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The Effect of the Restructuring Process on Economic Value Creation

The Case of the Spanish Banking Sector

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Abstract

The impact of the financial crisis on the Spanish banking sector has led to a wave of mergers and acquisitions whose aim has been to restore financial stability. In this context, a large number of savings banks (or *cajas* as they are known in Spain) disappeared as the result of a restructuring process that began in 2010, while, those that remained had to undergo a change to their legal status and operate under the legal form of a corporate bank.

To complete this intense and challenging process, the equivalent of 9.6% of the GDP in public aid was utilized between 2008 and 2014[1] [2] and 25% of jobs in the sector had been destroyed by November 2015.[3] In this sense, the quantitative and qualitative changes in the Spanish banking industry fully justify, on socioeconomic grounds, an investigation into the outcome of the restructuring process. There is a long list of metrics that could be used to evaluate the performance of banks after the restructuring, from a social and from a purely financial point of view. This dissertation has opted to use an economic metric of value creation. Specifically, we measure value by means of Economic Value Added Spread (EVAS), a relative measure of economic value creation that is arguably a superior metric of performance than traditional accounting measures.

In order to conduct the analysis, we divide banks and *cajas* into two clusters: one that includes credit institutions that merged, and another comprised of entities that did not do so. In this context, we aim to observe differences in value creation between the two clusters and, before and after the start of the restructuring process. This will set the bases for our final objective: to assess whether the restructuring process led to merged banks and *cajas* creating or destroying economic value. For this purpose, we rely on a panel dataset that includes data related to EVAS (the dependent variable), bank-specific variables, macroeconomic variables and dummy variables between 2006 and 2014. More specifically, we rely on the Differences-in-Differences (DID) Modeling approach to observe differences between groups (*interaction* effects).

Our results show significant differences between merged and non-merged banks. While merged banks were, on average, more efficient, better financed, larger and possessed a better asset structure after the restructuring process, non-merged banks held better quality assets, were better capitalized and more diversified. However, bank size, asset quality and funding were found to be not significant and hence do not explain changes in EVAS. Moreover, the analysis suggests that merged institutions were unable to create value as a result of the restructuring process, *ceteris paribus*. Thus, from an EVA point of view and according to the data at our disposal, we do not see evidence of value creation among merged institutions due to the restructuring. In fact, we see signs that the restructuring process may have caused merged institutions to destroy economic value.

Keywords: Restructuring process; Mergers; Acquisitions; Economic value added; Spanish banking sector.

[1] Eurostat. (2016a). GDP and main components (output, expenditure and income).
[2] Segovia, E. and Grasso, D. (2014). Cinco años y 100.000 millones después: historia del rescate de la banca española.
[3] Maudos, J. (2015). *Retos del sector bancario español tras la reestructuración.*

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III. Abbreviations

AEB	Spanish Banking Association
AS	Asset Structure
AQ	Asset Quality
BdE	Bank of Spain
Cap	Capitalization
CAPM	Capital Asset Pricing Model
CCM	*Caja Castilla La Mancha*
CECA	Spanish Confederation of Savings Banks
CET1	Common Equity Tier 1
CIR	Cost to Income Ratio
CIs	Credit Institutions
CoC	Cost of Capital
Cov	Covariance
CPI	Consumer Price Index
DID	Differences-in-Differences Model
D/E	Debt-to-Equity
EAD	Exposure at Default
ECB	European Central Bank
EFSF	European Financial Stability Facility
EL	Expected Losses
Euribor 12M	Euro Interbank Offered Rate 12 Months
EVA	Economic Value Added
EVAS	Economic Value Added Spread
F	Funding
FE	Fixed Effects
FROB	Fund for Orderly Bank Restructuring
Funcas	Savings Banks Foundation
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
INE	Spanish Statistical Office
LGD	Loss Given Default

LLP	Loan Loss Provisions
LogTA	Logarithm of Total Assets
MoU	Memorandum of Understanding
MVA	Market Value Added
M/B	Market-to-Book Value
M&As	Mergers and Acquisitions
NI	Net Income
OE	Operating Efficiency
OER	Operating Expense Ratio
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
RAROC	Risk Adjusted Return on Capital
RE	Random Effects
ROA	Return on Assets
ROC	Return on Capital
ROE	Return on Equity
RD	Revenue Diversification
RP	Risk Premium
Sareb	Company for the Management of Assets proceeding from Restructuring of the Banking System
SSM	Single Supervisory Mechanism
T-bill	Treasury Bills
TWB	The World Bank
VaR	Value at Risk
w	Weighted
WACC	Weighted Average Cost of Capita

1. Introduction

The global financial crisis that began in 2007 has had an unquestionable negative economic impact on the financial and banking sectors around the world. Governments, Central Banks and numerous international organizations have all worked hard to mitigate the damages caused by the crisis, restore stability and trust in the banking industry, and prevent future crises.

