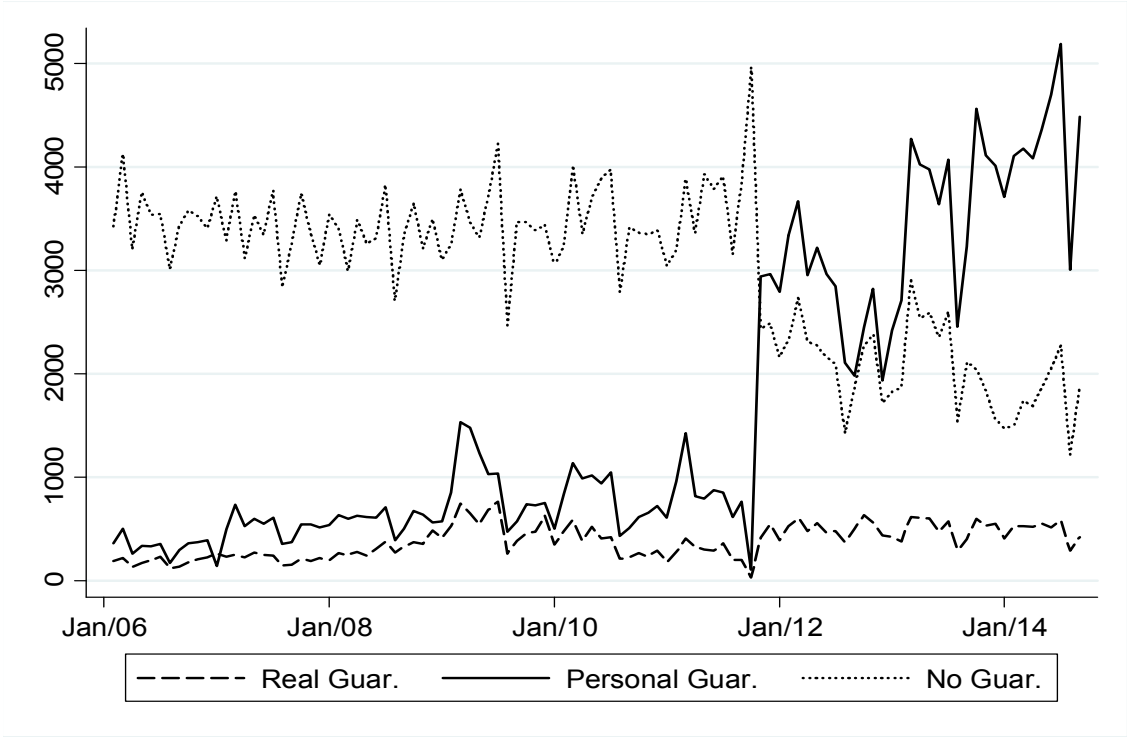

Figure 4: Mortgage Foreclosures

Figure 4 depicts the evolution of annual households and firms' mortgage forecloses in Spain. The sample spans from 2001 to 2014. (Source: Consejo General del Poder Judicial)

