Why are (or were) Spanish banks so profitable?

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This version: May 10th, 2011

Abstract

This paper analyzes empirically the factors that determine the profitability of Spanish banks for the period of 1999-2009. The results obtained by applying the system-GMM estimator to a large sample of Spanish banks indicate that higher bank profitability during these years is associated with a larger percentage of loans in total assets, a higher proportion of customer deposits, better efficiency, and a lower credit risk. In addition, higher capital ratios also increase the bank's return, although this finding applies only when using return on assets (ROA) as the profitability measure. We find no evidence of either economies or diseconomies of scale or scope in the Spanish banking sector. On the other hand, all industry and macroeconomic determinants, with the exception of interest rate, affect bank profitability in the anticipated ways. Finally, our study reveals differences in the performance of commercial and savings banks.

JEL classification: G21; G32; L11.
Keywords: Bank profitability; Commercial banks; Savings banks; European banking system.

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1. Introduction

In the past decade, Spanish banks have been significantly more profitable than those of the European Union as a whole (see Figure 1). In addition to this superior performance, the Spanish banking sector is among the five most important in Europe in terms of both assets managed and numbers of credit institutions, branches, and employees (see Table 1), which makes it interesting to study.[1] Profitability is necessary for a bank to maintain ongoing activity and for its shareholders to obtain fair returns. However, it is also important for supervisors because it guarantees more flexible capital ratios, even in the context of a riskier business environment. This higher profitability does not appear to have been achieved at the expense of the soundness of the banking system, which was characterized by a good level of provisions during those years. The Bank of Spain, being aware of the cyclical nature of credit losses, introduced dynamic provisioning (also known as statistical or generic provisioning) in 2000. This system requires banks to build up loan loss reserves in good times to be drawn on in economic downturns as losses increase. Because of this, the Spanish banks had accumulated a significant buffer, in comparison with banks in other developed countries, to cover their incurred losses when the current economic crisis began and so most of them faced the first years of the economic crisis with good levels of solvency.

To better understand the underlying mechanisms of bank performance in Spain for research purposes, some background information is required. Spanish banks can be grouped into two main categories: commercial banks and savings banks —the so-called

[1] Spain has the largest number of bank branches per capita in Europe: approximately 11.6 per 10,000 inhabitants over 16 years of age. This high ratio is a differentiating characteristic of the Spanish banking system, which places high priority on geographic proximity to the customer. However, in recent years, many banks have reduced their numbers of offices as a result of the economic crisis given the high operating costs of maintaining such a large network. Even so, Spanish banks continue to lead the European rankings in this respect.

cajas—. The savings banks were created in the 19th century as non-profit entities with the object of promoting savings and combating usury for social welfare purposes. However, today, they conduct their activity in a similar way to the commercial banks, although they are subject to certain operating limits because they must devote part of their profits to social causes. In most cases, the governance of the savings banks remains in the hands of local public authorities; hence, a high proportion of these entities focus their activities in the region where they were created, although there is greater openness to regions other than the region of origin in recent years. By the end of 2009, commercial and savings banks accounted for 91.5% of the total credit granted to the resident private sector and 93.4% of deposits from this sector, being the savings banks' market share several percentage points higher than that of the commercial banks in terms of both loans (48.0% versus 43.5%) and deposits (52.8% versus 40.6%). However, although at the end of the year there were 47 domestic commercial banks and 45 savings banks in Spain; during 2010 the banking sector underwent a major restructuring process involving mainly the savings banks. Forty of them participated in some type of integration process, reducing their number dramatically (17 savings banks or groups of savings banks as compared to the 45 formerly existing institutions).[2]

There is an abundant literature on the determinants of bank profitability both in the USA and in Europe, as we will see in the following section. Despite this, given the present strategic importance of the Spanish banking system in Europe and because a number of years have passed since the most recent studies were conducted —e.g., Carbó Valverde et al., 2007, analyze data from the Spanish market in the 1994-2001 period— we believe it is appropriate to re-examine the bank profitability drivers in Spain. In this context, our paper complements the previous literature by analyzing the factors that

[2] See Appendix 1 for a brief description of this restructuring process.

have allowed the Spanish banking system to be among the most profitable of the European Union from the introduction of the Euro in 1999 up to 2009, two years after the start of the current financial crisis. To do this, we use the generalized method of moments (GMM) estimator developed for dynamic panel models by Arellano and Bover (1995) and Blundell and Bond (1998), also referred to as the system-GMM estimator, which has been used in recent studies on determinants of bank profitability (e.g., García-Herrero et al., 2009; Dietrich and Wanzenried, 2011)[3]; this econometric technique allows us to control for endogeneity and unobserved heterogeneity. On the other hand, we also investigate whether significant differences between the commercial banks and savings banks during this period can be observed that might explain the worse performance apparently demonstrated by the savings banks following the onset of the financial crisis in late 2007 —savings banks operate in almost all countries, although it is in Spain where they have become more relevant in the last decade.[4]

The paper is structured as follows. Section 2 reviews the most significant empirical studies and develops our research hypotheses. Section 3 describes the data and methodology employed in the empirical research and also defines the explanatory variables. Section 4 presents and discusses the results obtained. Section 5 summarizes and concludes.

2. Literature review and research hypotheses

According to previous studies, the factors determining the profitability of banks fall into two main groups. First, there is a group of determinants of profitability that are

[3] We also use simpler methodologies, such as ordinary least squares (OLS) and static fixed-effects panel data models, in the robustness checks.

[4] On a global scale, Spain is second only to Germany in terms of the volume of assets managed by the savings banks; in fact, if we consider this volume in relative terms as the proportion of total of assets administered by the entire banking system of the country, Spain ranks ahead of Germany (see World Savings Banks Institute (WSBI) Member Statistics 2009, available at http://www.wsbi.org).

specific to each bank and that, in many cases, are the direct result of managerial decisions (asset structure, asset quality, capitalization, financial structure, efficiency, size, and revenue diversification). The second group of determinants includes factors relating profitability to the industry structure and to the macroeconomic environment within which the banking system operates, such as industry concentration, economic growth, inflation, and interest rates.

2.1. Asset structure

Most of the banking literature agrees that a bank's profitability is expected to increase as its portfolio of loans grows in relation to other more secure assets (such as government securities), taking into account the known relationship between risk and return (the so-called risk-return trade-off). Despite the higher operating costs of holding a large portfolio of loans, bank profitability should increase with a higher ratio of loans to assets as long as interest rates on loans are liberalized and the bank applies mark-up pricing (García-Herrero et al., 2009). This greater relative proportion of loans in the portfolio of the bank is usually coupled with a greater liquidity risk arising from the inability of banks to accommodate decreases in liabilities or to fund increases on the assets side of the balance sheet; consequently, a bank holding a low proportion of liquid assets (with greater liquidity risk) is more likely to earn high profits. Among the studies that report a direct relationship between relative percentage of loans in bank assets and profitability —or, similarly, an inverse relationship between liquidity and profitability— are Abreu and Mendes (2002), Angbazo (1997), Barros et al. (2007), Chiorazzo et al. (2008), DeYoung and Rice (2004), Goddard et al. (2004a), Iannotta et al. (2007), Molyneux and Thornton (1992), and Pasiouras and Kosmidou (2007). This finding leads us to the first of our hypotheses to be tested:

Hypothesis 1: There is a positive relationship between the relative percentage of loans in the assets of a bank and its profitability.

2.2 Asset quality

There seems to be a consensus that bank profitability is directly related to the quality of the assets on its balance sheet; i.e., poor credit quality has a negative effect on bank profitability and vice versa. This relation exists because an increase in the doubtful assets, which do not accrue income, requires a bank to allocate a significant portion of its gross margin to provisions to cover expected credit losses; thus, profitability will be lower. Therefore, the evolution of the impairment losses on loans and receivables explains a large part of the profitability of both commercial and savings banks. Among the studies that show a direct relationship between profitability and asset quality are Angbazo (1997), Alexiou and Sofoklis (2009), Athanasoglou et al. (2008), Chiorazzo et al. (2008), DeYoung and Rice (2004), and Hernando and Nieto (2007). Consequently, we formulate the following hypothesis:

Hypothesis 2a: There is a positive relationship between the quality of the assets of a bank and its profitability.

However, if the financial system is well remunerated – that is, if prices are set in accordance with the risk incurred – to the extent recommended in the new banking regulation (Basel II and, more recently, Basel III), riskier loans should produce higher interest income, with a positive impact on profitability (Iannotta et al., 2007; Kasman et al., 2010). Moreover, higher loan quality typically implies more resources devoted to credit underwriting and loan monitoring, thus increasing bank costs (Mester, 1996). These arguments lead us to a new hypothesis positing an opposite relationship from the previous one.

Hypothesis 2b: There is a negative relationship between the quality of the assets of a bank and its profitability.

