

**Bachelor's Degree in Finance and Accounting**

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## **End of Degree Project**

# **The timeliness of loan loss provisions and the credit crunch in Spain: Evidence from firm-level data**

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**Abstract:** The main objective of this End of Degree Project is to test whether more conservative banks before the economic crisis –i.e., those who exhibited timelier loan loss recognition-, were able to extend more loans to their borrowers after the burst of the real estate bubble in Spain. To do this, we use a unique database (SABI), which allows us to match borrowers and lenders financial statements for the period 1997-2009. Our findings suggest that a) financial entities with higher capital buffers before the crisis exhibit a lower reduction in its lending to non-financial firms during the crisis, b) commercial banks and saving banks with more timely loan loss recognition prior to the crisis exhibit a lower reduction in its lending to non-financial firms during the crisis, c) firms borrowing from banks with more timely loan loss recognition prior to the crisis exhibit a lower likelihood of bankruptcy during the crisis.

**JEL codes:** M41, G21

## 1. Introduction

The credit crunch faced by the Spanish firms, particularly the small and medium sized companies, has been recurrently identified as one of the main failures of the Spanish economy within the current economic crisis. Compared to other European countries, Spanish firms bear higher interest rates and face tighter restrictions to fund new investment projects. Some voices indicate that the credit crunch in Spain is not so much a supply-driven but a demand-driven phenomenon, which will fade away as the country completes the overhaul of its entire production model from a non-competitive low-value-added economy into a productive economy based on knowledge. However, it cannot be ruled out that the imbalances of the Spanish banking system, accumulated during the expansion phase of the economic cycle, had a negative impact in the Spanish firms, at least in the early stage of the crisis, due to the reluctance of the local authorities to undertake the restructuring process of the banking industry.

One of the aspects that could have negatively influenced the extension of bank loans *during* the crisis is the accounting policies implemented by the Spanish financial institutions *before* the economic crisis. Due to the apparent solvency of the borrowers during the boom, Banks and Saving Banks did not properly anticipate the risks associated with their lending activity. After the burst of the real estate bubble, many of these loans, especially those extended to the construction firms and land developers, became non-performing loans, leading Spanish banks to recognize additional loan loss provisions in their income statement. This circumstance had a negative impact in banks earnings, which were already decreasing because of declining margins and lower economic activity. Capital ratios worsened up to the limit of compromising the viability of some financial entities in the country, which were finally bailed out by the Fund for Orderly Banking Restructuring (FOBR). The vast majority of the Spanish financial institutions had to dramatically reduce the size of their balance sheets to restore their minimum regulatory capital, tightening the credit conditions to their clients.

Many of these problems might have been mitigated, had the Spanish banks adopted more conservative accounting policies before the crisis. Indeed, academics and practitioners had pointed out that excessive delay in loan loss recognition might hinder the stability of the financial system (Laeven and Majnoni, 2002). In Spain, the threat of a rise in default rates in an eventual crisis scenario prompted the setup of the dynamic provisioning system in 2000, though its effects on bank behavior were limited

and not always coherent with the objectives that oriented its design (Illueca, Norden y Udell, 2014).

In this context, the main objective of this End of Degree Project is to test whether more conservative banks before the economic crisis –i.e., those who exhibited timelier loan loss recognition-, were able to extend more loans to their borrowers after the burst of the real estate bubble in Spain. To do this, we use a unique database (SABI), which allows us to match borrowers and lenders financial statements for the period 1997-2009. Because of the very nature of the dataset, we can isolate the effects of banks' accounting policies on firms' bank debt from other supply and demand factors underlying the lending process.

This End of Degree Project is related to the academic literature on conditional accounting conservatism and its effects on the real economy. Accounting research highlights that timely recognition of future losses decreases managers' incentives to undertake negative NPV projects. Within the context of takeovers of quoted firms, Francis and Martin (2010) show that companies with a higher level of a conditional accounting conservatism exhibit higher post-acquisition performance. Bushman, Piotroski and Smith (2011) suggest that the effects of conditional accounting conservatism on firms' investing behavior increase when firms face a restricted set of investment opportunities. Finally, Biddle, Ma and Song (2011) posit a negative relationship between conditional conservative accounting and the likelihood of bankruptcy for the US setting.

As to the banking literature, this EDP draws from Beatty and Liao (2011), which provides empirical evidence compatible with the idea that the credit granted by American Banks during the financial crisis depends positively on its level of conditional accounting conservatism prior to the crisis. Compared to this study, the contribution of this EDP is threefold. First, the empirical evidence provided in this study is based on data from non-financial firms, previously identified as clients of commercial banks and savings Banks. Therefore, it is possible to investigate whether the amount of credit borrowed by non-financial firms during the crisis is related to the accounting policies implemented by the lenders prior to the crisis, controlling for aspects related to the supply side of the lending activity, and the specific characteristics of the borrower; i.e. ex ante credit risk, size, industry, growth and/or level of internationalization. In other terms, it is possible to isolate the effect of banks' accounting policies from other supply and demand factors underlying the lending process. Second, by focusing on the

borrowers and not so much on the lenders, it is possible to evaluate the effects of timely loan loss recognition by banks on non-financial firms financing strategies. In particular, we can evaluate whether borrowers from non-conservative lenders mitigate the negative shock in bank lending subsequent to the crisis by switching to other banks, by increasing the trade credit or simply by raising common equity. We look at these combined effects by estimating a standard bankruptcy model for borrowers in which loss recognition delays (of lenders) is included as an explanatory variable along with other variables typically considered in the literature. And third, the Spanish setting makes this project especially interesting. On the one hand, this EDP is based on one of the most profound banking crisis in the world after the Lehman Brothers' debacle. And on the other hand, this EDP takes advantage of the distinctive characteristics of the Spanish banking industry. Before 2012, our banking system was composed of commercial banks with a traditional corporate government structure, and savings Banks, which are nonprofit organizations and exhibit a high degree of control by Regional and Local Governments. Because saving banks had fewer incentives than commercial banks to undertake an early recognition of loan losses, the Spanish setting provides a unique opportunity to test the effects of conditional accounting conservatism of banks on the real economy.

By the way of summary, our results confirm that a) financial entities with higher capital buffers before the crisis exhibit a lower reduction in its lending to non-financial firms during the crisis, b) commercial banks and saving banks with more timely loan loss recognition prior to the crisis exhibit a lower reduction in its lending to non-financial firms during the crisis, c) firms borrowing from banks with more timely loan loss recognition prior to the crisis exhibit a lower likelihood of bankruptcy during the crisis.

Hereafter, this EDP is organized as follows. The following section presents the fundamental characteristics of the Spanish banking system and describes the accounting standards on loan loss provisioning in Spain. The third section sets forth the main hypotheses to be tested in this project. The fourth section describes the research design, especially focusing on the sample, the proxy for the timeliness in loan loss recognition, and the econometric models used to test our main hypotheses. Sections 5 and 6 discuss the main findings of this paper, and the seventh section concludes.

## 2. Institutional Background.

### a) The Spanish banking system: Commercial Banks versus Saving Banks

The Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000, relating to the taking up and pursuit of the business of credit institutions, states that “a credit institution shall mean an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account”. Accordingly, three types of banks coexisted in Spain from 1997 to 2009 -the time horizon of this paper-; namely, Commercial Banks, Saving Banks and Credit Cooperatives.

From the banking business perspective, there are no significant differences between the aforementioned types of financial institutions because, as the directive itself states the three of them “have reserved by law, exclusive and exclusionary, the funds acquisition activity, besides the core business of lending to others.” In this end-of-degree-project we will focus on commercial banks and savings banks. We will exclude credit cooperatives since their market share in the Spanish banking sector was -and still is- marginal, only 5% of total loans and deposits in 2007, and accordingly the number of borrowers from these institutions in our database is rather low.

