

# **Bank restructuring and concentration: credit quantity or quality?**

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**Abstract:** The restructuring of a banking sector is a common outcome of financial crises. In this paper, we analyse the medium-to-long term quantitative and qualitative effects of changes in a bank market structure on bank lending. In particular, we examine the impact of the restructuring of the Spanish banking sector on both credit growth and credit quality between 2009 and 2013. Our findings suggest that bank market concentration and loan supply have a U-shaped relationship with loan growth declining following a slow growth in the HHI and increasing where the HHI growth accelerates. We also find that high HHI growth may reduce the non-performing loan ratio. Our projection exercises predict that credit growth will be lower in the medium-and-long term than in the years prior to the crisis but credit quality will improve.

**JEL:** G21, H12.

**Keywords:** bank restructuring, lending, concentration, crisis.

## **1. Introduction**

During the last three decades there have been several studies trying to determine if a certain structure for the financial system –concerning intermediaries, markets and instruments- could stimulate economic growth (Rajan y Zingales, 1998; Boot and Thakor, 2000; Berger et al., 2004). One of the main topics is the analysis of the relationship between the bank market structure and the availability of credit. However, there are no conclusive results on this relationship. In the context of the financial crisis and in other scenarios characterized by the scarcity of bank funding, the relationship between market power –and, in general, a bank market structure- and credit availability become has frequently become a relevant policy debate. One way of looking at this problem is analysing bank competition policy. However, given the systemic nature of the banking sector, the policy scrutiny on the impact of bank market structure on credit availability has been frequently undermined by financial stability issues. It is a common feature that competition policy becomes a second-order concern when financial instability issues are in play. One prominent example is the restructuring of the banking industry that takes place in many countries as a response to a financial crisis whereby solvency and systemic risk issues are the main goal. After a transition, the post-crisis period will leave such banking industry with a new market structure whose effects on the availability of credit may be different to the pre-crisis period.

Most of the extant literature has focused on two issues. One of them is the relationship between bank lending and financial stability, which focus on the impact of loan growth on loan quality. The other one is the analysis of the effects of changes in bank concentration on credit availability. In the event of a banking crisis, the first set of studies can be considered as an *ex-ante* observation of the extent to which a given

market structure affects financial stability. The second set of studies can be seen as a way of examining how changes in the structure of the industry -as an *ex-post* response to the crisis- affect the financing conditions of households and firms. In this paper, we aim to take one step forward and analyse the medium-to-long term quantitative and qualitative effects of changes in a bank market structure on bank lending. In particular, we examine the impact of a restructuring of a banking sector on both credit growth and credit quality. We take the Spanish case between 2009 and 2013, a period characterized by an intense process of bank restructuring and a significant increase in concentration.

The paper is structure as follows: section 2 following this introduction studies the main previous contributions on bank market structure, credit availability and credit quality. The hypotheses and empirical methodology are explained in section 3. Section 4 presents the baseline results while section 5 offers an assessment of the potential impact of the restructuring process on credit growth and credit quality. The paper ends of section 6 with the main conclusions.

## **2. Bank market structure, credit quantity and credit quality: a background**

### **2.1. Market structure and credit availability**

As for the studies on the relationship between bank market structure and credit availability, the most traditional perspective –in line with standard Industrial Organization studies- is the “market power perspective” which suggests that competition and credit availability are positively and significantly related. Hence, according to this view, credit availability is lower and/or more expensive in markets where competition is low.

An alternative view has emerged over the last 15 years that argues that the impact of competition on credit may be related to the level of asymmetric information in the market (Petersen and Rajan, 1995; Dell’Ariccia and Marquez, 2005). In particular, this information hypothesis argues that competitive banking markets can weaken relationship-building by depriving banks of the incentive to invest in soft information. Therefore, according to this perspective, less competitive markets may be associated with more credit availability.

The existing literature has also argued that a high degree of bank concentration (as measured for example by the market share of the largest financial institutions) tends to have a negative impact on the efficiency of financial intermediation. Banks with greater market power can exploit their position to charge higher interest rates (Boyd and De Nicoló, 2005) and large banks in highly concentrated banking systems are more likely to benefit from implicit government guarantees that may distort market incentives. These incentives are particularly relevant in a context of a policy-induced bank restructuring, as we examine in this paper.

## **2.2. Does concentration mean market power?**

One fundamental caveat in analysing and comparing studies on the relationship between bank market structure and credit availability is the measurement of competition. There is usually an identification of concentration and competition as equivalents. However, this analogy is far from rigorous. Claessens and Laeven (2005), show that changes such as deregulation and technical innovation have made defining financial markets and services more problematic and may have rendered concentration only relatively valuable as an indicator of market power.