2.3. Capitalization

There are several reasons to believe that a better capitalized bank should be more profitable. First, Berger (1995b) points to the expected bankruptcy costs hypothesis as a cause of all or part of the observed positive relationship between capital and profitability. For a bank with capital below its equilibrium ratio, expected bankruptcy costs are relatively high, and an increase in capital ratios raises expected profits by lowering interest expenses on uninsured debt.[5] In this same vein, Athanasoglou et al. (2008) state that this positive impact can be due to the fact that capital acts as a safety net in the case of adverse developments. This relation would help the bank to finance its assets at more favorable interest rates, increasing expected profitability and offsetting the cost of equity, which is considered to be the most expensive bank liability in terms of expected return (García-Herrero et al., 2009). Another alternative theory that Berger (1995b) developed to explain this direct relationship between capital and profitability is the signaling hypothesis. Under this theory, bank management signals private information that future prospects are good by increasing capital. Finally, a third interpretation relies on the effects of the Basel Accord, which requires banks to hold a minimum level of capital as a percentage of risk-weighted assets. Higher levels of capital may therefore denote banks with riskier assets, which translate, in turn, to higher revenues that increase the profitability of the bank (Iannotta et al., 2007). The empirical studies observing this positive relationship between capital and profitability are abundant, including Alexiou and Sofoklis (2009), Angbazo (1997), Athanasoglou et al.

[5] Berger (1995b) defines expected bankruptcy costs as the probability of bank failure times the deadweight liquidation costs that must be absorbed by creditors in the event of failure.

(2008), Berger (1995b), Bourke (1989), García-Herrero et al. (2009), Iannotta et al. (2007), Lloyd-Williams et al. (1994), Molyneux and Thornton (1992), and Pasiouras and Kosmidou (2007). We therefore also expect a direct association between capital and profitability.

Hypothesis 3: There is a positive relationship between the amount of capital of a bank and its profitability.

2.4. Financial structure

Over the past decade, against a background of credit growth and favorable conditions in international financial markets, many European banks have financed an increasing portion of their growth by resorting to the medium- and long-term wholesale markets; although this decision has afforded banks greater flexibility in their financial structure, the cost has been greater than it would have been if the financing had been in the form of bank deposits. In this context, a higher share of customer deposits in bank liabilities should increase a bank's profitability, considering that deposits constitute a cheap and stable financial resource compared with other financing alternatives (Claeys and Vander Vennet, 2008; García-Herrero et al., 2009). Thus, we examine whether there is a direct relationship between the proportion of customer deposits in a bank's total liabilities and the bank's profitability.

Hypothesis 4a: There is a positive relationship between the proportion of customer deposits of a bank and its profitability.

On the other hand, an aggressive commercial policy or the difficulties of accessing international funding markets —particularly since the start of the financial crisis in late 2007— could lead banks to pay higher rates to attract deposits from competitors (the so-called "deposit war"), thus squeezing bank margins. We test whether high rates of

growth in customer deposits are achieved at the expense of a reduction of the net interest margin.

Hypothesis 4b: There is an inverse relationship between the growth rate of customer deposits of a bank and its profitability.

2.5. Efficiency

Since the early 1990s, advances in information, communications and financial technologies have allowed banks to perform many of their traditional services more efficiently. Consequently, the cost-to-income ratio, a proxy for operational efficiency, has been declining almost everywhere to different degrees (Albertazzi and Gambacorta, 2009), meaning that banks have lower expenses for a given level of output. Previous studies suggest a positive and highly significant effect of efficiency on profitability (see, for example, Alexiou and Sofoklis, 2009; Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; García-Herrero et al., 2009; and Pasiouras and Kosmidou, 2007, among others). This relation would imply that operational efficiency is a prerequisite for improving the profitability of the banking system, with the most profitable banks having the lowest efficiency ratios. On the other hand, Berger and Humphrey (1994) note that managerial ability in controlling costs (the so-called X-efficiency) is much more important than economies of scale and scope are —on average, banks may have costs about 20% higher than the industry minimum for the same scale and product mix because of poor management. Also, Berger (1995a) concludes that X-efficiency, or superior management of resources, is consistently associated with higher profits. Therefore, we examine whether there exists a direct relationship between efficiency and profitability in the Spanish bank system.

Hypothesis 5: There is a positive association between the efficiency of a bank and its profitability.

2.6. Size

We expect a positive relationship between size and profitability based on the view that a larger size should allow the bank to obtain economies of scale. Several recent studies adopt this premise, such as Alexiou and Sofoklis (2009), Iannotta et al. (2007) and Mercieca et al. (2007). However, there is consensus in the literature that the average cost curve in banking has a relatively flat U-shape, with medium-sized banks being slightly more scale efficient than either large or small banks are. Only small banks appear to have the potential for scale efficiency gains, and the measured economies are usually relatively small —on the order of 5% or less (Berger and Humphrey, 1994). In other words, the effect of size could be non-linear, with profitability initially increasing with size and then declining for bureaucratic and other reasons (Athanasoglou et al., 2008). On the other hand, larger size may also imply economies of scope for the bank resulting from the joint provision of related services (for example, banks could sell to their customers life and/or home insurance together with mortgage loans using their branch networks). Although Elsas et al. (2010) conclude that economies of scope are pronounced in banking, increasing its profitability, Barros et al. (2007) find that bigger and more diversified banks are more likely to perform poorly, suggesting that smaller and specialized banks can reduce asymmetric information problems associated with lending.

The preceding arguments lead us to formulate two hypotheses of different signs. In principle, one would expect that larger banks experience larger increases in profitability through economies of scale. However, above a certain threshold of size, diseconomies of scale could arise, making the size of the bank a negative determinant of its profitability. To this situation we must add the (uncertain) effect of bank size on

profitability derived from possible economies of scope in addition to a possible "too-big-to-fail" argument in favor of larger size.[6]

Hypothesis 6a: There is a positive relationship between bank size and bank profitability.

Hypothesis 6b: There is a negative relationship between bank size and bank profitability.

2.7. Revenue diversification

The decline in interest margins during the last decade has changed the traditional role of banks and forced them to search for new sources of revenue. In this context, Elsas et al. (2010) find that, initially, commercial banks typically increase diversification by moving into fee-based businesses. Then they expand their business into trading activities or by underwriting insurance contracts. As stated previously (see part 2.6), the effect of diversification of income on bank profitability is not clear.[7] Recently, both Chiorazzo et al. (2008) and Elsas et al. (2010) conclude that revenue diversification enhances bank profitability via higher margins from non-interest businesses. However, many previous studies (Acharya et al., 2002; DeLong, 2001; DeYoung and Rice, 2004; Morgan and Katherine, 2003; Stiroh, 2004; and Stiroh and Rumble, 2006; among others) show that greater diversification of the banking business does not necessarily translate into an improvement of the bank's profitability; it may, in fact, be detrimental to profitability. A reduction of the interest rates applied to certain loans with the object of capturing customers for other products and services offered by the bank could cause such a detriment; i. e., the profit on those other activities may not

[6] The "too-big-to-fail" argument states that large banks may benefit from this implicit guarantee that, other things being equal, has the effect of decreasing their cost of funding (Iannotta et al., 2007).

[7] Because banks of similar size may present different degrees of diversification, we include this variable as a determining factor of profitability independent of bank size, although it is likely that a larger bank could offer more different revenue-generating services.

be enough to compensate for the interest reduction (Lepetit et al., 2008). Thus, empirical studies do not provide conclusive evidence in support of any single hypothesis on the effect of revenue diversification. Therefore, again, we put forward two opposing hypotheses to be tested.

Hypothesis 7a: There is a positive relationship between the revenue diversification of a bank and its profitability.

Hypothesis 7b: There is a negative relationship between the revenue diversification of a bank and its profitability.

2.8. Industry concentration

Two theories are proposed to explain how the degree of sector concentration affects bank profitability. The structure-conduct-performance hypothesis (also referred to as the market-power hypothesis) states that a more concentrated sector favors bank profitability motivated by the benefits of greater market power, which reflects the setting of prices that are less favorable to consumers (lower deposit rates, higher loan rates) as a result of competitive imperfections in these markets (monopoly profits).[8] On the other hand, the efficient-structure theory explains the positive relationship between concentration and profitability as an indirect consequence of efficiency, to which we referred in part 2.5. It argues that the better managed banks or those with more efficient (and thus more profitable) cost structures could see their market shares increase, resulting in a higher degree of concentration; i.e., the increased profitability would not be a consequence of greater market power but rather the indirect result of an improvement in efficiency.

[8] A special case of this theory is the relative-market-power hypothesis, which suggests that only firms with large market shares and well-differentiated products are able to exercise market power and earn non-competitive profits (Berger, 1995a).