The main differences between savings banks and commercial banks rely on their ownership structure and governance model, which respond to different approaches on the nature and objectives of the banking business. Savings banks are non-for-profit organizations with no formal owners, which pursue a wide array of goals: providing social services to the community, contributing to regional development, enhancing competition among firms in the banking industry, and preventing the exclusion of popular classes from the financial system, particularly of those belonging to geographically isolated and economically depressed areas. Because there are no formal owners and no tradable shares, savings banks were not subject to market for corporate control, so that inefficient managers were not threatened by hostile takeovers, as opposed to those of commercial banks (Crespi, García-Cestona y Salas, 2006). Indeed, from 1990 to 2008 different savings banks took control of small and medium sized regional banks, such as Banco de Valencia, and Banco de Murcia, among others. After the deregulation of the Spanish banking industry in the late 80s, which consisted mainly of lifting compulsory lending coefficients and removing branching barriers, the Spanish Savings Banks undertook an ambitious expansion

process throughout the Spanish geography that significantly increased its network of branches and increased its market share to overcome that of commercial banks at the dawn of the economic crisis. Due to its unique ownership structure, savings banks could not raise external equity capital, so that their equity consisted mainly of retained earnings. Indeed, according to law, saving banks had to allocate at least 50% of their profits to reserves reserving the rest of profits to fund social projects in the territorial scope of these entities.

After the collapse of the sector in the early 10's, various international organizations, the business press and other financial experts have criticized the high degree of politicization of these institutions in the years of growth previous to crash of the estate bubble. In practice, the Spanish regional governments exerted a thorough control of many of these entities affecting various aspects of management. Garicano and Cuñat (2010) indicate that the level of training of executives designated by politicians was not suitable for the performance of their duties. Illueca, Norden and Udell (2013) suggest that the politicization of saving banks increased the risk taken in areas of expansion. And finally, Illueca and Lavezzolo (2014) document an artificial increase in loans granted by savings banks before regional elections.

Both the politicization of management and the restrictions on access to finance, which result from their unconventional institutional architecture, introduced serious problems when the Spanish authorities had to clean up the banking sector after the burst of the real estate bubble. Because of the supervisor's request of raising their capital ratios, saving banks were forced to issue financial instruments computable as additional Capital: subordinated debt, preferred stocks and non – voting equity units.

The differences in the legal nature of the Spanish savings banks and commercial banks grant an added interest to this final project, since we expect different incentives between the two types of entities in relation to the early recognition of impairment losses. A priori, the savings banks, which are more dependent on self-financing for the completion of their expansion strategies, had fewer incentives than commercial banks to develop a more conservative accounting policy. Timely loan loss provisions would have reduced the benefit and limited expansion possibilities. In this regard, in the next section we summarize the basic elements of the recognition of impairment losses, according to the Spanish legislation.

## **b) Spanish accounting standards on loan loss provisions**

In accordance with the accounting principle of prudence, the Bank of Spain states that financial institutions shall put effort into the rigorous and individualized study of the credit risk of their borrowers, not only at the time of granting credits but also during the entire time horizon of the loan, and importantly they shall not delay the recognition of non-performing loans and the corresponding loan loss provisions as soon as the existence of an abnormal credit risk is observed.

Accordingly, deposit institutions must consider as nonperforming assets the loans, debt securities and other debit balances, whatever the guarantee or collateral assets, when reimbursement is problematic for reasons other than sovereign risk. Within this definition of nonperforming assets it is worth explaining that there are two reasons to classify an instrument as nonperforming assets:

- Past due nonperforming assets, when payments of interest and principal are past due by 90 days or more.
- Other nonperforming assets; i.e., payments are not past due by 90 days or more, but there is a significant decline in borrower's creditworthiness.

Financial institutions shall classify a loan as nonperforming if payments of interests and principal are past due and three months have elapsed since the first request of payment made by the entity. Because loss given default is increasing with the amount of time past due, the Bank of Spain imposes increasing minimum coverage rates from 25% for the first 6 months to 100% after 24 months. These amounts might vary according to the type of required collateral and the nature of the borrower.

Regardless of the amount of time past due, financial institutions shall classify a loan as nonperforming if there is a significant deterioration in borrower's creditworthiness, according to its main financial indicators, such as recurrent losses, generalized late payments, negative equity or inadequate capital structure. In this context it shall classify as nonperforming loans those involved in a court dispute, and those extended to firms that filled for bankruptcy. These non-performing loans will be provisioned by an amount equal to the estimated irrecoverable amounts, according to internal criteria of financial institutions based on maximum prudence.

The recognized provisions to cover losses from nonperforming loans are referred to as specific provisions. Until 2005, specific provisions coexisted with the so-called general provisions, equivalent to 1% of bank loans, which had to be recognized by banks in order to cover any deterioration in the value of assets not associated with a triggering event, such as payments past due for example.

In the second half of 2000, the Bank of Spain introduced a new provisioning system, called dynamic provisioning system, which was designed to complete the insolvency fund accumulated by Spanish credit institutions during the expansionary phase of the economic cycle. At that time, Spain was growing at a strong pace and the default rate was the lowest of all OECD countries. To avoid the consequences of a rise in defaults during future crises, the Bank of Spain obliged banks to recognize in their income statements the potential losses that could arise in case of a worsening in the general economic conditions. They had, basically, to constitute a reserve in good years that would be used in bad years to mitigate the losses of banks, preserving their capital and avoiding excessive credit contraction.

The Bank of Spain gave precise rules to calculate such potential losses, based on the deterioration observed during the last economic crisis experienced by the Spanish economy. The new provisions were added to the general and specific provisions, to reach the level required by the supervisor. These rules of calculation would be revised slightly in 2005 to conform to international accounting standards. From this year, the anticyclical provision is included in the general provision, reducing to two categories the loan loss provisions recognized by the Spanish banks: specific and generic loan loss provisions.

In any case, for the purposes of this final project, it should be highlighted that the Bank of Spain established minimum amounts for both the specific and the general provision, allowing credit institutions choose higher levels of unconditional and conditional conservatism, depending on the nature of its loan portfolio and corporate strategy.

Precisely, as more conservative banks accrue provision buffers before the crisis, we expect the equity capital ratio to be less relevant during the crisis for these banks than for the less conservative entities. By recording greater provisions, banks can keep the loan supply even when the capital ratio decreases in relation to the levels prior to the crisis.



### **3. Hypothesis development**

#### **H1. Financial institutions with greater capital buffers before the crisis reduce less their credit supply to non-financial firms during the crisis.**

This first hypothesis is directly related to the theory of Credit Crunch. The Credit Crunch theory suggests that lending is particularly sensitive to regulatory capital constraints during recessionary periods, when regulatory capital declines and external-financing frictions increase (Beatty and Liao, 2011).

The Spanish banking regulation is subject to international criteria promulgated by Basel Committee on Banking Regulations and Supervisory Practice. According to these regulations, all Spanish financial institutions are subject to the conservation of a minimum ratio of capital to assets of 6% of the value of the total assets (Bank of Spain Circular 2/2014). These capital buffers are imposed by banking regulations to strengthen the stability of the global banking system as well as harmonize international regulation (Chouldhry, 2012).

During expansionary periods, the Spanish economy had a high activity rate, coupled with a low level of non-performing loans, so that provisions to cover future expected-losses decrease dramatically and providing banks with a strong incentive to extend new loans to non-financial firms. With the change in the economic cycle, Spanish financial institutions' activity experienced a significant decline and a sharp increase in non-performing loans takes place.

This fact had two important consequences: a) the collapse of the banking activity dramatically reduced the banks' income, and b) the increase in non-performing loans motivated by the financial turmoil obliged financial institutions to recognize additional provisions to cover expected future-losses. Both developments implied an increase in banks' losses, thereby eroding the benefit of the entity.

The decrease of banks' benefits during recessionary periods and the resulting drop of the capital buffers led to decrease on the banks' willingness to lend in order to avoid potential future violation of regulatory capital ratios. The banks, whose capital buffers were enough large to absorb the decrease of banks' earnings, are expected to reduce less their credit supply to non-financial companies during economic slowdowns.

## **H2. More conservative banks prior to the crisis restrict less their credit volume to their borrowers during the recessionary periods than less conservative banks.**

More conservative banks recognize timelier loan loss provision to riskier borrowers. This raises two advantages. The first one is that by recognizing an expense before the occurrence of the loss, the bank is creating hidden reserves in the balance sheet which serve as the aforementioned capital buffers. From this perspective, this second hypothesis would just be an extension of the first one: banks with more hidden reserves in the balance sheet could absorb higher loan loss provision during the crisis, as indeed those financial institutions which have large capital buffers do.