Before the financial and economic crisis, the Spanish economy enjoyed over two decades of development and major expansion both within and beyond its borders. At this point, the Spanish banking industry was institutionally diverse, comprising savings banks (known as *cajas*), commercial banks, and credit unions. The *cajas* or not-for-profit entities resembled the savings banks that for a long time had been popular in Europe and elsewhere. They had complex socioeconomic missions (contribute to financial inclusion, foster competition, support social works) and ownership and governance structures (with board representatives comprising depositors, employees and public authorities). However, contrary to what may have been expected, *cajas* had been able to provide more than half of Spanish retail banking and with good profit records.[4] On the other hand, while commercial for-profit banks were large shareholder- controlled banks highly involved in international business, the credit unions were in general small banks operating mainly in rural areas with a market share well below 10%.[5]

During the first years after joining the Euro, the *cajas* took advantage of the favorable economic situation to rapidly expand their operations and tried to compete on an equal footing with corporate banks. In doing so, they increased the number of complex financial products in their portfolios, expanded at two-digit rates in the mortgage market (real estate), and rapidly became oversized and inefficient. Although the initial economic and financial results seemed to show that *cajas* were doing the right thing, the crisis soon proved that they had gone too far in the convergence to behave as corporate banks. In this regard, the problem was not that *cajas* were doing worse than banks when things were going well, but that they

[4] Cuartas, J. (2012). *El desenlace de las cajas Las cajas actuaron como bancos sin tener la posibilidad de capitalizarse como ellos.*
[5] Martín-Oliver, A. and Ruano, S. and Salas-Fumás, V. (2015). The Fall of Spanish Cajas: Lessons of Ownership and Governance for Banks.

had neither the adequate capital funding sources, nor the right governance mechanisms to respond and adapt to a severe financial and economic crisis.[6]

The accounting statements and share prices of banks in 2007 were exceptional, with growth rates and market-to-book values among the highest in Europe and around the world. But the crisis unveiled severe weaknesses that the markets and the public authorities had overlooked: the accounting profits of banks and the market values of their shares were being supported by the inflation of real estate prices. When the bubble burst and real estate and other asset prices went down, the fair value of bank loans and other financial assets held by banks plummeted, causing them to experience severe solvency problems. Since lending was financed by issuing large volumes of securities that were often subscribed by foreign investors, the anticipation of the solvency issues also triggered a liquidity problem. Certainly, not all banks were equally exposed to these risks. *Cajas* were generally in a worse situation than corporate banks.[7]

In this context, the intervention of the banking system was inevitable. To deal with the increasingly difficult situation, the Spanish Government, together with the Bank of Spain (BdE), established legal bases to deal with the restructuring of the industry. New institutions and Royal-Decree Laws were constituted to restore financial stability and rearrange a dysfunctional sector. The scenario in which the Spanish authorities had to intervene was not helping their task. As bank branches began to close down to decrease excess capacity and increase efficiency, the unemployment rate soared and macroeconomic conditions worsened. Given the recessionary economic conditions, national resources were insufficient to restore the estimated potential losses to be covered and, in 2012, Spain finally had to appeal for financial support from the European Financial Stability Facility.[8]

In order to successfully recapitalize the banking sector, an 18-month long program was designed to outline the steps Spain should follow. Solvency and profitability levels were believed to be improved by a deep restructuring of banks and *cajas*. As a result, the banking sector was immersed in a great wave of mergers and acquisitions (M&As) that redefined

[6] Cuartas, J. (2012). *El desenlace de las cajas Las cajas actuaron como bancos sin tener la posibilidad de capitalizarse como ellos.*
[7] Idem Note 6.
[8] Banco de España. (2012). *Bank recapitalisation and restructuring process.*

Spain's banking landscape. A large number of *cajas* disappeared as the result of the M&As, while those that remained had to change their legal status.[9]

The bailout of the banking sector was formally concluded in January 2014. Overall, the restructuring process led to better-capitalized and more solvent financial institutions. The impact of this event on bank performance is however unknown as M&As are complex procedures that involve long integration processes.[10] The post-merger output depends largely on synergies that define performance and that are hard to capture in the short run. Our objective in this research is thus to consider the longitudinal dimension of the restructuring process. More specifically, we aim to analyze how this exceptional event has shaped the creation of economic value through time.