The empirical evidence on the relationship between concentration and profitability is not conclusive. Whereas Claeys and Vander Vennet (2008), Goddard et al. (2004a), and Maudos and de Guevara (2004), among others, report evidence from Europe favoring the structure-conduct-performance theory, other studies (see, for example, Athanasaglou et al., 2008; Berger, 1995a; García-Herrero et al., 2009; and Pasiouras and Kosmidou, 2007) find no relationship between the degree of concentration of the sector and bank profitability; some even show an inverse relationship between the two. We hypothesize a direct association between industry concentration and bank profitability in Spain.

Hypothesis 8: There is a positive relationship between the concentration of the banking sector and its profitability.

2.9. Economic growth

Bad economic conditions can worsen the quality of the loan portfolio, generating credit losses and increasing the provisions banks need to hold, thus reducing bank profitability. In contrast, an improvement in economic conditions, in addition to improving the solvency of borrowers, increases demand for credit by households and firms, with positive effects on the profitability of banks (Athanasoglou et al., 2008; Calza et al., 2003; among others). In the same vein, Albertazzi and Gambacorta (2009) conclude that the pro-cyclical nature of bank profits derives from the effects that the economic cycle exerts on net interest income (via lending activity) and loan loss provisions (via credit portfolio quality). Other recent studies that observe cyclical movements in bank profitability are Athanasoglou et al. (2008), Bikker and Hu (2002), Demirguc-Kunt and Huizinga (2000) and Dietrich and Wanzenried (2011), among others. Thus, we hypothesize that:

Hypothesis 9: There is a positive relationship between economic growth and bank profitability.

2.10. Inflation

Revell (1979) introduces the issue of the relationship between bank profitability and inflation, stating that the effect of inflation on bank profitability depends on how inflation affects both salaries and the other operating costs of the bank. In this context, Perry (1992) concludes that the extent to which inflation impacts bank profitability depends on whether the extent of inflation is fully anticipated. If the inflation rate is fully anticipated by the bank's management, the bank can adjust interest rates appropriately to increase revenues faster than costs, which should have a positive impact on profitability. Recent studies (Alexiou and Sofoklis, 2009; Athanasoglou et al., 2008; Claeys and Vander Vennet (2008); García-Herreto et al., 2009; Kasman et al., 2010; Pasiouras and Kosmidou, 2007) confirm a positive relationship between inflation and profitability. We therefore also expect a direct association between the two variables.

Hypothesis 10: There is a positive association between inflation and bank profitability.

2.11. Interest rates

An environment of low interest rates coupled with fierce competition among banks could limit the possibilities for banks to establish appropriate prices for their loans and deposits, putting pressure on the operating margin and negatively affecting banks' profitability. Among the studies that report a positive relationship between interest rates and bank profitability are Bourke (1989), Claeys and Vander Vennet (2008), Demirguç-Kunt and Huizinga (1999), García-Herrero et al. (2009), Molyneux

and Thornton (1992), and Staikouras and Wood (2003). We hypothesize a positive association between these two variables in Spain.

Hypothesis 11: There is a direct relationship between interest rates and bank profitability.

3. Methodological aspects

3.1. Sample

Our sample comprises all Spanish commercial banks, savings banks and credit cooperatives in the Bankscope database during the period 1999–2009 that have information available for all of the variables analyzed.[9] However, those entities that present abnormal ratios or extreme values are eliminated from the sample as outliers. After completing this filtering, the final sample consists of 89 banks, of which 28 correspond to commercial banks, 45 to savings banks and the rest to credit cooperatives. Table 2 shows the number of observations that compose the sample by bank category.

We take the bank-specific information from the Bankscope database compiled by Bureau van Dijk Electronic Publishing, which includes income statements and balance sheet information. As in other similar studies, we use unconsolidated statements; this choice prevents relevant differences in profit and loss statements and balance sheets of headquarters and subsidiaries from negating each other (García-Herrero et al., 2009).[10] We get the data on industry concentration from the European Central Bank (ECB) reports on EU banking structure, while macroeconomic data are taken from the Spanish

[9] Because in many cases we do not have available all of the financial statements of each bank for the complete time horizon and some of the banks either merged or went bankrupt, we have unbalanced panel data. However, to ensure consistency of the model, we require banks to have data for at least five consecutive years to be included in the sample.

[10] Despite the above decision, in a few observations we use some bank-specific variables obtained from consolidated statements (information related to non-performing loans and/or the capital adequacy ratio) when they are unavailable from the unconsolidated statements.

National Statistics Institute (INE), except for interest rates, which are obtained from the statistics of the ECB.[11]

3.2. Definition of variables

3.2.1. Dependent variable

We use as the dependent variable two measures of profitability widely employed in the banking literature.[12] The first of these, the return on assets (ROA), is perhaps the single most important ratio for comparing the efficiency and operational performance of banks. This ratio considers the returns generated from the assets that the bank finances; it is primarily an indicator of managerial efficiency, although it may be misleading due to off-balance-sheet activities. Second, we use the return on equity (ROE), which is a measure of the return on shareholder funds. Both variables are calculated by using average values in the denominator, and we use pre-tax values to avoid distortions of our conclusions due to the tax system. Because ROE equals ROA times the total assets-to-equity ratio, this ratio could be high at the expense of an over-leveraged balance sheet; therefore, banks with higher leverage, and thus lower equity, generally report lower ROA but higher ROE.[13] Although Athanassoglou et al. (2008) state that an analysis based on ROE disregards the risks associated with leverage, Goddard et al. (2004b) employ ROE as an appropriate profitability measure, arguing that for many European banks the off-balance-sheet business makes a significant contribution to total profit.

[11] The ECB Reports on banking structure are available at http://www.ecb.int.

[12] In the previous literature, the net interest margin (NIM) is also employed as a dependent variable as a proxy for the income-generation capacity of the intermediation function of banks. However, NIM does not take into account neither the income originating from other activities of the bank nor the costs of putting these activities into operation; consequently, it is a crude measure of performance.

[13] It may explain why some of the previously high-ROE banks have performed particularly poorly during the recent financial crisis: their ROE is dragged down by a rapid leverage adjustment.

3.2.2. Independent variables

Our aim is to analyze the determining factors of bank profitability in Spain during the period previously defined. We divide these factors into two groups: the bank-specific factors and the external (industry and macroeconomic) factors. Among the bank-specific factors are asset structure, asset quality, bank capitalization, financial structure, efficiency, size, and revenue diversification.

To analyze whether the way in which the assets side of a bank's balance sheet is structured affects its profitability, we use the loans-to-total assets ratio. This liquidity ratio indicates what percentage of the total assets of the bank is tied up in loans; a higher value of this ratio indicates that the bank is less liquid but predicts higher profitability (Hypothesis 1). To test Hypotheses 2a and 2b, we choose two variables: the ratio of non-performing loans to gross loans and the ratio of loan loss provisions to net loans. While the former is a measure of the amount of total doubtful loans as a percentage, the latter relates the provision for impairment losses to the loan portfolio of a bank. The increase of those two ratios would indicate a worsening in the quality of the loan assets; i.e., higher ratios correspond to worse asset quality. We use the proportion of the bank's own funds in total assets (equity-to-total assets ratio) to examine whether the level of capitalization is a determining factor of bank profitability; we expect that high values of this ratio are coupled with larger returns for the bank (Hypothesis 3). To analyze the effect of the capital structure on the profitability of the banks, we use the ratio of customer deposits to total liabilities; we anticipate a positive relationship between this ratio and profitability, given that customer deposits constitute an inexpensive and stable financial resource compared with other financing alternatives (Hypothesis 4a). We use the annual growth rate of customer deposits to explore the hypothesis that, in the event of a "deposit war" among banks, the resulting increase in funding costs would cause a

drop in their profits (Hypothesis 4b). To test Hypothesis 5, which states that more efficient banks are more profitable, we use as a proxy the cost-to-income ratio (CIR); this ratio measures the bank's overhead or running costs (the largest proportion of which is normally salaries) as a percentage of income generated before provisions. Because the effect of size on bank profitability seems to be non-linear, we use the logarithm of bank assets to accommodate this non-linear relationship.[14] Finally, to measure the last of the bank-specific characteristics and test Hypotheses 7a and 7b, referring to the effect of diversification of income on profitability, we use an adjusted Herfindahl–Hirschman index (HHI) similar to that employed by Elsas et al. (2010).[15] This new variable of our equation (HHI revenue diversification) is calculated as follows:

$$HHIRD = 1 - \left[\left(\frac{INT}{TOR} \right)^2 + \left(\frac{COM}{TOR} \right)^2 + \left(\frac{TRAD}{TOR} \right)^2 + \left(\frac{OTH}{TOR} \right)^2 \right] \quad (1)$$

Where INT denotes gross interest income, COM denotes gross commission and fee revenue, TRAD denotes trading revenue, and OTH denotes all other gross operating income. TOR denotes total operating revenue and is equal to the sum of the absolute values of INT, COM, TRAD and OTH.[16]

With respect to the variables exogenous to the banks, industry concentration is also measured as a Herfindahl–Hirschman index (HHI industry concentration), which is calculated as the sum of the squares of all banks' market shares in terms of total assets

[14] Moreover, as Berger et al. (2010) suggest, we use the squared logarithm of bank assets to control for this potential non-linear relationship between size and profitability in the robustness checks.