The second advantage is that by recognizing loan loss provisions in advance, financial institutions have fewer incentives to lend to risky borrowers (Illueca, Norden y Udell, 2014). In fact, recent literature suggests that more conservative non-financial firms: a) have higher returns after mergers (Francis et al, 2009) and b) have a lower likelihood of filing for bankruptcy (Biddle et al, 2011). Because more conservative banks have more incentives to lend to solvent borrowers, one might expect that after a significant deterioration in general economic conditions, these banks suffer lower losses than those who delayed the recognition of loan loss provisions in the expansionary periods.

Therefore, we expect that more conservative banks prior to the crisis restrict less their credit supply to non-financial firm during economic slowdowns.

## **H3. Conditional accounting conservative policies adopted prior to the crisis reduce non-financial firms' likelihood of filing bankruptcy during the recessionary periods.**

Lending constraints to non-financial firms may result in suboptimal capital expenditures, abnormally low inventories or insufficient amounts of credit to clients. To mitigate the effects of credit restrictions, non-financial firms could switch to alternative finance sources, basically equity capital or trade credit from suppliers. During economic slowdowns, characterized by high asymmetric information, it is difficult to raise external equity capital, especially for the non-listed companies which account for the vast majority of the firms in Spain. Moreover, the increase in credit from suppliers depends on sales growth, which is usually low under weak economic conditions. Hence,

constrained firms find it difficult to increase trade credit, even if suppliers are willing to extend the number of collection days.

Therefore, we expect that when facing an external shock in bank lending, firms cannot fully counteract the decrease in bank loans by switching to other financial institutions or turning to alternative financing sources, therefore endangering firm survival and growth. In short, we assume that borrowers of less conservative banks before the crisis will have a greater likelihood of filing for bankruptcy during the crisis than those operating with more conservative banks. Certainly, this hypothesis might be considered as a corollary of hypothesis 2. However, the empirical analysis carried to test hypothesis 3 is in itself a test on the economic relevance - and not just the statistical significance - of the effect of lender's accounting policy on the borrower's access to finance.

#### **4. Research Design**

##### **a) Sample**

To test the hypothesis put forward in this project, two interconnected databases have been used. The first one refers to non-financial Spanish firms, whereas the second one gathers information on their lenders, the Spanish banks.

The first source of information is the SABI database, which is commercialised in Spain by INFORMA. SABI contains the annual accounts submitted by firms to the Business Registers, along with general data such as location, incorporation date, managers, activity, auditor, and interestingly, the banks and saving banks they borrow from. Our dataset includes audited firms which meet the current regulations in terms of size, so as to guarantee a minimum of accuracy in the information used to test our three hypotheses. Moreover non-for-profit and non-market oriented firms were excluded from the database, because of their particular characteristics.

The information used in this project refers to more than 30.000 Spanish firms (most of them non-listed companies) for the period 1997-2009. All variables are winsorized at the 1% / 99% percentile. **Panel A Table1 shows** summary statistics of the Spanish non-financial firms considered in this study. Our firms are profitable, with median ROA of 4.08% and median Roe of 11.64%. In addition, firms are solvent as the

median firm has a ratio of equity to total assets of 37.31%. Finally, the mean Altman (1968) Z-score, ex ante measure of default risk, is 2.74.

(Insert here Table 1)

As previously mentioned, the SABI database provides the actual name of the banks that lend to each firm. After a long process of codification, it is possible to build a matched lender-borrower database, which allows us to evaluate the effects of lender's accounting policies on borrowers' access to finance. Bankscope provides financial records and general information about international financial institutions. In order to carry out this research, we use the financial statements of the financial institutions with at least 500 borrowers in the SABI database for the period 1997-2009. A total amount of 51 banks and saving banks are considered in this study. Generally, a single firm borrows from more than one commercial bank at a time. More specifically, the average number of bank relationships per borrower and year amounts to 2 or 3. Consequently, the sample observation unit used in this project is the combination of firm-bank-year.

**Panel B of Table 1** reports summary statistics of key bank variables. The mean bank exhibits a ratio of total loans on total assets of 65.91%. The mean bank has a ROE of 11.88% and mean of equity on total assets is 6.815%. The mean ratio of loan loss provisions over total loans is 0.446% and the mean ratio of nonperforming loans divided by total loans is 1.264%. Finally, the median bank exhibits a ratio of deposits to total loans of 67.66%, which implies that Spanish banks largely use deposits as main financing instruments.

After describing our database, the next sections of this paper are devoted to our empirical testing strategy, which consists of two parts: a) the estimation of the degree of conditional accounting conservatism of banks before the crisis, and b) the estimation of the effect of conditional accounting conservatism on credit availability for Spanish companies during the crisis.

#### **b) Conditional accounting conservatism in the Spanish banking industry**

Estimating the conditional accounting conservatism is a core aspect of this research. A general interpretation of accounting conservatism is articulated by the

International Accounting Standard Board (IASB), which states that conservatism is "a degree of caution in the exercise of the judgment needed in making the estimates required under conditions of uncertainty such that assets or revenues are not overstated and liabilities or expenses are not understated".

Although there is no unified definition of conservatism, we refer to it as 'the anticipated recognition of loan loss provision'. As it has been previously mentioned, in 2000 the Bank of Spain obliged the deposit institutions to recognise a dynamic provision to cover future potential losses that might arise in the recessive phase of the economic cycle. The supervisor determined the minimum amount of loan loss provisions to be recognized in the income statement, according to a formula based on the quarterly earnings for each entity. Hence, the level of conditional accounting conservatism of Spanish banks was not homogeneous along the period analysed in this EDP. In contrast it was quite heterogeneous, varying across financial institutions according to the institutional characteristics of two main components of the banking industry: savings banks and commercial banks.

In this study, we estimate the level of conditional accounting conservatism of Spanish banks by using the approach suggested by Nichols et al. (2009). Basically, these authors regress loan loss provisions on two different sets of independent variables: a) the increase in non-performing loans in the previous two quarters and b) the increase in non-performing loans in the previous two quarters, the current quarter and the subsequent quarter. If loan loss provisions depend mainly on the past increases in non-performing loans, the accounting policy of the bank is considered as backward looking and less conservative. In contrast, if loan loss provision is driven mainly by current and future increases in non-performing loans, the bank is considered as more forward-looking and conservative.

As previously stated, non-performing loans have an impact on loan loss provisions during at least 24 months from the occurrence of the triggering event. Hence, we adapt the Nichols et al' s model to consider growth in 36 successive months as determinants of the impairment losses reported in the quarterly Income Statement. More specifically, we consider as current increases in non-performing loans ( $\Delta NPL_t$ ) those that arise in past 12 months (in terms of quarters  $t-3$  to  $t$ ); past increases in non-performing loans ( $\Delta NPL_{t-1}$ ) are those recorded from quarter  $t-7$  to quarter  $t-4$ ; and future increases in non-performing loans ( $\Delta NPL_{t+1}$ ) are those reported from quarter  $t+1$  to

quarter t+4. Based on these on these definitions, we run the following system of equations for each bank with at least 10 consecutive available observations:

$$LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \varepsilon. \quad [I]$$

$$LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \alpha_2 \Delta NPL_t + \alpha_3 \Delta NPL_{t+1} + \varepsilon. \quad [II]$$

Where

$LLP_t$  denotes loan loss provision in quarter t divided by lagged total loans.  $\Delta NPL_{t-1}$ ,  $\Delta NPL_t$  y  $\Delta NPL_{t+1}$  refer to past, current and future changes in nonperforming loans divided by lagged total loans.

After estimating both equations for each bank, we obtain the specific conditional accounting conservatism measure by computing the difference of the adjusted  $R^2$  for both regressions. The higher the adjusted  $R^2$  of model [II] compared to model [I], the higher the delay in loan loss recognition by the bank. Following Beatty and Liao (2011), we define the dichotomous variable CAC which takes a value one if the difference of adjusted  $R^2$  is higher than the median of the sample and zero otherwise. We will use the variable CAC thereafter to empirically test the hypotheses put forward in this research.