Another problem is how to measure bank competition. The industrial organization literature has argued theoretically and empirically that the Lerner index (the difference between price and marginal cost divided by the price) and other structural competition measures are superior to concentration as measures of market power as suggested, *inter alia*, by Connor and Peterson (1992), Berger (1995), Aghion et al. (1996), Rhoades (1995) Borenstein and Bushnell, (1999), Dell’Ariccia (2001), Beck et al. (2004) o Carbó et al., (2009).

The relationship between bank market power and concentration and their effects on credit availability may also depend on the business cycle. For example, if concentration is “too low” it is possible that there is more competition intensity during the upturns as banks will be seeking to increase their market share and may take onto more risk. However, these banks will be those particularly affected by non-performing loans during recessions and the industry will then turn to be more concentrated and lending will tend to be lower.

Another reason that explains why the link between bank concentration and financial stability is weak is the recent evolution of the supply of financial services. Progress in information technology increased the availability of “hard” (quantifiable, verifiable) information on borrowers, particularly in advanced economies. This reduced the grip that banks had over their customers thanks to “soft” (proprietary) information accumulated in existing bank-customer relationships. As a result, today, banks in advanced economies may act competitively even when market structure is highly

concentrated. High competition means low profits and structurally (permanently) high incentives to take risk.

Another reason might be that competition in the provision in financial services has become more international and cross-sectoral. The last decades saw significant international expansion of banks. This makes the structure of domestic banking industry just one factor in defining the competitive environment. Some international studies have also shown that the relationship between a bank market structure (measured by concentration or other indicators) is also strongly dependent on local market conditions (Demirguc-Kunt *et al.*, 2004; Claessens and Laeven, 2005).

### **2.3. Competition policy and changes in industry structure**

The intermediate level of bank competition may be achieved by policies that focus on market structure:

- Entry/exit rules (for domestic and foreign banks);
- Consolidation policy (which may be particularly relevant around crises, when authorities can direct bank mergers; see Perotti and Suarez, 2003); and
- Restrictions on activities (non-lending activities of banks, and bank-like activities of non-banks such as insurance companies).

This relationship may be also affected by policies that affect contestability in banking services (competition given market structure):

- Establishing credit registries;
- Providing equal access to infrastructure, such as payment systems; and

- Other measures that enable easier switching of banks by customers.

Some papers suggest that the relationship between competition/concentration and credit availability depend on the lending technology. This makes so-called relationship lending also a key issue here (Zarutskie, 2003; Hyytinen and Toivanen, 2004; Bonaccorsi di Patti and Dell'Ariccia, 2004; or Degryse and Ongena, 2007).

#### **2.4. Concentration and credit quality**

The theoretical predictions and empirical results on the link between bank competition, risk-taking, and stability are somewhat ambiguous. Much of the theoretical literature warns that competition may increase bank risk-taking and lead to excessive credit supply. Competition lowers margins and charter value of banks, making them more willing to take risk (Chan *et al.*, 1986; Keeley, 1990; Hellman *et al.*, 2000; Matutes and Vives, 2000; Repullo, 2004). Another channel is that competition may force banks to focus on maintaining market share instead of screening existing borrowers (Dell'Ariccia and Marquez, 2006). Following this line of reasoning, some theoretical studies also suggest greater bank competition may weaken screening incentives (Boot and Thakor, 1993) and can lead to excessive risk-taking (Allen and Gale, 2000).

Yet some papers also highlight opposite effects where bank competition lowers interest rates in the economy, making borrowers safer and reducing risk (Boyd and De Nicolò, 2005). The effects can be reconciled in models that show an inverse U-shaped relationship between bank competition and stability. There, introducing competition in monopolistic systems initially increases stability as borrowers become safer, but high

competition becomes destabilizing due to the charter value effect (Martinez-Miera and Repullo, 2010). Keen *et al.* (2013) empirically examine this issue and show that some of these relationships are simply non-linear. In particular, the evidence is consistent with some inverse U-shaped relationship between concentration—a measure of market structure—and performance of banks during the crisis. This is driven primarily by positions of Canada and Australia, the countries least affected by the crisis. Yet the robustness of this relationship is unclear since banks from countries with similar bank concentration were vastly differently affected by the crisis (compare Canada, France, and Ireland). Other factors—notably non-core exposures funded in wholesale markets (e.g., in Germany and U.K.) along with high leverage (e.g., in Ireland or Germany)—have certainly played a larger role in explaining bank performance. The empirical literature also offers ample evidence that too much bank competition may reduce stability. (In the papers, competition is measured through margins or concentration, and stability is captured as loan quality or probability of failure; see Keeley, 1990; Dick, 2006; Jimenez *et al.*, 2007; Beck *et al.*, 2006a and 2006b). There is evidence that competition distorted credit quality also during the recent crisis (Dell’Ariccia *et al.*, 2012). Interestingly, some papers show that the stability effects of lower competition stem not from charter values, but from diversification benefits in large banks (Benston *et al.*, 1995; Beck *et al.*, 2006a and 2006b).