[15] Stiroh and Rumble (2006) employ a similar index.

[16] Because this variable is a measure of revenue diversification, we use gross values to the extent that it is possible. However, in some cases, Bankscope does not provide the gross values for the commission and fee revenue and/or the trading revenue; in these cases, we use the net values. By definition, HHIRD can take values between 0 (no revenue diversification) and 0.75 (indicating a bank that generates a fully balanced revenue mix from all four business areas).

(in percentage).[17] It reflects more accurately the entry of new and smaller banks as well as the impact of a single bank with a very large market share. It is often said that a market is highly concentrated when the index exceeds 1,800 (or 0.18 if we use units instead of percentages) and unconcentrated when the index is below 1,000 (or 0.1). As discussed in the literature review, we expect that the relationship between economic growth and profitability will be positive and use the annual growth rate of the real gross domestic product (GDP) to explore this association. We measure the effect of inflation on bank profitability through the consumer price index (CPI) annual inflation rate. In addition, we take the interest rate on the main refinancing operations (MRO) of the European Central Bank, which provides the bulk of liquidity to the Spanish banking system, as a proxy for interest rates. Finally, we include dummy variables to control for bank type (commercial bank, savings bank and credit cooperative) and time effects; the latter capture the influence of potential time-varying economic variables that are not included in our equation but may affect bank profitability.

Table 3 summarizes the explanatory variables and their expected signs as considered in the present study.

3.3. Methodology

One of the main problems in assessing the drivers of bank profitability is the potentially endogenous character of certain determinants. For example, more profitable banks may have more resources to increase their equity; they may also find it easier to increase their customer base through successful advertising and thereby enhance profitability. Causality could even go in the opposite direction; e.g., higher bank

[17] An alternative indicator of the degree of competition in banking markets is the Lerner index. This index is defined as the difference between the price and the marginal cost, divided by the price, and it measures the capacity to set prices above the marginal cost; it is an inverse function of the elasticity of demand and of the number of banks. The values of the Lerner index range from 0 (perfect competition) to 1 (monopoly). See, for example, Maudos and de Guevara (2004).

profitability could lead to more employees and less efficiency (García-Herrero et al., 2009). In addition, some characteristics of banks affecting their profitability are difficult to measure or identify in an equation (the so-called unobserved heterogeneity); if the influence of such characteristics is not taken into account, there could be correlations between some of the coefficients of the explanatory variables and the error terms that bias these coefficients. Finally, the persistence of profitability is well documented in the literature. To deal with all of these concerns, we use the generalized method of moments (GMM) estimator developed for dynamic panel models by Arellano and Bover (1995) and Blundell and Bond (1998), also referred to as the system-GMM estimator. This is an alternative method to the first-difference GMM estimator by Arellano and Bond (1991). It estimates the regression in differences jointly with the regression in levels; i.e., the system-GMM estimator uses lagged levels of the dependent and endogenous variables as instruments for the first-difference equation, which reduces the potential biases in finite samples and asymptotic imprecision associated with the difference estimator. The consistency of the GMM estimator depends on the validity of the assumption of non-serial correlation in the error term and on the validity of the instruments. We perform two tests proposed by Arellano and Bond (1991) to test these assumptions: the Arellano-Bond test for second-order serial correlation of the differenced residuals and the Sargan/Hansen test for over-identifying restrictions, which checks the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process.[18]

Taking into account the above-mentioned aspects, our baseline equation is as follows:

[18] We also report Wald tests of the joint significance of both the coefficients and the dummies, which validates the use of such variables in our equation.

$$Y_{i,t} = \alpha + \delta \cdot Y_{i,t-1} + \beta_1 \cdot Loan/TA_{i,t} + \beta_2 \cdot NPL/GL_{i,t} + \beta_3 \cdot LLP/NL_{i,t} + \beta_4 \cdot Eq/TA_{i,t} + \beta_5 \cdot Dep/TL_{i,t} + \beta_6 \cdot DepGR_{i,t} + \beta_7 \cdot CIR_{i,t} + \beta_8 \cdot Size_{i,t} + \beta_9 \cdot HHIRD_{i,t} + \beta_{10} \cdot HHIIC_{i,t} + \beta_{11} \cdot GDP_{i,t} + \beta_{12} \cdot Inflation_{i,t} + \beta_{13} \cdot Interest_{i,t} + \beta_{14} \cdot Bank\ Type\ (\text{dummy})_{i,t} + \varepsilon_{i,t}. \quad (2)$$

Here, subscripts *i* and *t* index banks and time in years, respectively. *Y* denotes the dependent variable, which can be the ROA —the pre-tax return on average assets— or the ROE —the pre-tax return on average equity— and $Y_{i,t-1}$ their lagged values. δ measures the speed of mean reversion. A value of delta between 0 and 1 indicates that profitability is persistent but will eventually return to the equilibrium level. Specifically, values close to 0 denote a high speed of adjustment and imply a relatively competitive market structure, while a value closer to 1 implies slower mean reversion and, therefore, less competitive markets. As stated before, we consider nine bank-specific and four other variables to account for the industry and the macroeconomic environment. The notations of these explanatory variables are described in Table 3. Finally, we control for bank type by including dummy variables. $\varepsilon_{i,t}$ is the disturbance, which contains the unobserved bank-specific effect (η_i) and the idiosyncratic error ($\nu_{i,t}$).

4. Results

4.1. Determinants of bank profitability in Spain

Table 4 gives an initial outline of the Spanish banking situation during the last decade. We can deduce from this outline that Spanish banks typically engage in retail-oriented activity; loans as a percentage of total assets reached a maximum of 78.4% in 2007. The strong growth of credit up to that date was largely directed towards financing the construction and acquisition of dwellings and, as in other countries of the eurozone, this was facilitated mainly by a low level of interest rates in the context of a bullish phase of the economic cycle. Most credit is financed through customer deposits,

although since 2004 Spanish banks have financed a larger share of their activity by resorting to the medium- and long-term wholesale markets, as in other banking systems.[19] The doubtful assets ratio in the Spanish banking system remains at relatively low levels (of around 1%), while the level of coverage by provisions is high.[20] Similarly, the solvency ratios throughout the period under study comfortably exceed the minimum regulatory requirements; the equity ratio stands above 7% in the majority of the years of the study. There is a marked improvement in the efficiency ratio (the CIR ratio) and in the role that the income from non-interest income activities (HHIRD) seems to play in the profit and loss account. Finally, the average size of banks progressively increases throughout the study period, while the concentration of the Spanish banking system remains relatively low. All of the above characteristics enable Spanish banks to achieve high levels of profitability during this period (on average, approximately 1% for ROA and 14% for ROE) despite the abrupt change to most of the indicators as a result of the international financial crisis, the effects of which can be seen in the banks' financial statements beginning in 2008 and 2009.

Table 5 reports the empirical estimations of Eq. (1) for both measures of bank profitability (ROA and ROE) in Spain during the 1999-2009 period, using the system-GMM estimator suggested by Arellano and Bover (1995) and Blundell and Bond

[19] Financing of Spanish banks is obtained on the wholesale markets through a broad range of financial instruments, including most notably medium- and long-term fixed incomes. Second in importance is asset securitization, which in Spain, unlike in other countries, has been used as a means of obtaining funds and not for transferring risk (see Cardone-Riportella et al., 2010). More financing is obtained by issuing shares, hybrid instruments (basically subordinated debt and preference shares), and short-term fixed income securities in the form of commercial papers.

[20] Remember that there are two types of provisions in the Spanish system: a specific provision that is point-in-time and a generic provision that is through-the-cycle.

(1998).[21] The estimator ensures efficiency and consistency provided that the residuals do not show serial correlation of order two (AB tests for AR (2) with high *p*-values) and that the instruments used are valid (Sargan tests with *p*-value = 1). The high statistical significances of the lagged profitability variables also confirm the dynamic character of the model specification. The values of δ are close to 0.40, which indicates a moderate persistence in bank profitability similar to that found by previous studies in the European banking sector (e.g., Athanasoglou et al., 2008).

With respect to the first of the hypotheses to be tested in our study, namely that concerning the effect of the composition of the bank's assets on profitability, the positive and highly significant coefficient of the loans-to-total-assets ratio confirms our expectations; that is, the larger the bank's loan portfolio is on its balance sheet, the higher is its profitability measured both by ROA and by ROE. This finding for the Spanish banking system is consistent with that reported in the previous literature for banks in Europe and in the US.