**Table 2** reports regression results for the period 1997 - 2007. We find that second regression model has a higher adjusted  $R^2$ , which implies that the median Spanish bank recognized present provisions based on past, current and, especially, future nonperforming loans. The median of adjusted  $R^2$  for our sample is 7.45% (mean is 12.43% and standard deviation in 19.48%). Our sample is composed for 51 Spanish banks and we classified 25 conservative banks and 26 non conservative banks.

(Insert here Table 2)

### **c) Capital buffers, conditional conservatism and bank lending during the crisis**

In order to test the hypothesis set out in this research project, we use a differences in difference approach. Our estimation strategy is to observe the reaction to the crisis exhibited by the target banks (i.e., banks with higher capital ratios or lower delay in loan loss recognition) vis-à-vis the control group. Our model incorporate a set of variables aimed at controlling for firm, bank, and firm-bank specific characteristics.

### c.1) Credit crunch hypothesis: Baseline Model

We start our research project by replicating Beatty and Liao (2011). Our objective is to evaluate the effect of regulatory capital ratio of the Spanish banks on the borrowers' access to credit, both before and after the crisis. Unlike Beatty and Liao (2011), our analysis is based on micro-data at the firm level, rather than aggregated data at the bank level. Particularly, we run the annual increase in bank debt of non-financial firms in year  $t$  on the capital ratio in year  $t-1$  of the banks they operate with, and a set of control variables referred to firm specific, bank specific and bank-firm specific characteristics. In order to assess the differential effect of the economic crisis on the relationship between regulatory capital ratio and the increase of credit to non-financial firms, we introduce a dummy variable which is activated from 2007, and the interaction of this variable with the regulatory capital of bank lenders. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects.

$$\Delta \text{Loan}_{ijt} = \beta_0 + \beta_1 \text{Z-score}_{it-1} + \beta_2 \text{Relations}_{it-1} + \beta_3 \text{Recession}_t + \beta_4 \text{Capital}_{jt-1} + \beta_5 \text{Capital}_{jt-1} * \text{Recession}_t + \beta_6 \text{Bank\_Size}_{jt} + \beta_7 \text{Bank\_Depta}_{jt} + \Phi_{ij} + \varepsilon_{ijt}$$

Where  $j$  and  $i$  refers to lenders and borrowers respectively, and

$\Delta$ Loan:	Annual increase in loans divided by total assets.
Z-score:	Altman Z-score for non-listed firms.
Relations:	Number of bank Relationships at the beginning of the year.
Recession:	An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.
Capital:	Capital Ratio at the beginning of the year, divided by 100.
Bank_Size:	Natural log of lagged total assets.
Bank_Depta:	Lagged total deposits divided by total loans.
Bank- Firm Fixed Effects:	Fixed effects for each bank-firm combination, which aim to control unobservable, constant and specific aspects.

The main variable in this prediction is *Capital x Recession*. We predict a positive coefficient for this variable, since the capital buffers created by the banks have a more relevant impact during the crisis as opposed to expansion periods; that is, the

regulatory capital ratio of the financial entities will be a key indicator in the increase of loans during the recessionary periods.

We add two control variables, following the model of Beatty and Liao (2011). We include *Bank\_Depta* to capture access to deposit financing. Financial institutions which base their financing model on collecting deposits are considered as more averse to risk, consequently, they will tend to reduce the credit volume to a greater extent. We predict a negative coefficient on this control variable. We account for entity size by means of *Bank\_Size*. In accordance with the study mentioned above, we include this variable so as to control technical aspects of the entity.

The reach and depth of our database allows us to complete the model with control variables at specific to firms. More specifically, we add to regression the variable *Z-score*, a widely accepted indicator of the non-financial firms' filing bankruptcy ex ante. We predict a positive coefficient on *Z-Score*, taking into account that the higher the *Z-score*, the lesser the risk for the financial entity, therefore higher credit access for the company. We also incorporate the number of bank – firms' relationships to the basic econometric model. However, we do not predict the sign of the coefficient on this variable.

Following Kysucky and Norden (2013), firms which keep a financial model based on exclusive relational banking tend to register a higher volume of credit. However, several studies such as von Thaden (2004), suggest that companies which have fewer banking relationships suffer credit access restrictions in the medium-term, because the banks enjoy a monopoly position over the essential financial information of the firm. The coefficient sign which links the increment of credit to the number of banking relationships is, after all an empirical question, which will be elucidated along this work for the Spanish case.

Along with the control variables previously mentioned, our baseline regression model includes fixed effects for each bank-firm combination, aimed at controlling for time-invariant non-observable characteristics of a) banks, b) firms and c) lender-borrower relationship, such as the structure of the property of the firm (as long as it remains constant for the whole estimation window), institutional features of the deposit institutions (whether the lender is a commercial bank or a saving bank) or the physical distance between the lender and the borrower.



In addition, we split the sample into two sub-samples: companies that borrow from commercial banks and saving banks, respectively. We predict that the impact of the variable *Capital x Recession* on the borrower's access to credit will be higher for saving banks, since these financial institutions have greater difficulties to issue external equity capital in case of violations of the regulatory capital ratio.

### c.2) Delay in loan loss recognition by lenders and borrowers' increase in bank loans

After evaluating the differential impact of banks' regulatory capital ratio on borrowers' access to credit during the crisis, our second hypothesis focuses on the relationship between the delay of loan loss recognition by banks before the crisis and the borrowers' increase in bank debt during the crisis. To that end, we extend the baseline regression model in the following way:

$$\Delta \text{Loan}_{ijt} = \beta_0 + \beta_1 \text{Z-score}_{ijt-1} + \beta_2 \text{Relations}_{it-1} + \beta_3 \text{Recession}_t + \beta_4 \text{Capital}_{jt-1} + \beta_5 \text{Capital}_{jt-1} * \text{Recession}_t + \beta_6 \text{CAC}_j \times \text{Capital}_{jt-1} + \beta_7 \text{CAC}_j \times \text{Recession}_t + \beta_8 \text{CAC}_j \times \text{Capital}_{jt-1} \times \text{Recession}_t + \beta_9 \text{Bank\_Size}_{jt} + \beta_{10} \text{Bank\_Depta}_{jt} + \Phi_{ij} + \varepsilon_t.$$

Where j and i refers to lenders and borrowers respectively, and

$\Delta$  Loan: Annual increase in bank loans divided by total assets.

Z-score: Altman Z-score for non-listed firms.

Relations: Number of bank Relationships.

Recession: An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.

Capital: Capital Ratio

CAC: An indicator variable equal to one for conservative banks and zero otherwise. Where the conservatism measure is the difference between adjusted  $R^2$  (II – I), from following two regression. The difference between adjusted  $R^2$  is greater than the median of the sample the non-financial firm is conservative and non-conservative otherwise.

$$\text{Eq (I): } \text{LLP}_t = \alpha_0 + \alpha_1 \Delta \text{NPL}_{t-1} + \varepsilon.$$

$$\text{Eq (II): } \text{LLP}_t = \alpha_0 + \alpha_1 \Delta \text{NPL}_{t-1} + \alpha_2 \Delta \text{NPL}_t + \alpha_3 \Delta \text{NPL}_{t+1} + \varepsilon.$$

Where:

$\text{LLP}_t$  denotes loan loss provision in quarter  $t$  divided by lagged total loans.  $\Delta \text{NPL}_{t-1}$ ,  $\Delta \text{NPL}_t$  and  $\Delta \text{NPL}_{t+1}$  refer to past, current and future changes in nonperforming loans divided by lagged total loans.

Bank\_Size: Natural log of lagged total assets.

Bank\_Depta: Lagged total deposits divided by total loans.

Bank- Firm Fixed Effects: Fixed effects for each bank-firm combination, aimed at controlling for unobservable, time invariant specific characteristics of banks, firms and the borrower-lender relationship.