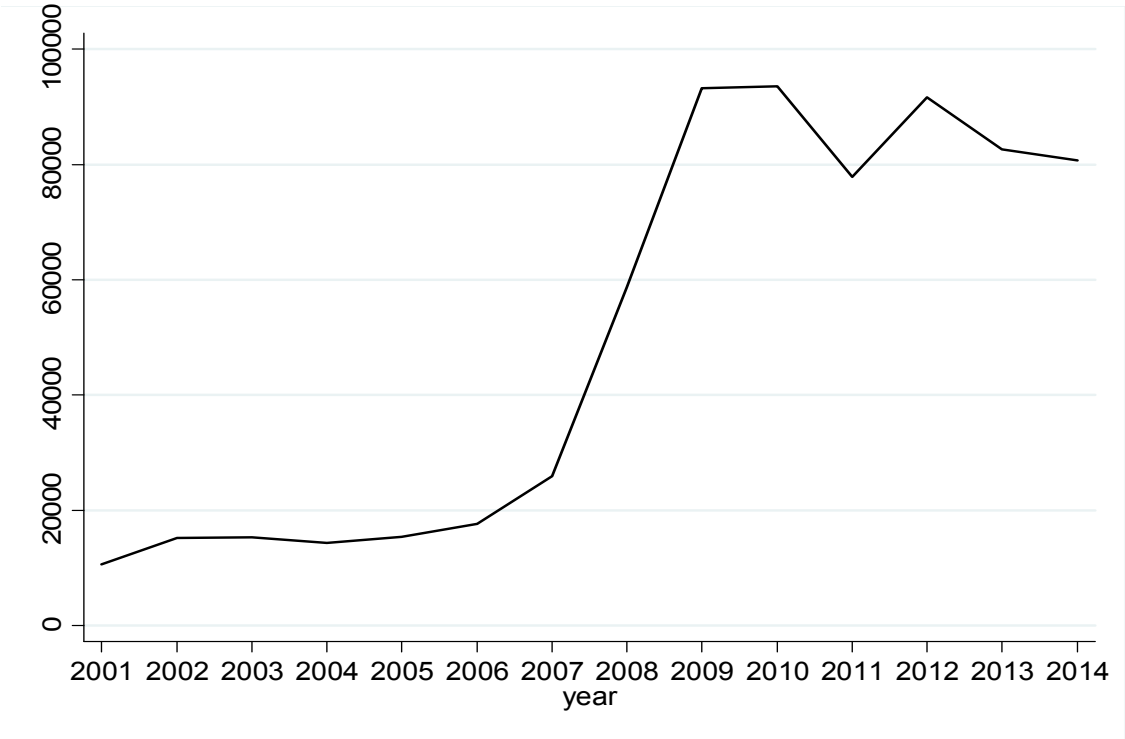

Figure 5: Year Fixed Effects

Figure 5 shows the year fixed effects estimated from equation (1) using as dependent variables dummy variables that denotes the existence of personal (solid line) and real (dashed line) guarantees in a given loan.

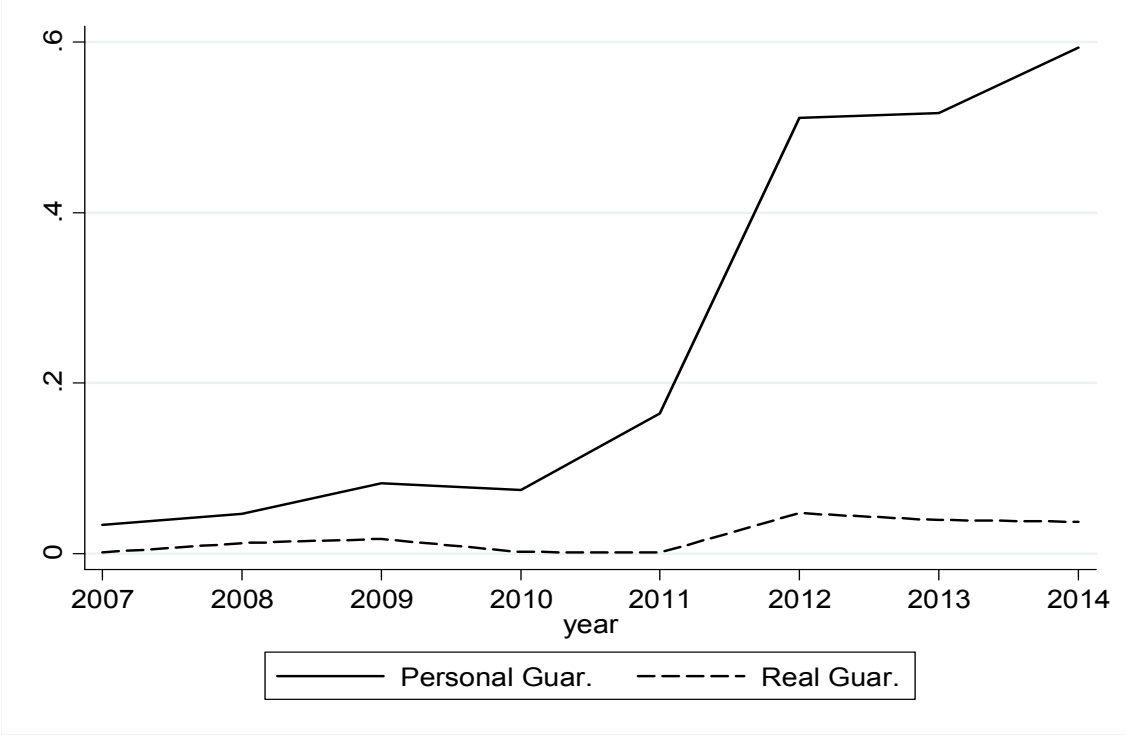

Figure 6: Maturity and Size around the Policy Shock

The top panel shows the average loan maturity before and after the recapitalization policy shock. The bottom panel shows the average loan size before and after the recapitalization policy shock.