We also find a direct and significant relationship between bank profitability and loan quality measured through either the doubtful assets ratio or the loan loss provisions ratio. The latter appears to be a very important determinant of bank profitability for Spanish banks as it declined significantly after the eruption of the financial crisis —and subsequent economic crisis— in late 2007.[22] Because it appears that a greater level of risk does not translate into higher income, the Spanish banking system in general may

[21] We obtain similar results for the bank-specific variables' coefficients when using time dummies instead of macroeconomic controls. We do not present here for space reasons.

[22] This reduction in profitability could be even greater were it not for the Spanish dynamic provisions, which have dampened the impact of non-performing loans on bank profits, particularly in the initial stages of the economic crisis. This finding does not mean that banks delayed recognition of bad debts in results but rather the contrary; in the cyclical upturn, when defaults were low, the risks accumulated in balance sheets were recognized by reducing profits through the recording of provisions (that can be used now that the downturn has arrived).

not be setting prices according to the assumed credit risk, contrary to the proposal of the new banking regulation.

The effect of the bank capital on profitability is different depending on whether we consider the profitability of assets or of equity. In the first case, when ROA is considered as the dependent variable, the effect is positive and highly significant, as we expected. There appears to be consensus in the previous literature that more capital (and, therefore, better solvency) reduces the costs of external debt, compensating for the higher costs of own funds. On the other hand, the negative effect of banks' capital on the ROE is explained if we take into account that ROE can be broken down as the product of the ROA and the inverse of the ratio of equity-to-total-assets, i.e., ROE = ROA x 1/(Eq/TA). In consequence, the decreases of the ROE resulting from increases in this ratio cannot be interpreted as decreases in the wealth created using the capital invested; rather, they can be seen as a consequence of the decreased level of indebtedness or leverage of the banks.

The liabilities of the Spanish banks are characterized by a high proportion of customer deposits, as we saw earlier, which appears to have a positive effect on their profitability, measured both by ROA and by ROE. This characterization is demonstrated by the positive and statistically significant coefficient of the ratio of customer deposits to total liabilities. Therefore, the increase of Spanish banks resorting to the medium and long term wholesale markets in recent years involves a greater cost than if the financing had taken place more over the short term; however it has given them greater flexibility in their capital structure. On the other hand, the so-called “deposit war” would not harm the banks' profitability, possibly because the temporary increase in the cost of the liabilities (in many cases these deposits offer high returns for only a few months) could

be compensated by the income derived from the other services provided or by the lower financial costs of maintaining these deposits once this short initial period of time ends.

The negative sign of the CIR variable in the equations of the ROA and ROE and its high statistical significance confirm our Hypothesis 5 referring to the effect of efficiency on bank profitability; i.e., improvements in efficiency are translated into improvements in profitability. Therefore, the decrease of this ratio in Spanish banks that we observe in Table 4 may contribute considerably to explaining part of their profitability. Moreover, given that, in the period analyzed, a process of intense geographic expansion took place in Spanish banks, with a consequent increase in the number of employees and new branch offices, this improvement in efficiency could be attributed to banks' demonstrating a notable capacity for effective management (the so-called X-efficiency).

In our study, we do not find the size of Spanish banks to be a determining factor of their profitability, although the model also does not indicate size to be a negative factor in their development. This result has important consequences in the current situation, where many commercial and savings banks are engaged in processes of growth involving mergers and acquisitions; however, these are likely to be undertaken with the aim of reinforcing solvency rather than increasing profitability. Likewise, we find no statistical significance in the variable that measures the effect of diversification of income (HHIRD) on bank profitability, which indicates that non-interest income activities do not affect bank profitability in Spain.

With regard to the set of exogenous variables, our results suggest a positive relationship between bank concentration and profitability in Spain (Hypothesis 8); i.e., a more concentrated banking system is associated with both a higher ROA and a higher ROE, as in other European countries (e.g., Claeys and Vander Vennet, 2008; Maudos

and de Guevara, 2004). This finding seems to support the structure-conduct-performance hypothesis in the context of Spain; however, this profitability increase could also be an indirect consequence of greater efficiency of the banking system, as the efficient-structure hypothesis proposes. As expected, bank profitability is directly related to GDP growth, mainly through the effect that the economic cycle exerts on demand for credit by households and firms, and to provisions. Inflation affects bank profitability when this is defined in terms of ROA, implying that managers anticipate inflation expectations and adjust interest rates to achieve higher profits. Finally, contrary to expectations, bank profitability shows a negative correlation with the interest rate on the MRO of the ECB. This inverse relationship may be caused by a time lag to pass changes in interest rates on to customers in which changes take place more quickly on the funding side than on the lending side; therefore, bank net interest margins increase in the event of a fall in interest rates and decrease in the event of an upturn in rates.

4.2. Are there differences between commercial and savings banks?

We find statistical significance in the dummy that identifies commercial banks in our baseline equation, but only when profitability is defined in terms of ROA. The positive sign of the coefficient for this variable suggests that Spanish commercial banks have a higher return on assets than savings banks and credit cooperatives during the years considered. However, since we are interested in identifying qualitative rather than quantitative divergences in the performance of commercial and savings banks, we conduct a statistical test of mean differences on the bank-specific explanatory variables (see table 6).

First, we observe that the Spanish savings banks have higher percentages of both loans and customer deposits on their balance sheets. This difference can be explained in

two ways. On one hand, Spanish customers tend to choose their bank according to geographic proximity; therefore, because the savings banks tend to concentrate their efforts in one particular region, they have a competitive advantage over the commercial banks. On the other hand, the savings banks face constraints in raising funds in financial markets; these limitations make them more dependent on traditional bank deposits, whereas commercial banks diversify the structure of liabilities of their balance sheets to a greater extent.[23] Both issues may help Spanish savings banks to increase their profitability in comparison to the commercial banks'. On the negative side, the savings banks have poorer-quality loan portfolios —the shares of both non-performing loans and loan loss provisions are greater— as well as lower efficiency, as demonstrated by their CIR ratio, which is 4.5 percentage points higher than that of the commercial banks. Table 6 also reports that the savings banks have lower solvency (measured by the equity-to-total-assets ratio, as a rough proxy), although the difference in this variable does not reach statistical significance and remains above international standards. Lastly, although the savings banks are of statistically significantly smaller average size and have less income diversification than the commercial banks, both explanatory variables do not appear to play a determining role in bank profitability, as we saw in the previous section.

[23] Savings banks are not limited companies, so they do not have equity capital in the strict sense. Despite this, as of 2004, the Spanish savings banks can issue non-voting equity units (the so-called *cuotas participativas*), which are considered own resources for the purposes of calculating the BIS capital ratio. These are securities similar to shares that do not grant voting rights to the holder, which limits their trading in the financial markets. Recently, the Royal Decree-Law 11/2010 of 9 July on governing bodies and other aspects of the legal regime for savings banks allows them to issue equity units with voting rights within certain limits.

4.3. Robustness checks

To further confirm the aforementioned findings, we conduct a number of robustness checks and report all of these results in Table 7. First, we perform some robustness checks to evaluate the method of estimation used in the analysis. In model 2, we employ an ordinary least squares (OLS) regression to estimate our equation, which is used widely in early studies on bank profitability (e.g., Angbazo, 1997; Bourke, 1989; Molyneux and Thornton, 1992). The results obtained do not differ much from those found previously; most of the explanatory variables retain both their signs and their statistical significance. However, we observe certain differences in one of them: the statistically significant negative sign of the variable that measures the effect of bank size might indicate the existence of diseconomies of scale in the Spanish market. We also estimate the explanatory equation by introducing fixed effects with the aim of capturing the influences of specific characteristics of each bank and each year using the within-group estimator (model 3).[24] Among others, Elsas et al. (2010), Hannan and Prager (2009) and Maudos and de Guevara (2004), use this technique. As we can see, most of the explanatory variables have the same sign and the same statistical significance as in model 1. Nevertheless, the index used to measure the effect of inflation on bank profitability loses its statistical significance.

Second, we re-estimate our baseline equation, changing some of the variables employed as regressors. We replace the ratio of loans to total assets with the ratio of liquid to total assets as a proxy to analyze the effect of the asset structure on bank profitability (model 4). This latter ratio was employed previously by authors such as Goddard et al. (2004), Iannotta et al. (2007) and Molyneux and Thornton (1992). Both the sign and the statistical significance are as expected. On the other hand, like Berger et

[24] The appropriateness of using a model with fixed rather than random effects was tested by applying the Hausman test.

al. (2010), in model 5 we employ the squared logarithm of bank assets to control for the potential non-linear relationship between size and profitability. This change does not result in any change in the variable's statistical significance. Finally, we use non-interest income as a percentage of total operating revenue instead of HHIRD as a proxy for the measurement of the revenue diversification of the banks (model 6). The result does not differ from that obtained previously. This result confirms that there is no relationship between income diversification and profitability for Spanish banks.[25]

5. Conclusions

This paper analyzes empirically the main factors driving the higher profitability of Spanish banks in the period of 1999-2009 using an unbalanced panel data of 697 observations. We also look for differences between commercial and saving banks that might explain why the latter seem to be experiencing greater difficulties after the eruption of the financial crisis in late 2007 and the subsequent economic crisis.