Regarding the previous model, the second model incorporates three new variables:

CAC x Capital

CAC x Recession

CAC x Capital x Recession

Where *CAC* is a dummy variable which equals to one for conservative banks and zero otherwise. The time invariant variable *CAC* does not appear in the regression model since it is perfectly correlated with the bank-firm fixed effect.

Our second hypothesis relative to the association between conditional accounting conservatism and credit access of Spanish non-financial firms is compatible with a positive sign for variable *CAC x Recession* and with a negative sign for the variable *CAC x Capital x Recession*. Basically, more conservative banks will have recognised timelier loan loss provisions before the crisis, thus mitigating the decrease of both, profits and capital during the crisis. Obviously, as losses are diminished during

the crisis, the expected credit constraints to firms and families are smaller and therefore, the coefficient of the variable *CAC x Recession* is expected to be positive.

### **c.3) Delay in loan loss recognition and the likelihood of bankruptcy**

After testing the effects of conditional accounting conservatism on credit access of non-financial firms, our third hypothesis states that higher delays in loan loss recognition by banks prior to the crisis leads have a positive impact in the likelihood that borrowers fill for bankruptcy during the crisis. Theoretically, this hypothesis could be interpreted as a corollary of our previous hypotheses, since tighter credit conditions hinder borrowers' operating activities. However, non-financial firms could offset the decrease in bank debt using alternative sources of financing, such as trade credit or other shareholders contributions. Whether firms may substitute bank debt is ultimately an empirical question. In sum, the type of contribution implicit in this hypothesis is not qualitative or conceptual, it is rather quantitative: the question is whether the effect induced by the conditional accounting conservatism of banks before the crisis is relevant enough so as to increase the borrowers' likelihood of bankruptcy during the crisis. In particular, we run the following logistic regression:

$$\text{Bankrupt}_{ij} = \beta_0 + \beta_1 \text{Z-score}_i + \beta_2 \text{Relations}_i + \beta_3 \text{Consti}_i + \beta_4 \text{Industry}_i + \beta_5 \text{Firm\_Size}_i + \beta_6 \text{CAC}_j + \beta_7 \text{CAC} \times \text{Capital} + \beta_8 \text{Capital}_j + \beta_9 \text{Bank\_Depta}_j + \beta_{10} \text{Bank\_Loans}_j + \epsilon_{ij}.$$

Where j and i refers to lenders and borrowers respectively, and

**Bankrupt:** An indicator variable equal to one if firm went bankrupt and zero otherwise.

**Z-Score:** Average Z-score for non-listed firms

**Relations:** Average bank relations. Bank Relations by firm.

**Consti:** Date of incorporation.

Firm_Size:	Average of the natural log of total assets.
CAC:	CAC is an indicator variable equal to one for conservative banks and zero otherwise.
Capital:	Average Capital Ratio.
Bank_Depta:	Average of total deposits divided by total loans.
Bank_Loans:	Average of total loans divided by total assets.
Industry:	Industry Dummies.

Variable *CAC* is included in order to study the effect that conditional conservatism exerts on bankruptcy of non-financial firms. We predict that the coefficient of *CAC* will be negative, since more conservative banks will reduce credit to a lesser extent during the crisis, to the benefit of their borrowers.

As previously mentioned, conditional accounting conservatism tends to play a substitute role of capital, thus we add the variable *CAC x Capital*. In this respect, we expect a positive coefficient for this variable, showing that conditional accounting conservatism tends to compensate the adverse effect of the lack of regulatory capital over the non-financial firms' likelihood of bankruptcy during the crisis.

Furthermore, we add industry fixed effects and three control variables related to firm characteristics: date of incorporation, size and *Z-score*. We predict a positive coefficient for the first variable, because older companies are less likely to fall for bankruptcy as opposed to new setup companies. Regarding the second variable -firm size-, we predict a negative coefficient. Finally, we expect a negative sign for the coefficient associated to the *Z-score*.

At the bank level, we control for bank capital ratio, bank size and the ratio of deposits to total assets. We do not predict a sign for these control variables. As previously mentioned, we split the sample into firms borrowing from commercial banks and savings banks. Then we evaluate the effect of delayed loan loss recognition on the likelihood of bankruptcy in both subsamples.

## 5. Results and Discussion

### a) First Hypothesis: Banks' Capital Ratio and the Spanish Credit Crunch

To test the Credit Crunch hypothesis we run our base line model, which is explained in the section 4.b.1). The empirical results are included in the **Table 3**. Our main objective is to evaluate the effect of capital buffers on banks' willingness to lend to non-financial firms, before and after the burst of the construction bubble in Spain. The dependent variable is the increase in borrower's bank debt, deflated by lagged total assets. As independent variables, we consider lender's capital ratio and a set of control variables aimed at capturing firm specific, bank specific and firm-bank specific effects.

To evaluate the differential effect of the economic crisis, we have included a dummy variable, RECESSON, which equals to one for periods after 2007 and zero otherwise, and the interaction between this dummy variable and the lender's capital ratio, RECESSON x CAPITAL. This interaction is the essential variable in this first regression model, since it allows us to estimate the differential effects exerted by the capital ratio in banks' willingness to lend during the crisis as opposed to previous years.

(Insert here Table 3)

Consistent with our prediction, we find that the coefficient of RECESSON x CAPITAL is positive and statistically significant. This empirical result is consistent with our first hypothesis relative to the Credit Crunch theory, which states that the banks' capital buffers set up before the crisis have played a prominent role during the Spanish crisis in mitigating the credit crunch. In contrast, capital buffers do not seem to play any significant role during the boom.

As explained in section 4.c.1), our base line model includes two control variables, previously identified in the literature as main determinants of bank risk taking: bank size and total deposits divided by total assets. According to our prediction, we find that the coefficient on *Bank\_Depta* variable is negative and statistically significant. The sign of this coefficient suggests that financial institutions which based their financing model through taking deposits are more risk-averse. The coefficient of *Bank\_Size* variable is positive and statistically significant. In addition, we consider two control variables relative to the financial characteristics of non-financial firms: *Z-Score* and *Relations*. Our findings are in line with expectations. The coefficient

of *Z-Score* is positive and statistically significant, suggesting that riskier borrowers face stronger restrictions in access to finance.

A fundamental aspect to elucidate through this first regression model is the association between the number of bank - borrower's relationship and bank lending. In line with Kysucky and Norden (2013), our findings confirm that long-lasting and exclusive bank - borrower relationships are associated with lower loan rates and higher credit volume. Contrary to our empirical evidence, Von Thadden (2004) suggests that firms with a single bank - borrower relationship may suffer restricted access to credit, because lenders tend to use proprietary and exclusive information on borrower's to extract rents in the lending process.

**b) Second Hypothesis: Lenders' delay in loan loss recognition and borrower's access to credit**

The main objective of our second econometric model is to test the second hypothesis set forth in this EDP, whereby we predict that firms borrowing from more conservative banks prior to the crisis should be exposed to less credit's constraints during economic slowdowns. To do this, we extend the Base Line Model, adding the interaction of the dummy variable, *CAC*, with our main explanatory variables *RECESSION*, *CAPITAL* and *RECESSION x CAPITAL*. As explained in section 4.b), *CAC* is a proxy for the level of conditional accounting conservatism of banks prior to the crisis. Regression results are provided in the **Table 4**.

(Insert here Table 4)

The coefficients of the interactions *CAC x RECESSION*, *CAC x CAPITAL*, and *CAC x CAPITAL x RECESSION* are used to test the effect of conditional accounting conservatism policies adopted by the financial institutions prior to the Spanish crisis on the banks' willingness to lend to non-financial firms during the recessionary periods.

The coefficient of *CAC x Recession* is positive and statistically significant consistent with the idea that more conservative banks prior to the crisis exhibit a lower decrease in bank capital ratios, which allow them to mitigate the impact of the crisis in its lending activity. Because more conservative banks accumulate additional reserve buffers before the crisis, we predict that the effect of capital buffers accumulated prior to the crisis is lower for these banks compared to less conservative banks. Less conservative banks rely more on capital to withstand lending restrictions.