However, as theory predicts, too little competition may compromise bank stability. This is predominantly driven by distortions in large banks. As banks get larger and more diversified, they may increase the risks of their portfolios, or strategically choose to operate at a closer distance to default (Chong, 1991; De Nicolo, 2000). Larger banks also become subject to internal inefficiencies and increased operational risk



(Beck et al., 2006a; Cetorelli et al., 2007).<sup>82</sup> Taken together, the two effects may—similar to the theoretical predictions—lead to an inverse U-shaped effect of bank competition on

Beyond the ambiguous effect of risk, higher competition is beneficial—in the static sense—as it lowers costs and increases access to finance, benefitting most firms (especially financially dependent ones, see Petersen and Rajan, 1995) and households. But there are two caveats. First, competition may make banking services more arm’s length and hence disadvantage information-sensitive borrowers (Berger et al., 2004; Carow et al., 2004). Second, when banks do not have good knowledge of customers, they may restrict credit during downturns (Petersen and Rajan, 1994; Bae et al., 2002; Bolton et al., 2012), increasing procyclicality.

Institutional and market design features are also relevant for credit availability and quality. Demirgüç-Kunt et al (2013) show that the size of both banks and securities markets increases relative to the size of the economy, and that the association between an increase in economic output and an increase in bank development becomes smaller. However, they show that the association between an increase in economic output and an increase in securities market development becomes larger. Similarly, Bremus and Buch (2013), suggest that financial openness may affect GDP growth in and of itself, and it may also influence concentration in banking and thus the impact of bank-specific shocks for the aggregate economy.

Finally, Bruhn et al (2013) suggest that countries with lower entry barriers into the banking market (that is, a greater threat of competition) are less likely to have a

credit bureau, presumably because banks are less willing to share proprietary information when the threat of market entry is high. The evidence suggests that credit quality is not always guaranteed when there is market concentration, in particular if there are no solid institutional arrangements (supervision, regulation,...).

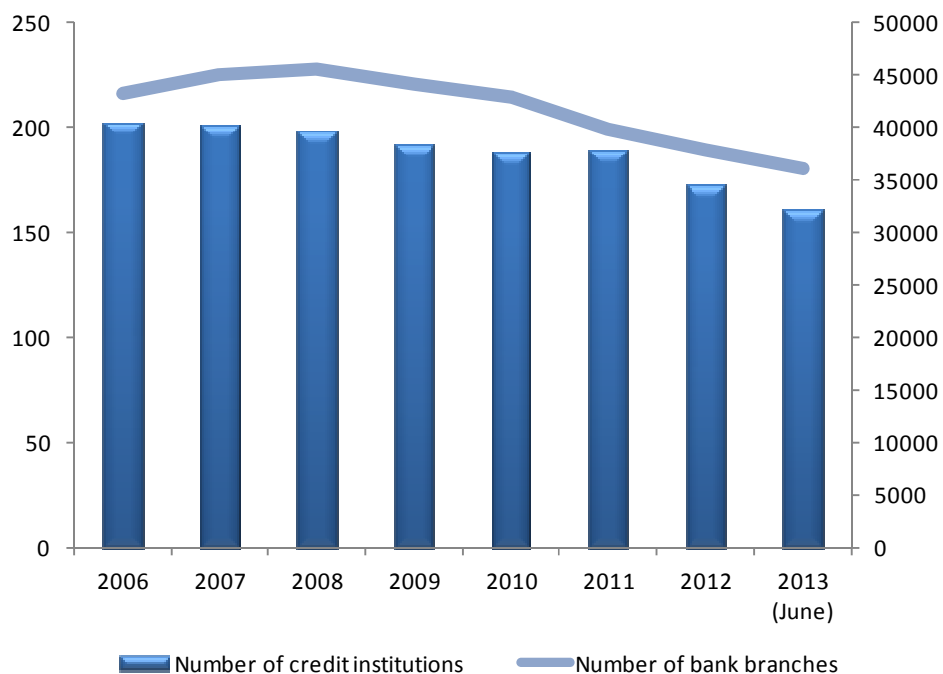
### **3. Hypotheses, data and methodology**