Spanish banks typically engage in retail-oriented activity, with an extensive office network and close contact with customers. Consequently, loans to and deposits from the customer base constitute a large part of Spanish banks' economic and financial structure, and funding from the wholesale market has relatively little weight in comparison with other European countries. Our study concludes that this characteristic enhances bank profitability, in terms of both ROA and ROE. The results also provide empirical evidence that a higher amount of poor-quality assets on the bank's balance sheet is significantly detrimental to its profitability; this finding is logical considering that doubtful customers usually cannot keep paying their debt and that loan loss provisions account for a significant part of profits. On the other hand, we find that better

[25] We make several additional changes in the explanatory variables. We use the operating expenses as a percentage of average total assets and the capital adequacy ratio to control for bank efficiency and capitalization, respectively. We do not report these results for reasons of space limitations.

capitalized banks tend to be more profitable when ROA is taken as the measure of profitability. However, an increase in the equity-to-total-assets ratio reduces the ROE of the banks due to the fall in leverage. Consequently, the high level of capitalization of Spanish banks could favor their ROA to the detriment of their ROE. Efficiency also constitutes an important determinant of the profitability of Spanish banks. Our study does not confirm that the rate of growth of deposits is related to profitability, a finding that would lead us to reject the hypothesis of negative effects on the banks' profit and loss accounts of the so-called "deposit war". Furthermore, size and income diversification do not appear to be explanatory factors of banking profitability in Spain: no symptoms of either economies or diseconomies of scale or scope are evident. With regard to the exogenous variables, our results seem to confirm the structure-conduct-performance hypothesis in Spain, together with the importance of the economic cycle for the profitability of the banking system. The inflation rate and the interest rate also influence bank profitability; but while the first factor exerts the effect expected, the latter shows behavior different from that expected, probably because of temporary differences in applying variations in interest rates to customer deposits and loans.

Our study also reveals qualitative differences in the performance of commercial and savings banks in Spain. Thus, the higher proportions of both customer loans and deposits on savings banks' balance sheets increase their profitability, whereas the lower quality of their loan portfolios and worse efficiency in comparison with the Spanish commercial banks are detrimental to savings banks' profitability.

Finally, several challenges face the Spanish banking system in the near future. First, the persistent economic crisis is likely to continue to reduce the industry's business volume and to affect borrowers' ability to repay their loans; this latter factor is forcing the banking sector to allocate a large amount of its gross margin to provisions

—now that the buffer provided by dynamic provisioning is almost exhausted— with the aforementioned negative impact on bank profitability. Second, we cannot exclude further complications arising from turbulence in international wholesale capital markets, with the consequent increase in funding costs for banks. Lastly, the new liquidity standards set by Basel III could reduce bank profitability from traditional lending activities, whereas the higher capital requirements under the new banking regulation may have a positive effect on ROA (and a negative effect on ROE). Despite these potential problems, the Spanish banking system, which employs the traditional buy-and-hold banking model, exhibits features that should make management of the above issues easier. These include, among others, a strong presence in the retail business (more resistant to market fluctuations); a scant amount of fixed-rate and very long-dated asset-side operations, which facilitates passing through the increase in the cost of funding to assets; and efficiency ratios that are among the best in the world. In addition, the savings banks' restructuring process performed in 2010 may help absorb the excess capacity in the banking sector due to lower business volumes (mainly by reducing the numbers of branches and employees), while the reform of their legal regime may contribute to strengthening their capital ratios and improving their corporate governance.

Appendix 1: The Spanish savings banks' restructuring process

In 2010, more than two years after the start of the international economic and financial crisis, the Spanish banking sector, and most especially savings banks, had a number of weaknesses: first, capacity in the sector had been attuned to a period of excessive growth marked by very high business volumes; thus, the fall in the demand for financial services highlighted excess capacity, which needed to be absorbed. Second, with significant differences from one bank to another, this growth was supported by the real estate and construction sector, and in many cases it was funded on the wholesale markets; consequently, the increase in bad debts and greater difficulties in gaining access to funding exerted pressure on institutions' income statements, making the generation of synergies vital. Finally, savings banks faced added difficulties in increasing their capital through means other than retaining profits, given the lack of attractiveness of their non-voting equity units.

The solution to the above-mentioned issues necessarily involved the restructuring of the banking system through integration processes, either through a merger or an institutional protection system (IPS), and because of this the number of savings banks decreased from 45 (in 2009) to just 17 at the end of 2010. This restructuring process was conducted mainly under the Fund for the Orderly Restructuring of the Banking Sector (FROB), created by the Royal Decree-Law 9/2009 of 26 June 2009. Under an IPS, also known as a 'virtual merger', each savings bank retains its own governing body, balance sheet, legal structure and brand. However, for the following reasons, mergers and IPSs are essentially the same as far as the relevant end effects are concerned: first, an IPS usually implies the creation of a central institution that defines the principal policies and strategies; second, a high degree of commitment between entities enables them to support each other in terms of solvency and liquidity; and, third, the participants share a high percentage of the profit from their activity.

In addition to this, the recent reform of legal regime governing Spanish savings banks (approved pursuant to Royal Decree-Law 11/2010 of 9 July 2010) allows them to carry out their activity using new business models. Among these alternatives is the conversion of the savings bank into a foundation that segregates financial activities from social and welfare-related activities, thereby assigning its business as a credit institution to a commercial bank in which it has a holding. The new legislation also allows assigning all financial business to a commercial bank controlled by the savings bank, holding at least 50% of its capital, and retaining savings bank status. Both options would enable them to better access to capital markets and may contribute to increasing the professionalism of their management and governing bodies.

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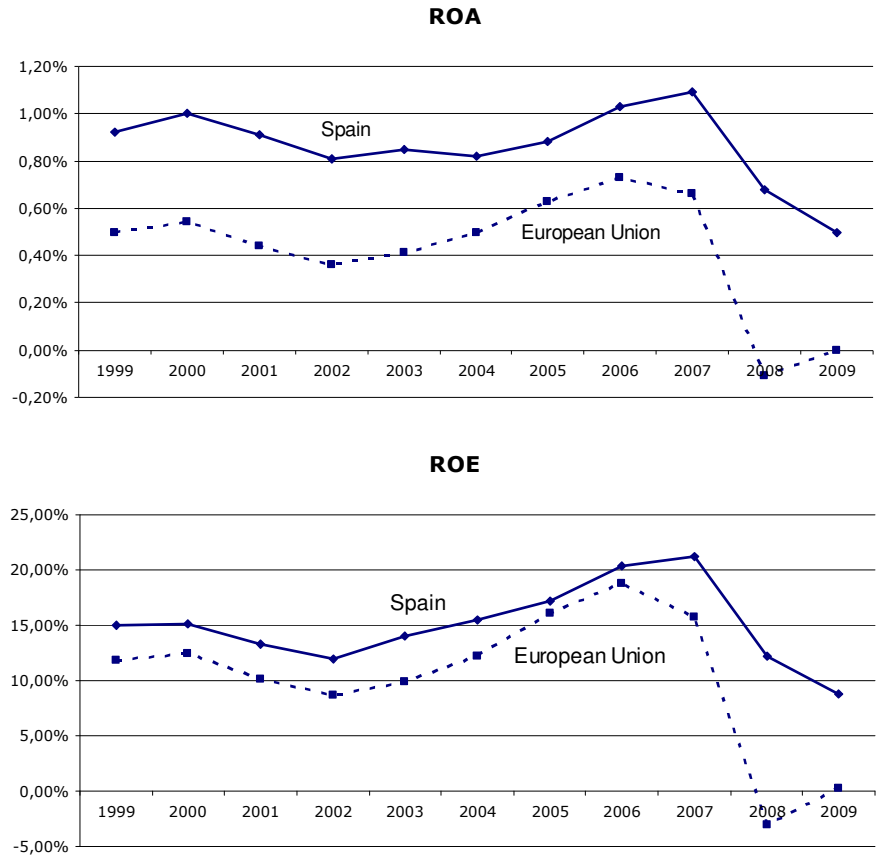

Figure 1. Profitability of Spanish and European banks (consolidated banking data).

Sources: Bank of Spain (Spanish banks, 1999 to 2003) and European Central Bank (all others).