Consistent with our second hypothesis, regression results show that the Spanish financial institutions, which are classified as more conservative prior to the crisis, restrict less their lending volume to their borrowers during the recessionary periods compared to less conservative banks. Accounting policies on loan loss provisioning have a significant impact on the banks' willingness to lend to non-financial firms during economic slowdowns. In sum, conservative banks are less likely to worsen credit conditions, leading borrowers' bank debt to suboptimal levels. This circumstance is attributable to two main factors, the high information asymmetries in the recession period and the systemic nature of the crisis, which made it difficult for borrowers to switch to other financial institutions.

After evaluating the effect of conditional accounting conservatism on access to credit by non-financial firms, we focus on our third hypothesis which might be considered as corollary of the above hypotheses. Given that non-financial firms have difficulties to switch to other financial institutions, we predict that lending constraints imposed to non-financial firms could have a significant impact on borrowers' likelihood of bankruptcy. To test this hypothesis, we run a bankruptcy model, which include as independent variables *Capital*, *CAC* and *CAC x Capital*, and a set of variables aimed at controlling for bank, firm and bank-firm specific characteristics.

### **c) Third Hypothesis: Lenders' delay in loan loss recognition and borrower's likelihood of bankruptcy**

As previously explained, this third regression model allows us to evaluate, not only the statistical significance, but also the economic relevance of conditional accounting conservatism of banks from the perspective of their borrowers. In particular, we can assess whether the effect of the accounting conservatism policies induced by Spanish banks before the crisis significantly affects the borrower's likelihood of bankruptcy. Regression results are provided in **Table 5**.

(Insert here Table 5)

To test the third hypothesis we run a logistical regression model whose dependent variable **BANKRUPT** is a dummy variable, which equals to one if non-financial firms' filing bankruptcy during the crisis and zero otherwise. The model is estimated for all bank-firm combinations in the sample. For each of this bank - firm combination, independent variables are incorporated to the model as means computed for the period 1997-2009.

*CAC* and *CAC x CAPITAL* are used to test the effects of conditional accounting conservatism on bank borrowers' filing bankruptcy. As we predict in the section 4.c.3), the coefficient of *CAC* is negative and statically significance. This coefficient is consistent with our third hypothesis, which suggests that more conservative banks restrict less their credit supply during the recessionary periods, with favors the survival of non-financial firms. In line with prior expectations, the coefficient of *CAC x CAPITAL* is positive and statistically significant. This coefficient indicates that the conditional accounting conservatism tends to offset the Credit Crunch effects on non-financial firms' filing bankruptcy during economic slowdowns.

As to control variables, we find that the coefficient of *Z-Score* is negative and statistically significant. A large value for this ratio indicates a lower probability of non-financial firms' bankruptcy from ex ante perspective. Moreover, we find that the coefficient of *Consti* is positive and statistically significant, which confirms that older firms are less likely to going bankrupt as opposed to startup firms. Finally, the coefficient of *Firm\_Size* is negative and statistically significant, which suggests that smaller non-financial firms are more likely to filing bankruptcy.

Regarding the number of bank relationships *RELATIONS*, Kysucky and Norden (2013) state that the amount of credit received by non-financial firms is decreasing with the number of bank relationships. Because firms with many bank relationships face tighter financing restrictions, we hypothesize that the likelihood of bankruptcy is positively correlated to the number of lenders. However, Carletti et al (2007) suggest that banks tend to share the supervision of the riskier borrowers, so that firms with a not exclusive bank - borrower relationship may be riskier. In sum, the relationship between the number of relationships and the likelihood of bankruptcy is ultimately an empirical issue. As shown in table 5, the coefficient of *Relations* is positive and statistically significant, which is consistent with the Kysucky and Norden's prediction.

In sum, our findings suggest that the delays in loan loss recognition by banks prior to the crisis have a significant impact in non-financial firms' likelihood of filing bankruptcy. This result is contrary to the idea that firms may completely offset the external shock in bank debt by switching to other funding sources. The empirical evidence provided in this paper suggests the existence of a statistically significant and economically relevant relationship between banks' accounting policies adopted before the economic crisis and credit access for non-financial firms during the financial crisis.



## 6. Additional analysis

As an additional analysis, we decided to split the sample into two subsamples: firms borrowing from commercial banks and saving banks. We expect significant differences in our empirical analysis, because of the institutional differences between both types of banks.

Empirical results of our first regression model are provided in the **Table 6**. As explained in the previous section, the main objective of this first regression is to evaluate the effect of capital ratio on banks' willingness to lend to non-financial firms.

(Insert here Table 6)

In the section 4.c.1) we argue that the effect of bank capital ratios on borrowers' access to credit is expected to be higher for borrowers of saving banks, since these financial institutions face strong restrictions to raise external equity capital in the recessionary periods, as opposed to commercial banks that may issue ordinary shares. Consistent with that prediction, we find that the coefficient of *Capital x Recession* is positive and statistically significant only in the subsample of borrowers from saving banks. For the borrowers from commercial banks, the coefficient - thought positive - is not statistically significant. In short, our first regression model suggests that capital ratios have a positive significant impact in saving banks' willingness to lend during the crisis, which does not extend to the commercial banks.

Our second econometric model, which includes CAC as an independent variable, is aimed at evaluating the effect of the timeliness in loan loss recognition by banks on borrowers' access to credit. The empirical results are provided on **Table7**.

(Insert here Table 7)

After the removal of branching barriers in the late nineties, savings banks engaged in a dramatic expansion across the Spanish regions. Because savings banks could not rely on equity capital to fund their expansion strategies, they had strong incentives to maximize retained earnings by delaying loan loss recognition. Hence, we expect saving banks to exhibit a homogeneous and rather low level of conditional accounting conservatism prior to the crisis. Consistent with that prediction, the coefficient of the variable *CAC x Recession* is not significant for the subsample of savings banks clients. In turn, this coefficient is positive and statistically significant for the firms borrowing from commercial banks, reflecting that commercial bank had a

heterogeneous and rather high level of accounting conservatism before the burst of the construction bubble.

Finally, we evaluate the effect of banks' conditional accounting conservatism on borrowers' likelihood of bankruptcy. The results of our logistic regression models, which are included in **Table 8**, are consistent with those reported in Table 7. The coefficient of variable CAC is negative and significant for the commercial banks subsample, suggesting that the higher the delay in loan loss recognition by commercial banks prior to the crisis, the lower the likelihood of bankruptcy for the borrowers during the crisis. However, we find no significant effects of the CAC variable in the savings banks subsample, consistent with the idea that savings banks exhibited a low and rather homogeneous level of conditional accounting conservatism prior to the crisis. Moreover, the coefficient of the interaction between CAC and *Capital* is negative statistically significant in the commercial banks subsample, suggesting that a higher degree of conditional accounting conservatism mitigate the effect of capital ratios on loan supply.

(Insert here Table 8)

## 7. Conclusions

This End of Degree Project investigates the effects of banks' accounting policies on the access to credit by non-financial firms during the crisis in Spain. To evaluate these effects, we use a sample data with matched lender-borrower financial statements, which allows us to test our main hypotheses on the basis of more than 350.000 firm – bank – year observations.

In particular, we test whether banks capital buffers have an impact in the increase in bank debt of non-financial firms before and after the burst of the construction bubble. The empirical evidence provided in this paper suggests that banks with large capital buffers withstand income declines generated by both the increase in non-performance loans and the decrease in economic activity. As a consequence, borrowers from these banks exhibit a lower reduction in bank loans. However, the impact of the regulatory capital ratio depends on the type of bank. Interestingly, the effect of capital buffers on borrowers' access to credit is statistically significant only for savings banks. Commercial banks may raise external equity capital by issuing common shares, which mitigates the effects of prior capital ratios on its lending activity.

As to our second hypothesis, our findings suggest that conditional accounting policies have a significant impact on credit constraints to non-financial firms. More conservative banks reduce less their credit supply during recessionary periods than less conservative banks, because timelier loan loss provisioning generates hidden reserves in the balance sheet. Moreover, we find that the level of conditional accounting conservatism commercial banks is heterogeneous and high on average, whereas that of saving banks is homogeneous and low on average. Finally, we find that conditional accounting conservatism has a significant impact on borrower's likelihood of bankruptcy.