#### **3.1. A snapshot on the restructuring process of the Spanish banking sector (2009-2013)**

As our empirical aims and methodology are applied to the case of the bank restructuring in Spain, we briefly discuss the main outcomes of this process that we cover from 2009 to mid-2013. Before describing the institutional and policy features, we show some general effects of the restructuring of the sector. In particular, from 2009 to 2013 the number of credit institutions fell from 192 to 160 (see Figure 1). If we concentrate on the most relevant players, the reduction in the number of market participants is even more obvious. In particular, there were 45 savings banks in Spain in 2009, controlling around 50% of the retail market (taking deposits as a reference) and in June 2013 there are only 12 savings banks' groups.

As for the number of bank branches, they have fallen from 44,085 in 2009 to 36,115 in June 2013, an accumulated decrease of 13.1%.

**Figure 1. Number of credit institutions and bank branches in Spain (2006-2013)**



Source: Bank of Spain and own elaboration

Regarding restructuring policy<sup>1</sup> the starting point is the constitution of the Fund for Orderly Bank Restructuring (in Spanish, FROB). The FROB was created to manage the restructuring and resolution processes of credit institutions and assist in the enhancement of their solvency position (Royal Decree-law 9/2009). The FROB, in coordination with the Bank of Spain, has been leading the restructuring process and, as noted above, the actions concentrated mostly (although not exclusively) on savings banks. Out of 45 savings banks, 43 participated in a consolidation process. The average size of the 45 institutions was 29.44 billion Euros and in 2013 there were only 12 institutions average total assets of 90.83 billion Euros.

<sup>1</sup> This section provides necessarily a brief summary of policy actions. A broader and more complete picture is provided in a specific webpage of the Bank of Spain: <http://www.bde.es/bde/en/secciones/prensa/infointeres/reestructuracion/>

Royal Decree-law 11/2010 is also important in terms of restructuring outcomes. This law introduced new corporate formulas for savings banks, by allowing them to indirectly exercise their financial activity through a commercial bank and to keep their original social aims as 'Special Character' Foundations. This law also introduced improvements in corporate governance of the savings banks such as setting a reduced weight of public authorities' representation and the professionalization of the members of governing bodies.

Some capital reinforcement actions also accompanied. In particular, Royal Decree-law 2/2011 increased capital requirements, being 10% for those groups or entities which have a percentage of wholesale funding in excess of 20% and have not allocated at least 20% of their capital to third party investors. Similarly, Royal Decree-law 2/2012, established a clean-up plan that included capital requirements and additional provisions to cover the deterioration in bank balance sheets caused by the assets at risk related to the property development business. Additionally, Law 8/2012 required higher provisions for performing assets associated to land for property development, construction or real estate business. This law also established that foreclosed real estate assets are separated through their mandatory transfer to and Management Company for the Assets coming from the Financial Restructuring Process (SAREB).

The restructuring process had a final and key step in the subscription of a Financial Assistance Program by the EU for Spanish Banks. The Memorandum of Understanding for such program was signed in July 2012 and included plans for restructuring or resolution, burden sharing, segregation of damaged assets to SAREB

and some so-called “horizontal conditions” such new information requirements or a Common Equity Tier 1 of 9%. This program acknowledges that “mergers allow the problem of excess capacity in the sector to be tackled.”

### **3.2. Hypotheses and data**

Following our main goal of examining the effects of bank restructuring in Spain on loan quantity and quality, and the main theoretical predictions from previous studies we formulate the following two empirical hypotheses:

*Hypothesis 1:* the relationship between concentration and loan quantity is non-linear. It is expected to be negative for low levels of concentration and may become positive for higher levels of concentration following the restructuring of a banking sector after a crisis.

*Hypothesis 2:* the relationship between concentration and credit quality is positive in the aftermath of bank restructuring.

We use an (unbalanced) sample of Spanish commercial and savings banks from the first quarter of 1995 to the second quarter of 2013. We use quarterly data from public accounting statements published by the Spanish Banking Association (AEB) and the Association of Savings Banks and Related Banking Institutions (Cecabank) while some securitization information is obtained from the annual audited reports published by the individual banks. Macro and market indicators are obtained from the Spanish Statistical Office (INE) and the Bank of Spain and computed as a regional weighted

average of the markets in which the banks operate (using the distribution of branches as a weighting factor). The total number of bank-year observations is 2,968.