Table 1

Main data of the European banking sector (December 2009)

Country	Credit Institutions	Branches	Employees	Total Assets (EUR billion)
Austria	855	4,172	78,794	1,034.0
Belgium	102	4,201	62,199	1,217.8
Denmark	149	1,760	45,935	802.2
Finland	325	1,606	24,879	363.2
France	313	38,545	458,370	7,656.7
Germany	2,121	39,441	663,000	7,436.1
Greece	66	4,079	65,682	418.7
Ireland	80	809	38,178	1,306.7
Italy	788	34,036	328,582	3,747.7
Netherlands	93	2,358	79,700	2,231.0
Norway	146	1,184	20,100	444.6
Portugal	43	6,400	56,965	491.7
Spain	***352***	***44,431***	***269,483***	***3,238.2***
Sweden	117	1,934	40,193	571.9
Switzerland	325	3,458	107,546	1,776.3
United Kingdom	332	10,120	431,665	8,577.3

Source: European Banking Federation (available at http://www.ebf-fbe.eu)

Table 2

Number of banks and observations by bank category

	Commercial banks	Savings banks	Credit cooperatives	All
No. of banks	28	45	16	89
No. of observations	174	422	101	697

Table 3

Explanatory variables and expected signs

Explanatory Variables	Notation	Classification	Hypotheses and expected signs
Bank-specific variables			
Loans/Total Assets (%)	Loan/TA	Asset structure	H1 (+)
Non-Performing Loans/Gross Loans (%)	NPL/GL	Asset quality	H2a (-); H2b (+)
Loan Loss Provisions/Net Loans (%)	LLP/NL	Asset quality	H2a (-); H2b (+)
Equity/Total Assets (%)	Eq/TA	Capitalization	H3 (+)
Customer Deposits/Total Liabilities (%)	Dep/TL	Financial structure	H4a (+)
Annual Customer Deposits, growth rate (%)	DepGR	Financial structure	H4b (-)
Cost-to-Income Ratio (%)	CIR	Efficiency	H5 (-)
Total Assets, logarithm	Size	Size	H6a (+); H6b (-)
Revenue Diversification, measured as a Herfindahl–Hirschman index	HHIRD	Revenue diversification	H7a (+); H7b (-)
Industry and macroeconomic variables			
Industry Concentration, measured as a Herfindahl–Hirschman index	HHIIC	Industry concentration	H8 (+)
Annual real GDP growth rate	GDP	Economic growth	H9 (+)
CPI annual inflation rate	Inflation	Inflation	H10 (+)
Interest rate on the MRO of the ECB	Interest	Interest Rates	H11 (+)

Table 4

Summary statistics for Spanish banks

This table reports means and standard deviations (in parentheses) for the entire sample by year. The sample comprises 89 banks (697 observations). *ROA* is the pre-tax return on average assets. *ROE* is the pre-tax return on average equity. See Table 3 for a description of the rest of the variables.

Variable	Year											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**All years**
ROA	1.307 (0.406)	1.292 (0.671)	1.154 (0.573)	1.057 (0.599)	1.076 (0.549)	1.041 (0.458)	1.123 (0.497)	0.988 (0.485)	0.973 (0.487)	0.624 (0.330)	0.414 (0.271)	0.992 (0.553)
ROE	18.924 (4.581)	17.620 (6.659)	16.064 (5.801)	14.766 (6.898)	15.067 (5.713)	15.002 (4.808)	13.735 (5.635)	14.349 (6.345)	15.175 (7.086)	10.448 (4.962)	6.943 (4.306)	14.258 (6.534)
Loan/TA	59.280 (10.368)	61.378 (12.514)	63.825 (11.289)	68.367 (11.910)	70.916 (11.731)	73.805 (10.176)	72.905 (9.520)	77.749 (8.457)	78.444 (9.283)	75.964 (8.333)	72.103 (8.066)	70.963 (11.824)
NPL/GL	1.444 (0.558)	1.045 (0.407)	1.038 (0.468)	1.085 (0.461)	1.008 (0.643)	0.832 (0.553)	0.820 (0.445)	0.729 (0.448)	0.979 (0.613)	3.124 (1.449)	4.770 (1.637)	1.536 (1.453)
LLP/NL	0.313 (0.343)	0.420 (0.294)	0.537 (0.134)	0.540 (0.165)	0.567 (0.196)	0.458 (0.167)	0.401 (0.203)	0.356 (0.156)	0.457 (0.197)	0.727 (0.373)	1.053 (0.581)	0.534 (0.341)
Eq/TA	6.998 (2.035)	7.220 (2.390)	7.141 (2.244)	7.254 (2.300)	7.209 (2.280)	6.990 (2.349)	8.213 (2.177)	6.990 (2.355)	6.572 (2.290)	6.157 (2.167)	6.448 (2.275)	6.987 (2.307)
Dep/TL	77.889 (12.825)	77.994 (12.450)	78.301 (12.390)	79.294 (11.942)	79.214 (12.132)	78.248 (13.380)	60.243 (17.010)	73.512 (16.824)	73.193 (17.944)	73.072 (16.585)	63.983 (18.058)	74.154 (16.015)
DepGR	-4.994 (8.816)	7.257 (10.238)	6.852 (5.227)	32.545 (11.516)	32.822 (7.732)	21.877 (8.295)	-2.438 (8.477)	33.223 (17.150)	28.460 (18.213)	2.350 (16.388)	5.823 (14.042)	15.903 (18.906)
CIR	60.948 (9.267)	61.504 (11.446)	60.119 (10.123)	60.815 (10.290)	58.449 (9.067)	58.490 (9.159)	57.727 (8.553)	55.560 (11.446)	51.839 (11.236)	55.260 (12.843)	52.453 10.590	57.337 (10.952)
Size	6.722 (0.528)	6.705 (0.499)	6.727 (0.551)	6.831 (0.566)	6.923 (0.570)	7.012 (0.589)	7.171 (0.603)	7.103 (0.627)	7.210 (0.623)	7.236 (0.633)	7.384 (0.635)	7.014 (0.625)
HHIRD	0.276 (0.065)	0.266 (0.070)	0.243 (0.060)	0.261 (0.060)	0.293 (0.075)	0.308 (0.062)	0.377 (0.056)	0.311 (0.069)	0.241 (0.076)	0.202 (0.082)	0.268 (0.081)	0.275 (0.082)
HHIIC	441	581	551	513	506	482	487	441	459	497	507	496.302 (40.524)
GDP	4.700	5.000	3.600	2.700	3.100	3.300	3.600	4.000	3.600	0.900	-3.600	2.777 (2.235)
Inflation	2.900	4.000	2.700	4.000	2.600	3.200	3.700	2.700	4.200	1.400	0.800	2.914 (1.042)
Interest	3.000	4.750	3.250	2.750	2.000	2.000	2.250	3.500	4.000	2.500	1.000	2.840 (0.993)

Table 5

Determinants of bank profitability in Spain.

This table reports the determinants of the profitability of Spanish banks during 1999-2009 using the system-GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). The sample comprises 89 banks (697 observations). *ROA* is the pre-tax return on average assets. *ROE* is the pre-tax return on average equity. See Table 3 for a description of the rest of the variables. Except for *HHIIC*, *GPD*, *Inflation* and *Interest*, all variables are considered as endogenous in our model. We report heteroskedasticity-consistent asymptotic standard errors in parentheses, and significance levels are indicated as follows: ***= significant at the 1% level; **= significant at the 5% level; *= significant at the 10% level. z_1 and z_2 are Wald tests of the joint significance of the reported coefficients and of the bank type dummies, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses. m_i is a serial correlation test of order i using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses.

Variables	**Model 1**	
	ROA	**ROE**
Dep. $Var._{t-1}$	0.455***	0.398***
	(0.085)	(0.070)
Loan/TA	0.005***	0.033***
	(0.002)	(0.007)
NPL/GL	-0.041**	-0.913***
	(0.017)	(0.266)
LLP/NL	-0.120***	-0.743**
	(0.038)	(0.358)
Eq/TA	0.030***	-0.762***
	(0.011)	(0.136)
Dep/TL	0.002**	0.036**
	(0.001)	(0.018)
DepGR	0.000	0.011
	(0.001)	(0.013)
CIR	-0.016***	-0.260***
	(0.003)	(0.043)
Size	-0.032	-0.028
	(0.037)	(0.713)
HHIRD	0.134	3.235
	(0.229)	(4.632)
HHIIC	0.003***	0.032***
	(0.001)	(0.008)
GDP	0.049***	0.604***
	(0.013)	(0.207)
Inflation	0.058***	0.458
	(0.016)	(0.279)
Interest	-0.088***	-0.590*
	(0.022)	(0.345)
Commercial Bank	0.016**	0.177
	(0.007)	(0.118)
Savings Bank	0.006	-0.033
	(0.006)	(0.106)
Constant	-0.542	5.907
	(0.578)	(9.487)
z_1	955.42 (14)	652.72 (14)
z_2	5.78 (2)	10.77 (2)
m_1	-2.04	-3.05
m_2	1.01	-0.02
Hansen	75.95 (272)	71.59 (272)

Table 6

Differences between savings and commercial banks in Spain.