In sum, the empirical evidence provided in this paper suggests that there is a statistically significant and economically relevant relationship between banks' accounting policies adopted before the economic crisis and credit access for non-financial firms during the financial crisis.

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**Table 1. Summary statistics**

**Panel A: Firm Variables.**

*This table reports the mean, median and standard deviation of key firm characteristics. All variables are winsorized at the 1% / 99% percentile. Data come from 33.122 firms during the period from 1997 to 2007 (541.541 firm – bank – year observations).*

<b>Variable</b>	<b>Description</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>
ROA	Return on assets (%)	4,08	3,27	11,22
ROE	Return on equity (%)	11,64	9,11	52,65
EQTA	Equity to total assets (%)	37,31	33,07	26,6
ZSCORE	Altman´s 1968 Z-Score (measure of ex ante risk)	2,74	2,59	1,41

**Table 1. Summary statistics**

**Panel B: Bank Variables.**

*This table reports mean and median and standard derivation of key bank variables for 43 Spanish banks covering the period from 1997 to 2010. We not consider credit cooperatives since their market share in the Spanish banking sector is very small (less than 5% of total assets).*

Variable	Description	Mean	Median	Standard Deviation
ROA	Return on assets (%)	0,832%	0,810%	0,37%
ROE	Return on equity (%)	11,880%	11,650%	47,59%
EQTA	Equity to assets (%)	6,815%	7,100%	1,79%
BANK LOANS	Total loans on total assets (%)	65,910%	67,660%	12,07%
BANK LOAN LOSS PROVISION	Loan Loss provision on total loans (%)	0,446%	0,440%	0,24%
BANKS NONPERFORMING LOANS	Nonperforming loans on total loans (%)	1,264%	0,979%	0,84%
BANK DEPTA	Deposits on total assets (%)	67,666%	65,910%	14,24%

**Table 2. Estimating the degree of timeliness in loan loss recognition for the Spanish banking industry**

*This table reports the estimation results of two regression models of loan loss provisions on past, current and future increases in non-performing loans. Data comes from 51 banks and cover the period from 1997 – 2007.  $LLP_t$  denotes loan loss provision in quarter  $t$  divided by lagged total loans.  $\Delta NPL_{t-1}$ ,  $\Delta NPL_t$ ,  $\Delta NPL_{t+1}$  refer to past, current and future changes in nonperforming loans divided by lagged total loans. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.*

Dep. Var.:	Provisions					
	Regression I			Regression II		
	Coefficient	T - Stat.	Sig.	Coefficient	T - Stat.	Sig.
$NPL_{t-1}$	0,0646	25,2181	***	0,0519603	19,7707	***
$NPL_t$				0,08015	17,92029	***
$NPL_{t+1}$				0,07219	19,9599	***
Adjusted $R^2$	0,08844			0,2088		



**TABLE 3: Banks' Capital Ratios and the Spanish Credit Crunch**

*This table reports estimation results of an OLS model for the increase in bank debt by borrowers. The main independent variables are the lenders' capital ratios before and after the burst of the construction bubble. This regression model includes a set control variables at the bank, firm and bank-firm level. Data comes from 382.677 firm - bank - year combinations for the period 1997 - 2009. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.*

Dep. Var.:	$\Delta$ Loan			
	Expected signs	Coefficients	p-value	Sig.
Z- Score	(+)	0,0437	0,000	***
Relations		-0,0025	0,000	***
Recession	(-)	-0,0396	0,000	***
Capital		-0,048	0,021	**
Capital x Recession	(+)	0,0908	0,110	**
Bank_Size		0,0019	0,031	**
Bank_Depta	(-)	-0,0112	0,140	**
BANK - FIRM Dummies		YES		
Number of observations		382.677		
Adjusted R <sup>2</sup>		0,0518		

Variable definition:

$\Delta$ Loan:	Annual increase in loans divided by total assets.
Z-score:	Altman Z-score for non-listed firms.
Relations:	Number of bank Relationships at the beginning of the year.
Recession:	An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.
Capital:	Capital Ratio at the beginning of the year, divided by 100.
Bank_Size:	Natural log of lagged total assets.
Bank_Depta:	Lagged total deposits divided by total loans.
Bank- Firm Fixed Effects:	Fixed effects for each bank-firm combination, which aim to control unobservable, constant and specific aspects.

**TABLE 4. Delay of loan loss recognition by lenders before the crisis and increase in bank loans by borrowers during the crisis.**

*This table reports regression results of an OLS model for the increase in borrowers' bank debt during the crisis. The main independent variables are the delay of loan loss recognition by banks before the crisis, a dichotomous variable, Recession, that equals one if year>2007 and zero otherwise, and the interaction between both variables. In addition, this regression model includes a set of control variables at bank, firm and bank - firm level. Data comes from 342.687 firm - bank - year combinations for the period 1997 - 2009. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.*

Dep. var.:	Δ Loan			
	Expected signs	Coefficients	p-value	Sig.
Z- Score	(+)	0,04383	0,000	***
Relations		-0,0025	0,000	***
Recession	(-)	-0,0531	0,000	***
Capital		-0,1801	0,000	***
Capital x Recession	(+)	0,3298	0,001	***
CAC x Capital		0,1045	0,152	
CAC x Recession	(+)	0,1325	0,073	*
CAC x Capital x Recession	(-)	- 0,2805	0,027	**
Bank_Size		0,0013	0,171	
Bank_Depta	(-)	-0,0965	0,082	*
BANK - FIRM Dummies		YES		
Number of observations		342.687		
Adjusted R <sup>2</sup>		0,0533		

## Variable Definitions

- $\Delta$  Loan: Annual increase in bank loans divided by total assets.
- Z-score: Altman Z-score for non-listed firms.
- Relations: Number of bank Relationships.
- Recession: An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.
- Capital: Capital Ratio
- CAC: An indicator variable equal to one for conservative banks and zero otherwise. Where the conservatism measure is the difference between adjusted  $R^2$  (II – I), from following two regression. The difference between adjusted  $R^2$  is greater than the median of the sample the non-financial firm is conservative and non-conservative otherwise

$$\text{Eq (I): } LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \varepsilon.$$

$$\text{Eq (II): } LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \alpha_2 \Delta NPL_t + \alpha_3 \Delta NPL_{t+1} + \varepsilon.$$

Where:

$LLP_t$  denotes loan loss provision in quarter  $t$  divided by lagged total loans.  $\Delta NPL_{t-1}$ ,  $\Delta NPL_t$ ,  $\Delta NPL_{t+1}$  refer to past, current and future changes in nonperforming loans divided by lagged total loans.

Bank\_Size: Natural log of lagged total assets.

Bank\_Depta: Lagged total deposits divided by total loans.

Bank- Firm Fixed Effects: Fixed effects for each bank-firm combination, aimed at controlling for unobservable, time invariant specific characteristics of banks, firms and the borrower-lender relationship.

**Table 5. Effects of delay in loan loss recognition by banks prior to the crisis on the borrowers' likelihood of bankruptcy**

This table reports estimation results of a logistic regression model whose dependent variable is BANKRUPT, a dummy variable which equals to one if non-financial firms fill for bankruptcy during the crisis and zero otherwise. The main independent variables are CAC, bank capital ratio and the interaction between both variables. Control variables are included as arithmetic means for the period 1997-2009. *Data comes from 147.471 firm - bank combinations for the period 1997 – 2009.* The estimated standard errors are robust to heteroskedasticity and bank clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.

Dep. var.:		Bankrupt		
	Expected signs	Coefficients	p-value	Sig.
Z- Score	(-)	-0,7153	0,000	***
Relations		0,2587	0,000	***
Consti	(+)	0,0025	0,009	***
Firm_Size	(-)	-0,1720	0,000	***
CAC	(-)	-0,6455	0,000	***
Capital		-1,2533	0,324	
CAC x Capital	(+)	6,9761	0,000	***
Bank_Depta		0,2700	0,358	
Bank_Loans		1,2487	0,000	***
INDUSTRY Dummies		YES		
Number of observations		147.741		
Adjusted R <sup>2</sup>		0,0981		

## Variable Definitions

Bankrupt:	An indicator variable equal to one if firm went bankrupt and zero otherwise.
Z-Score:	Average Z-score for non-listed firms
Relations:	Average bank relations. Bank Relations by firm.
Consti:	Date of incorporation.
Firm_Size:	Average of the natural log of total assets.
CAC:	CAC is an indicator variable equal to one for conservative banks and zero otherwise.
Capital:	Average Capital Ratio.
Bank_Depta:	Average of total deposits divided by total loans.
Bank_Loans:	Average of total loans divided by total assets.
Industry:	Industry Dummies.