To provide the reader with a better understanding of the situation in which Spain and the banking industry have been involved, the dissertation starts by elaborating on the historical evolution of commercial and, more especially, of savings banks. Then, we introduce the restructuring process and the new mapping of the Spanish banking system. With the bases set, we elaborate on the literature that has covered the analysis of bank performance and subsequently discuss the methodology for our research. Finally, we dedicate the last part of the paper to further develop our research, assess the empirical evidence and conclude with a brief outlook of the Spanish banking industry.

1.1 Motivation

The purpose of this dissertation is, in brief, to investigate the economic value creation levels of Spanish credit institutions (CIs) in the pre- and post-restructuring periods, and more specifically, to assess whether banks that merged (as a result of the restructuring policies carried out by the state and the BdE since 2010) have created more or less value than those that did not.

We have a number of personal motivations for choosing this as our area of study. First of all, we have an initial interest in the M&As processes that companies undergo; how they work and whether they contribute to value creation for companies. This shared personal interest

[9] Romero, A. (2015). *Las cajas de ahorros tras la reestructuración.*
[10] Rtve. (2014). *Se cierra el rescate bancario, aunque España seguirá vigilada hasta que devuelva el préstamo.*

made us think about the Spanish banking sector as a natural industry to look into, since it has been immersed in a constant and prolonged merging process since 2010.

Similarly, we thought that since we are both Spaniards, this would be a truly interesting topic for our dissertation. On the one hand, carrying out this research would help us better understand the functioning of the Spanish banking system. We are both studying similar Masters within the field of finance, and banking may well be the industry in which we develop our future careers. On the other hand, as Spanish citizens we are concerned about the overall economic and non-economic costs of the banking crisis for Spanish society as a whole, which has paid a high tangible and intangible cost as a result of the crisis.

In 2008, when the housing bubble burst, Spain was severely hit and this directly affected the banking system, especially the *cajas* which were highly exposed to credit granted to the housing sector. Therefore, many CIs that had been financing homebuilding had deep financial problems and had to receive financial relief, with some even having to be bailed out by the state. This meant that the Spanish Government had to utilize a substantial amount of tax-payers' money to compensate for the damage caused by previous excesses. By the end of 2012, financial aid to the Spanish banking sector amounted to around € 61 billion, or around 5.8% of national GDP.[11] In March 2014, five years after the intervention of the first savings bank (*Caja de Castilla-La Mancha*), this amount had risen to around € 99.6 billion[12], or about 9.6% of national GDP.[13] It is worth noting that the escalation of the financial support happened at the same time as the Spanish economy was enduring one of its most severe crises, with unemployment rates reaching as high as 26.3% of the labor force in 2013.[14]

We thus believe that, given the magnitude of the public aid used in the restructuring of the Spanish financial system, it is more than justified that the Spanish people express concerns about the consequences of the restructuring process and to what extent the transformed industry is in a situation to pay back at least part of the public help received. Similarly, the importance of the financial industry for the economy and society as a whole is another reason that has motivated us to consider these issues. It is widely argued that a solvent, efficient,

[11] Martin-Aceña, P. (2013). The savings banks crisis in Spain: When and how?. *ESBG Perspectives No66*. 85-98.
[12] Segovia, E. and Grasso, D. (2014). Cinco años y 100.000 millones después: historia del rescate de la banca española.
[13] Eurostat. (2016a). GDP and main components (output, expenditure and income).
[14] OECD. (2015). Unemployment - Harmonized Unemployment Rate (HUR).

transparent, and adequately regulated and supervised banking industry is key to avoiding future financial crisis and to fostering economic growth.[15]

Finally, the crisis in the European countries and in Spain at last appears less alarming and economic growth now seems to have a more solid base. It thus makes sense for us to assess whether the state of the banking industry is proceeding along the same lines. A reasonable amount of time has passed since the first merger took place in 2009 and synergies may have begun to emerge. In this context, we would already expect to be able to appreciate the results of the restructuring process and its impact on value creation.

1.2 Goals

The study of the determinants of bank performance has always attracted a lot of attention in academic research into banking. Numerous papers have addressed the importance of measuring this factor in terms of profitability. These studies have relied on bank-specific and macroeconomic variables to explain variations in bank performance, while researchers have made use of different regression analysis techniques to capture the level of significance of each factor and thus explain the evolution of banks' returns.

The global financial crisis has now opened the door to a wave of papers focused on the impact of the financial crisis on bank performance. This interest results from its profound repercussions on overall economic growth. Spain has been no exception. In 2008, the crisis began to unfold in the Spanish banking sector and in the following years the BdE had to initiate a restructuring process that has still not reached its end.