### 3.3. Empirical approach

A fundamental identification issue in our empirical approach is that hypotheses 1 and 2 need to be estimated jointly. This is simply because a relationship between bank market concentration and credit quality can be only correctly identified if the relationship between concentration and credit quantity is controlled for. In order to meet this requirement, we estimate a two-equation model to study relationships between market concentration and credit availability and quality jointly. The estimation consists of two reduced-form equations of loan-growth of the bank, and the performance of the loan portfolio of that bank:

$$\begin{aligned} \text{Loan growth}_{i,t} = \\ f(\text{loan growth}_{i,t-1}, \text{bank conditions}_{i,t}, \text{market fundamentals}_{i,t}) \end{aligned} \quad (1)$$

$$\begin{aligned} \text{NPL ratio}_{i,t} = \\ f(\text{NPL ratio}_{i,t-1}, \text{loan growth}_{i,t-1}, \text{bank conditions}_{i,t}, \text{market fundamentals}_{i,t}) \end{aligned} \quad (2)$$

All variables are expressed at the bank-level. In equation 1, the loan growth in period  $t$  of the bank  $i$  is explained by the one-quarter lagged loan growth of that bank (since we expect current loan supply to be affected by lagged loan supply), a vector of other bank characteristics and a vector market fundamentals. The vector of bank conditions includes the solvency ratio at the beginning of the quarter (*Equity/Total assets*), size (log of total assets), observed deposit funding at the beginning of the quarter (*Deposits/total liabilities*), the volume of securitization (value of the reported

securitized assets) of the same bank in the last four quarters (*Securitization*), an indicator of market power (*Lerner index*), the efficiency ratio (*Cost/income ratio*) a measure of customer service expansion in the last two years (*Branch growth*), the number of competitors in the market where the bank operates (*Number of competitors*) and an indicator of observed cash-flow generation at the beginning of the quarter (*RoE*). In principle, loans are expected to grow with observed solvency, deposit funding, securitization and cash-flow. We also hypothesize that higher competition (lower Lerner index) may foster risk-taking by banks and accelerate loan growth. Additionally, an increase in the efficiency ratio (higher costs) may reduce loan supply. As for the market and macro fundamentals in equation (1), we include the 1-year euribor rate (*1-year Euribor rate*) as a proxy for market funding costs, GDP growth (*GDPG*) and lagged housing prices (*Real housing prices growth*).

As for equation (2), the ratio of non-performing loans over total assets in period  $t$  of bank  $i$  that issues the security  $i$  (*Non-performing loans ratio*) is explained by lagged non-performing loans (*Non-performing loans ratio*) – since we also expect loan performance to be explained by past performance – a vector of bank conditions and market fundamentals. In equation (2) the vector of bank conditions includes loan growth one year before, two years before and four years before, in order to estimate how is loan quality affected by previous loan growth. It also includes market power (*Lerner index*), the efficiency ratio (*Cost/income ratio*), a measure of customer service expansion in the last two years (*Branch growth*), the number of competitors in the market where the bank operates (*Number of competitors*), and the indicator of observed cash-flow generation at the beginning of the quarter (*RoE*). The lagged ratio of loan-loss provisions (*Ratio of provisions on loan losses*) is also included as an *ex-ante* indicator of bank loan

performance. As for market and macroeconomic controls in equation (2), we include the unemployment rate (*Unemployment*) and lagged housing prices (*Real housing prices growth*).

The descriptive statistics for the main posited variables are explained in Table 1.

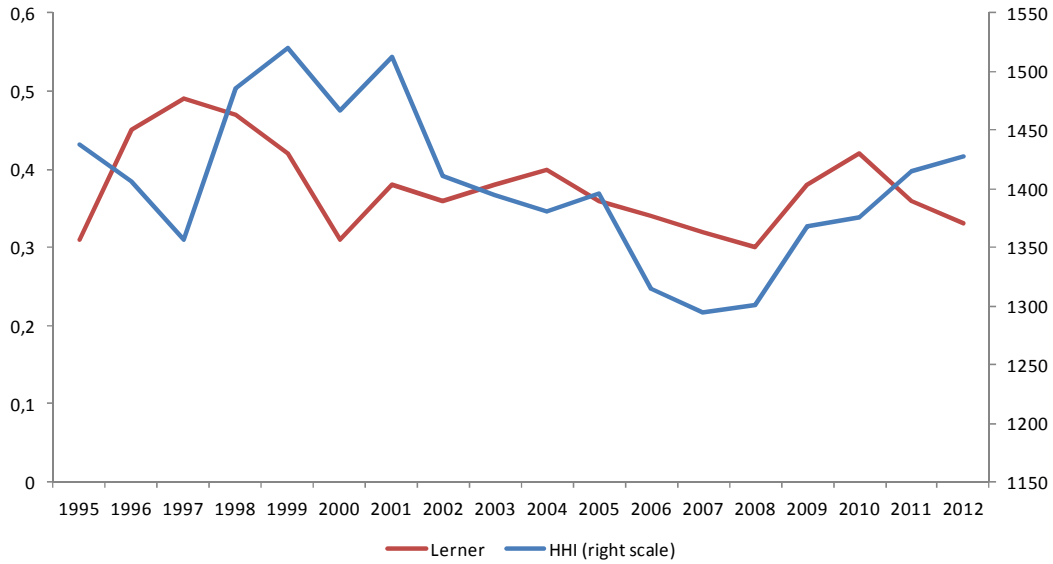
**Table 1. Descriptive statistics for the variables of the empirical analysis**