**Table 6. Banks' Capital Ratio and the Spanish Credit Crunch  
Saving Banks vs. Commercial Banks**

*This table reports estimation results of an OLS model for the increase in bank debt by borrowers. The main independent variables are the lenders' capital ratios before and after the burst of the construction bubble. This regression model includes a set control variables at the bank, firm and bank-firm level. Data comes from 283.827 firm – commercial bank - year combinations and 98.850 firm – saving banks – year combinations for the period 1997 – 2009. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.*

Dep. var.:		Δ Loan					
		Savings Banks			Commercial Banks		
	Expected signs	Coefficients	p-value	Sig.	Coefficients	p-value	Sig.
Z- Score	(+)	0,0478	0,000	***	0,0422	0,000	***
Relations		-0,0043	0,000	***	-0,002	0,000	***
Recession	(-)	0,0538	0,000	***	-0,0366	0,000	***
Capital		-0,0768	0,137		-0,0544	0,019	**
Capital x Recession	(+)	0,2894	0,000	***	0,03804	0,355	
Bank_Size		0,0056	0,015	**	0,0013	0,182	
Bank_Depta	(-)	-0,0076	0,467		-0,0107	0,037	**
BANK – FIRM Dummies		YES			YES		
Number of observations		98.850			283.827		
Adjusted R <sup>2</sup>		0,0516			0,0521		

Variable definition:

$\Delta$ Loan:	Annual increase in loans divided by total assets.
Z-score:	Altman Z-score for non-listed firms.
Relations:	Number of bank Relationships at the beginning of the year.
Recession:	An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.
Capital:	Capital Ratio at the beginning of the year, divided by 100.
Bank_Size:	Natural log of lagged total assets.
Bank_Depta:	Lagged total deposits divided by total loans.
Bank- Firm Fixed Effects:	Fixed effects for each bank-firm combination, which aim to control unobservable, constant and specific aspects.

**TABLE 7. Delay of loan loss recognition by lenders before the crisis and increase in bank loans by borrowers during the crisis.  
Saving Banks vs. Commercial Banks.**

*This table reports regression results of an OLS model for the increase in borrowers' bank debt during the crisis. The main independent variables are the delay of loan loss recognition by banks before the crisis, a dichotomous variable, Recession, that equals one if year>2007 and zero otherwise, and the interaction between both variables. In addition, this regression model includes a set of control variables at bank, firm and bank - firm level. Data comes from 247.424 firm-commercial bank- year combinations and 95.264 firm-savings bank- year combinations for the period 1997 - 2009. The estimated standard errors are robust to heteroskedasticity and bank-firm clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.*

Dep. var.:	Δ Loan						
	Expected signs	Savings Banks			Commercial Banks		
		Coefficients	p-value	Sig.	Coefficients	p-value	Sig.
Z- Score	(+)	0,0478	0,000	***	0,0424	0,000	***
Relations		-0,0043	0,000	***	-0,002	0,000	***
Recession	(-)	-0,0653	0,000	***	-0,0453	0,000	***
Capital		-0,093	0,149		-0,2451	0,000	***
Capital x Recession	(+)	0,5042	0,001	***	0,1875	0,283	
CAC x Capital		-0,1449	0,264		0,2005	0,028	**
CAC x Recession	(+)	0,0026	0,835		0,0329	0,007	***
CAC x Capital x Recession	(-)	-0,1569	0,385		-0,6169	0,006	***
Bank_Size		0,0054	0,019	**	0,0003	0,791	
Bank_Depta	(-)	-0,0066	0,532		-0,0101	0,171	
BANK - FIRM Dummies		YES			YES		
Number of observations		95.267			247.424		
Adjusted R		0,0518			0,0542		



## Variable Definitions

- $\Delta$  Loan: Annual increase in bank loans divided by total assets.
- Z-score: Altman Z-score for non-listed firms.
- Relations: Number of bank Relationships.
- Recession: An indicator variable equal to one for subsequent periods to 2007, and zero otherwise.
- Capital: Capital Ratio
- CAC: An indicator variable equal to one for conservative banks and zero otherwise. Where the conservatism measure is the difference between adjusted  $R^2$  (II – I), from following two regression. The difference between adjusted  $R^2$  is greater than the median of the sample the non-financial firm is conservative and non-conservative otherwise

$$\text{Eq (I): } LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \varepsilon.$$

$$\text{Eq (II): } LLP_t = \alpha_0 + \alpha_1 \Delta NPL_{t-1} + \alpha_2 \Delta NPL_t + \alpha_3 \Delta NPL_{t+1} + \varepsilon.$$

Where:

$LLP_t$  denotes loan loss provision in quarter  $t$  divided by lagged total loans.  $\Delta NPL_{t-1}$ ,  $\Delta NPL_t$  and  $\Delta NPL_{t+1}$  refer to past, current and future changes in nonperforming loans divided by lagged total loans.

Bank\_Size: Natural log of lagged total assets.

Bank\_Depta: Lagged total deposits divided by total loans.

Bank- Firm Fixed Effects: Fixed effects for each bank-firm combination, aimed at controlling for unobservable, time invariant specific characteristics of banks, firms and the borrower-lender relationship.

**TABLE 8. Effects of delay in loan loss recognition by banks prior to the crisis on the borrowers' likelihood of bankruptcy**

**Saving Banks vs. Commercial Banks**

This table reports estimation results of a logistic regression model whose dependent variable is BANKRUPT, a dummy variable which equals to one if non-financial firms fill for bankruptcy during the crisis and zero otherwise. The main independent variables are CAC, bank capital ratio and the interaction between both variables. Control variables are included as arithmetic means for the period 1997-2009. *Data comes from 98.441 firm-commercial bank combinations and 42.688 firm-saving bank combinations for the period 1997 – 2009.* The estimated standard errors are robust to heteroskedasticity and bank clustering effects. \*\*\*, \*\* and \* denote statistical significance at 1%, 5% and 10% level, respectively.

Dep. var.:	BANKRUPT						
		Savings Banks			Commercial Banks		
	Expected signs	Coefficients	p-value	Sig.	Coefficients	p-value	Sig.
Z- Score	(-)	-0,6560	0,000	***	-0,7478	0,000	***
Relations		0,2667	0,000	***	0,2454	0,000	***
Consti	(+)	0,0045	0,057	**	0,0021	0,064	*
Firm_Size	(-)	-0,1378	0,000	***	-0,1833	0,000	***
CAC	(-)	-0,2775	0,234		-0,8913	0,000	***
Capital		-1,4878	0,513		-0,3268	0,384	
CAC x Capital	(+)	0,2957	0,428		10,7943	0,001	***
Bank_Loans		1,4510	0,005	***	1,0721	0,001	***
Bank_Depta	(-)	-0,5728	0,246		-0,0865	0,825	
BANK - FIRM Dummies			YES			YES	
INDUSTRIE Dummies			YES			YES	
Number of observations			42.688			98.441	
Adjusted R <sup>2</sup>			0,0965			0,10	

## Variable Definitions

Bankrupt:	An indicator variable equal to one if firm went bankrupt and zero otherwise.
Z-Score:	Average Z-score for non-listed firms
Relations:	Average bank relations. Bank Relations by firm.
Consti:	Date of incorporation.
Firm_Size:	Average of the natural log of total assets.
CAC:	CAC is an indicator variable equal to one for conservative banks and zero otherwise.
Capital:	Average Capital Ratio.
Bank_Depta:	Average of total deposits divided by total loans.
Bank_Loans:	Average of total loans divided by total assets.
Industry:	Industry Dummies.