This table reports the differences of the determinants of the profitability between savings and commercial banks in Spain during 1999-2009. See Table 3 for a description of the variables. *p*-values are calculated using the two-sample *t* test with unequal variances. We report standard errors in parentheses, and significance levels are indicated as follows: ***= significant at the 1% level; **= significant at the 5% level; *= significant at the 10% level.

Variables	Savings Banks	Commercial Banks	Difference
Loan/TA	72.032	63.450	8.582**
	(0.470)	(1.208)	(3.296)
NPL/GL	1.599	1.374	0.225*
	(0.075)	(0.110)	(0.143)
LLP/NL	0.538	0.442	0.096**
	(0.159)	(0.031)	(0.035)
Eq/TA	6.818	7.118	-0.300
	(0.106)	(0.198)	(0.225)
Dep/TL	77.597	59.610	17.987***
	(0.626)	(1.207)	(1.356)
DepGR	15.034	16.328	-1.249
	(0.946)	(1.457)	(1.738)
CIR	58.308	53.846	4.462***
	(0.432)	(1.197)	(1.273)
Size	7.042	7.231	-0.189***
	(0.026)	(0.057)	(0.062)
HHIRD	0.257	0.325	-0.068***
	(0.004)	(0.006)	(0.007)
Observations	422	174	

Table 7

Robustness checks.

This table reports the results of the robustness checks. The sample comprises 89 banks (697 observations). *ROA* is the pre-tax return on average assets. *ROE* is the pre-tax return on average equity. See Table 3 for a description of the rest of the variables. Model 2 is estimated using ordinary least squares (OLS) with robust standard errors clustered by bank (reported in parentheses). Model 3 uses fixed-effects (within) regression with robust standard errors clustered by bank (reported in parentheses). Model 4 considers *Liq/TA* (liquid assets as a percentage of total assets) in place of *Loan/TA* ratio. Model 5 include $Size^2$ (the square of log (assets)) in place of *Size*. Model 6 considers *NonII/TOR* (non-interest income as a percentage of total operating revenue) in place of *HHIRD*. The rest of the variables remain the same. We report heteroskedasticity-consistent asymptotic standard errors in parentheses. Significance levels are indicated as follows: ***= significant at the 1% level; **= significant at the 5% level; *= significant at the 10% level. R^2 is the proportion of variation in the dependent variable explained by the model. Hausman is a test which compares the fixed versus random effects, asymptotically distributed as χ^2 under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model, degrees of freedom in parentheses. z_1 and z_2 are Wald tests of the joint significance of the reported coefficients and of the bank type dummies, respectively, asymptotically distributed as F (models 2 and 3) or χ^2 (models 4, 5, and 6) under the null of no significance, degrees of freedom in parentheses. m_2 is a serial correlation test of second order using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation. Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses.

Variables	**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
	ROA	**ROE**	**ROA**	**ROE**	**ROA**	**ROE**	**ROA**	**ROE**	**ROA**	**ROE**
Dep. $Var._{t-1}$					0.444***	0.401***	0.450***	0.405***	0.446***	0.392***
					(0.080)	(0.072)	(0.082)	(0.069)	(0.079)	(0.070)
Loan/TA [Liq/TA]	0.005**	0.083***	0.002**	0.050**	-0.004**	-0.036***	0.005**	0.027**	0.006***	0.049**
	(0.002)	(0.026)	(0.001)	(0.027)	(0.002)	(0.011)	(0.002)	(0.011)	(0.002)	(0.023)
NPL/GL	0.014	-0.164	0.009	-0.205	-0.048**	-0.862***	-0.037**	-0.919***	-0.040**	-0.927***
	(0.021)	(0.228)	(0.015)	(0.217)	(0.020)	(0.302)	(0.017)	(0.251)	(0.020)	(0.269)
LLP/NL	-0.275***	-3.090***	-0.160***	-1.973**	-0.158**	-0.922	-0.112*	-0.855	-0.111**	-0.685
	(0.056)	(0.848)	(0.049)	(0.799)	(0.080)	(1.392)	(0.065)	(1.138)	(0.058)	(1.027)
Eq/TA	0.061***	-1.011***	0.060***	-0.813***	0.029***	-0.690***	0.028***	-0.778***	0.031***	-0.716***
	(0.014)	(0.132)	(0.013)	(0.142)	(0.009)	(0.122)	(0.010)	(0.138)	(0.012)	(0.132)
Dep/TL	0.003***	0.061**	0.003**	0.026	0.002**	0.031*	0.003**	0.032*	0.002**	0.038**
	(0.001)	(0.024)	(0.001)	(0.018)	(0.001)	(0.015)	(0.001)	(0.016)	(0.001)	(0.016)
DepGR	-0.002	-0.026	-0.000	-0.007	0.000	0.014	0.000	0.012	0.000	0.013
	(0.001)	(0.018)	(0.001)	(0.010)	(0.001)	(0.012)	(0.001)	(0.013)	(0.001)	(0.014)
CIR	-0.031***	-0.410***	-0.019***	-0.277***	-0.016***	-0.267***	-0.016***	-0.268***	-0.015***	-0.263***
	(0.003)	(0.039)	(0.003)	(0.053)	(0.003)	(0.047)	(0.003)	(0.046)	(0.003)	(0.045)
Size [$Size^2$]	-0.129***	-0.927*	-0.209	-4.638	-0.067	-0.177	-0.002	-0.008	-0.054	0.355
	(0.044)	(0.516)	(0.184)	(3.717)	(0.045)	(0.513)	(0.002)	(0.047)	(0.039)	(0.589)
HHIRD [NonII/TOR]	-0.091	-1.535	0.399*	2.473	0.075	2.983	0.188	3.746	0.002	0.030
	(0.247)	(3.262)	(0.217)	(3.549)	(0.227)	(4.254)	(0.210)	(5.002)	(0.003)	(0.057)
HHIIC	0.003***	0.026***	0.002**	-0.001	0.003***	0.032***	0.003***	0.032***	0.003***	0.036***
	(0.000)	(0.005)	(0.001)	(0.005)	(0.000)	(0.009)	(0.000)	(0.009)	(0.001)	(0.008)
GDP	0.129***	1.595***	0.055***	0.575***	0.044***	0.599***	0.051***	0.568**	0.049***	0.629***
	(0.014)	(0.185)	(0.014)	(0.208)	(0.013)	(0.219)	(0.011)	(0.224)	(0.013)	(0.217)
Inflation	0.029**	0.507**	0.014	0.296	0.057***	0.509*	0.058***	0.468*	0.056***	0.516*
	(0.014)	(0.204)	(0.015)	(0.243)	(0.018)	(0.273)	(0.013)	(0.282)	(0.016)	(0.267)
Interest	-0.115***	-1.433***	-0.023*	-0.143	-0.089***	-0.634*	-0.088***	-0.566	-0.084***	-0.677*
	(0.022)	(0.296)	(0.013)	(0.268)	(0.022)	(0.338)	(0.019)	(0.377)	(0.021)	(0.371)
Commercial Bank	0.348***	4.227***	-0.014	0.036	0.019**	0.212*	0.015**	0.153	0.020**	0.152
	(0.092)	(0.949)	(0.013)	(0.164)	(0.006)	(0.114)	(0.006)	(0.108)	(0.009)	(0.114)
Savings Bank	0.139***	1.444**	-0.035***	-0.499***	0.004	-0.031	0.004	-0.045	0.008	-0.042
	(0.048)	(0.641)	(0.010)	(0.132)	(0.005)	(0.096)	(0.005)	(0.093)	(0.007)	(0.096)
Constant	1.326***	31.899***	2.784*	67.768***	0.357	10.456	-0.626	7.045	-0.502	1.980
	(0.497)	(6.047)	(1.050)	(14.589)	(0.343)	(6.990)	(0.482)	(8.364)	(0.537)	(8.603)
R^2	0.705	0.596	0.597 (within)	0.516 (within)						
Hausman			88.91 (15)	77.73 (15)						
z_1	40.76 (13, 97)	36.09 (13, 97)	16.68 (13, 584)	12.77 (13, 584)	937.18 (14)	745.94 (14)	922.29 (14)	784.75 (14)	762.11 (14)	573.38 (14)
z_2	7.29 (2, 97)	9.98 (2, 97)	8.01 (2, 584)	11.77 (2, 584)	12.63 (2)	10.68 (2)	6.80 (2)	10.04 (2)	6.98 (2)	7.60 (2)
m_2					1.02	-0.06	0.98	-0.03	1.02	-0.11
Hansen					67.68 (272)	76.16 (272)	68.20 (272)	70.67 (272)	69.40 (272)	72.56 (272)