	<b>Mean</b>	<b>Std. Dev.</b>
<i>Loan growth</i>	0.09	0.04
<i>Equity/Total assets</i>	0.05	0.03
<i>Size (logTA)</i>	8.71	2.28
<i>Deposits/total liabilities</i>	43.4	15.3
<i>Securitization (log total volume)</i>	1.48	0.43
<i>HHI<sub>it</sub></i>	0.133	0.08
<i>Cost/income ratio</i>	0.43	0.19
<i>Branch growth</i>	0.07	0.03
<i>Number of competitors</i>	19.3	5.4
<i>RoE</i>	0.123	0.031
<i>GDPG</i>	0.021	0.017
<i>Unemployment</i>	0.181	0.027
<i>Real housing prices growth</i>	0.009	0.003

As the relationship between market power and concentration is one of our main focal points in the analysis, it is important to note that the Lerner index is computed at the bank-level as the difference between the price of total assets interest and non-interest income/total assets) and their estimated marginal costs, divided by the price of total assets. Marginal costs are estimated using a translog cost function of total bank costs including one output (total assets) and three inputs (deposits, labor and physical capital). The relationship between the concentration indicator (HHI) and the Lerner index is shown in Figure 2. In line with theoretical predictions, there is no clear correlation between both indicators suggesting that the information content of both variables as indicators of contestability and market structure is simply different.



**Figure 2. Descriptive evidence on the evolution of the HHI and the Lerner index before and after the restructuring process**



Two main caveats determine the selection of our estimation method. First, endogeneity is a potential concern in jointly estimating equations (1) and (2) since they relate to a similar set of potentially endogenous regressors such as bank profitability or efficiency to our main dependent variables. Secondly, cross-equation relationships are present. In particular, equations (1) and (2) impose some cross-equation restrictions since lagged loan growth affects loan performance. To obtain efficient estimates and address the issue of endogeneity and cross-equation restrictions we propose to estimate (1) and (2) jointly using a General-Method of Moments (GMM) approach with fixed effects and time dummies. The GMM estimation relies on a set of orthogonality conditions which are the products of equations and instruments. Initial conditions for estimation are obtained using three-stage least squares (3SLS), which is a restricted version of the simultaneous equation GMM model. Unlike the standard 3SLS, the GMM estimator allows for heteroskedasticity in addition to cross-equation correlation

when some variables appear both as exogenous and (lagged) endogenous variables in the different equations (Wooldrige, 2002). All variables (excepting size) are expressed as ratios or growth rates so that we can interpret the coefficient as marginal effects on those rates and ratios. Lagged values of these explanatory variables (i.e. variables lagged an additional period) are used as instruments. This treatment eliminates perhaps the most obvious source of endogeneity, but, as is well understood, it does not eliminate all such sources of endogeneity if errors are correlated over time. We include market-specific measures that control for those otherwise unobservable aspects of the change in markets over time, as it is the use of market fundamentals in our specification. Additionally, we have included measures of market population, population density, and regional unemployment rates (not reported) as instruments for loan growth and loan performance.

#### **4. Baseline results**

Our baseline results on the joint estimation of (1) and (2) are shown in Table 2. As for the determinants of loan growth in equation (1), previous loan growth, as expected, affects current loan growth positively and significantly. In particular, a 1% increase in lagged loan growth increases the current quarterly loan growth rate by 0.3%. Bank solvency is found to affect loan growth positively. In particular, a 1% increase in the ratio of equity to total assets leads to an estimated increase in the loan growth rate of 9.1%. Liquidity generation indicators are also found to affect loan growth positively. This is the case of the ratio “deposits/total liabilities” and the variables showing the volume of securitization at the bank where a 1% increase in these indicators is expected to augment the loan growth rate by 6.7% and 9.1%, respectively.

One of the focal variables in the analysis, the concentration indicator HHI, is only found to affect loan growth significantly and positively for high values as the coefficients of “HHI” is not significant but the coefficient of “Squared HHI” is positive and significant. In any event, the potential increase of a high growth of HHI on loan supply is limited as our estimation suggests that a 1% increase in “Squared HHI” would increase the loan growth rate by 0.8%. When the relationship between market power and loan growth is examined, we find that a 1% increase in the Lerner index (higher market power) is expected to reduce the loan growth rate by 2.3%.

Amongst the contestability and bank performance indicators, an increase in branch growth and in the number of competitors, as well as on bank profitability (RoE) is found to have a positive and significant effect in loan growth. GDP and real house price growth also have a positive and significant impact on loan growth, as expected. The last column in Table 2 shows the estimated coefficients for equation 2, where the dependent variable is the non-performing loan ratio (NPL). Lagged-loan growth is shown to have a positive and significant effect on NPL, which seems to be larger the longer and larger is loan growth. In particular, a 1% increase in the “Squared loan growth” variable with two lags is expected to increase the NPL ratio by 2.8%. Other bank-level indicators such as solvency and size are expected to have a negative effect on the NPL ratio. As for concentration, we find that only high levels of the HHI have an impact on the NPL. In particular, a 1% increase in squared HHI is expected to reduce the NPL ratio by 1.3%. Other bank performance and market contestability indicators are also found to have a significant impact on the NPL ratio as inefficiency and branch growth (positively) or profitability (negatively). As expected, the unemployment rate is found to have a positive and large impact on the NPL ratio.

**Table 2. Loan growth and loan quality (1995-2013). GMM simultaneous estimation with fixed effects (p-values in parentheses)**

	<i>Loan growth<sub>it</sub></i>	<i>Non-performing loans ratio<sub>ijt</sub></i>
<i>Loan growth<sub>it-1</sub></i>	0.003** (0.002)	-
<i>Loan growth<sub>it-2</sub></i>	-	0.028 (0.321)
<i>Squared loan growth<sub>it-1</sub></i>	-	0.009** (0.002)
<i>Squared loan growth<sub>it-2</sub></i>	-	0.028* (0.032)
<i>Equity/Total assets<sub>it-1</sub></i>	0.091** (0.001)	-0.024* (0.012)
<i>Size (logTA)<sub>it</sub></i>	0.014 (0.633)	-0.012* (0.048)
<i>Deposits/total liabilities<sub>it-1</sub></i>	0.067** (0.002)	- -
<i>Securitization<sub>it-1</sub></i>	0.091** (0.002)	- -
<i>HHI<sub>it</sub></i>	-0.012 (0.057)	-0.017 (0.076)
<i>Squared HHI<sub>it</sub></i>	0.008* (0.013)	-0.013* (0.031)
<i>Lerner<sub>t</sub></i>	-0.023** (0.001)	0.011 (0.003)
<i>Cost/income ratio<sub>it</sub></i>	-0.018 (0.234)	0.025* (0.020)
<i>Branch growth<sub>it-1</sub></i>	0.029* (0.031)	0.026** (0.008)
<i>Number of competitors<sub>it-1</sub></i>	0.019* (0.023)	0.013 (0.145)
<i>RoE<sub>it-1</sub></i>	0.013* (0.016)	-0.014* (0.040)
<i>GDPG<sub>it</sub></i>	0.085** (0.002)	-
<i>Unemployment<sub>it</sub></i>	-	0.057** (0.006)
<i>Real housing prices growth<sub>it-1</sub></i>	0.031** (0.004)	-
<i>Crisis dummy (1=2007-2012; 0 otherwise)</i>	-0.023* (0.016)	0.037** (0.06)
<i>Adjusted R2</i>	0.87	0.81
<i>Sargan test of overidentifying restrictions</i>		141.90 (0.001)
<b>Number of observations</b>		2,968

Overall, the baseline results suggest that common features of restructuring processes such as an increase in market concentration or a reduction in bank branches may potentially have a negative effect on loan growth while a positive effect on loan quality. It is also important to have in mind that macro indicators (as proxies for demand conditions) have a larger effect on average than bank restructuring in explaining credit quantity and quality.

### **5. An assessment of the potential impact of the restructuring process on credit growth and credit quality**

In order to examine the potential impact of the restructuring process on the availability of credit we estimate our model for a period of “normal” loan growth. We consider 1995-2002 as a period of “normal” loan growth given that loan growth rates increase substantially in Spain between 2003 and 2007 and this way we isolate the pre-crisis years and crisis years from our estimation. The main idea is to proceed with a second stage in which we can use the values of the bank-level variables during 2009Q1-2013Q2 and apply them to the estimated coefficients of HHI, loan growth and the rest of the parameters for the period 1995-2002. As for the macroeconomic variables for the simulation exercise we take the government projections for 2014 and 2015. This way we examine how the current banking structure after the restructuring process may affect loan growth and loan quality in 2014 and 2015.

Table 3 shows a selection of the main coefficients estimated for the 1995-2002 period. The results are in line with those of Table 2. It is important to note that the expected U-shaped relationship between market concentration and loan growth (our hypothesis 1) is clearly shown for this period with the HHI having a negative impact on

loan growth, while “Squared HHI” having a positive and significant impact. We also find again support for hypothesis 2 as the NPL ratio is found to be negatively and significantly affected by “Squared HHI” suggesting that a significant increase in concentration may have a positive impact on loan quality.

**Table 3. Loan growth and loan quality (1995-2002) GMM simultaneous estimation with fixed effects - Selected coefficients (p-values in parentheses)**

	<i>Loan growth<sub>it</sub></i>	<i>Non-performing loans ratio<sub>ijt</sub></i>
<i>Loan growth<sub>it-1</sub></i>	0.002**	-
	(0.002)	
<i>Loan growth<sub>it-2</sub></i>	-	0.023
		(0.261)
<i>Squared loan growth<sub>it-1</sub></i>	-	0.008**
		(0.002)
<i>Squared loan growth<sub>it-2</sub></i>	-	0.025*
		(0.028)
<i>Equity/Total assets<sub>it-1</sub></i>	0.072**	-0.021*
	(0.001)	(0.014)
<i>Size (logTA)<sub>it</sub></i>	0.011	-0.015*
	(0.588)	(0.041)
<i>Deposits/total liabilities<sub>it-1</sub></i>	0.051**	-
	(0.002)	-
<i>Securitization<sub>it-1</sub></i>	0.094**	-
	(0.001)	-
<i>HHI<sub>it</sub></i>	-0.010*	-0.014
	(0.046)	(0.051)
<i>Squared HHI<sub>it</sub></i>	0.011**	-0.016*
	(0.009)	(0.019)

Taking the estimated coefficients in Table 3 and applying the average values of the main variables over the period 2009Q1-2013Q2, we aim at projecting the impact of the bank restructuring during the crisis on loan growth and loan quality. Importantly, this exercise can be applied to the market structure and related bank variables but we need make assumptions beyond the restructuring period in what the macroeconomic indicators are concerned. In particular, we make projections for four potential scenarios: the first two scenarios correspond to 2014 and 2015 using the official government

projections for GDP and unemployment for these years. The other two scenarios are described as long-term scenarios. In one of them we assume GDP growth at 1.5% and unemployment at 20% and another one with GDP growth at 2% and unemployment at 15%. The results are shown in Table 4. The main conclusion is that if Spain follows the expected path, we will go to a situation where year-on-year credit growth will be lower than in the years prior to the crisis (and years prior to the boom) but credit quality will improve.

**Table 4. Projections for loan growth in Spain 2014-2015**

	<i>2014</i>	<i>2015</i>	<i>With a GDP growth of 1.5% and unemployment on 20%</i>	<i>With a GDP growth of 2.0% and unemployment on 15%</i>
<i>Year-on-year loan growth</i>	-0.5%	0.6%	4.6%	7%
<i>Non-performing loans ratio (year-on-year change)</i>	4.3%	-7.9%	-9.3%	-15.8%

## 6. Conclusions

A number of international studies have studied the relationship between bank market structure and loan quantity and quality in recent years. Most of these studies have focused on two relationships separately. Specifically, some research studies have analysed the relationship between market concentration and credit availability, while some others have paid attention to the relationship between market concentration and loan quality. We take both views together and examine the medium-to-long term quantitative and qualitative effects of changes in a bank market structure on bank lending. In particular, we study the impact of a restructuring of a banking sector on both credit growth and credit quality. We take the Spanish case between 2009 and 2013, a

period characterized by an intense process of bank restructuring and a significant increase in concentration.

By jointly estimating the determinants of loan growth and loan quality (non-performing loan ratio, NPL) we find that bank market concentration and loan supply have a U-shaped relationship with loan growth declining following a slow growth in the HHI and increasing where the HHI growth accelerates. We also find that high HHI growth may reduce the NPL ratio. Overall, a bank restructuring which increases concentration and reduce the number of branches and competitors may lead to lower loan growth rates but higher loan quality. The projection exercises made in this paper for Spain –assuming to the projected official macroeconomic scenarios- suggest that credit growth will be lower in the medium-and-long term than in the years prior to the crisis but credit quality will improve.



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