In this context, our objective is to understand and analyze the drivers of economic value creation. In choosing this performance measure we are already setting our research apart from the bulk of the literature review. While most studies tend to rely on non-risk adjusted profitability ratios to measure bank performance, we have set an economic measure as our dependent variable. This measure is arguably superior to profitability ratios, such as return on assets and/or return on equity, since it adjusts these traditional measures by the opportunity cost of the bank's capital. In this sense, while we adjust shareholders-controlled banks by its cost of equity capital, we deduct the opportunity cost of not-for-profits banks like *cajas* to

[15] IMF. (2015). *Financial System Soundness.*

measure economic value creation. That is, even though *cajas* are not privately appropriated, their equity has an opportunity cost that must be accounted for when evaluating economic performance.

With respect to the drivers of bank performance, our objective in this research is twofold. Our first aim is to reveal bank-specific variables that explain the evolution of relative economic value added (EVAS), which we define as the *spread* or difference between return on equity and the bank's equity cost of capital. In this sense, we rely on the main drivers of performance reported in the literature and observe their evolution between 2006 and 2014. To pursue this, we graphically explore these factors together with the evolution of EVAS, and use a detailed firm-level panel dataset to measure their level of significance.

Secondly, we aim to analyze the impact that the restructuring process had on EVAS for merged banks as compared to non-merged banks. In this sense, we divide banks and *cajas* into two clusters: one including all CIs that merged, were absorbed or absorbed another CI[16], and another for all CIs that did not merge, were not absorbed or did not absorb another CI.[17] This distinction offers a first insight into the differences in EVAS and bank-specific variables between merged and non-merged banks. Graphically, we expect to observe two variations in pattern: one between both clusters, merged and non-merged; and another between the time period, prior to and following the start of the restructuring process. Again, we rely on a panel dataset to capture the impact of these two events through dummy variables.

Finally, the goal of this setup is to reveal the effects of the mergers on economic value creation. More specifically, we aim to conclude whether merged banks have created more or less economic value as a result of the restructuring of the banking industry that began in Spain in 2010. In this way, our research goes beyond structural changes and offers us the chance to determine whether the public aid used for this event has been fruitful, at least in terms of economic value creation. Other intangible (for example, the loss of trust in banks) and indirect effects (like the impact of the financial and banking crisis on jobs and lost business) are left for future research.

[16] Throughout the text, we broadly refer to this group of CIs as those that "were involved in the mergers" or as the "banks that merged".
[17] We broadly refer to this last group of CIs as those "not involved in the mergers".

2. Overview of the Spanish Banking System

The following section provides a brief summary of the history of commercial banking and savings banks in Spain. We cover the period from the creation of the first bank and *cajas* till the beginning of the 21st century, when our main analysis starts. In the next pages, we follow descriptions provided by the *Banco de España* (2016), Martín-Aceña, P. (2005), Ontiveros-Baeza, E. et al. (2013), and Roldán, J.M. et al. (2015). To conclude this section, we look into the restructuring process and its impact on the mapping of the banking sector in Spain.

2.1 Commercial Banks in Spain

The history of Spanish banks is comparable to that of any other European country. It commenced with the foundation of the first bank in the early 1780s, suffered the consequences of various crises and finally developed into a largely diversified sector with numerous players involved.

Overall, the decade that followed the founding of the first bank in Spain, the *Banco Nacional de San Carlos* established in 1782, was characterized by a good economic situation that encouraged entrepreneurs and traders to establish banks in the main Spanish cities. Numerous commercial banks emerged during this period. Among them, *Banco de Bilbao* and *Banco de Santander*, the origins of today's well known BBVA and Santander.

Thereafter, four main events will shape the landscape of Spanish commercial banks. The first took place in 1866. In this year Spain, was hit by a severe crisis in the railway business, one of the major sources of income to the country. As a result, 25 banks had to interrupt payments, liquidate their business or declare bankruptcy.

Secondly, Spanish banks were severely hit by the post-war economic crisis of WWI. While Spain had become a net-exporter and had greatly benefited from trading goods with other European countries at war, the demand for Spanish goods suffered a severe drop after the war was over. Consequently, many banks experienced liquidity and solvency issues.

Similarly, the Spanish Civil War (1936-1939) only changed the banking landscape during the post-war period. In fact, there were a remarkable number of takeovers and mergers that

sharply increased the concentration of wealth in the banking sector. By the end of 1960, the five largest banks (out of 109) in Spain controlled 70% of the banking assets.

Finally, the oil crisis in the 1970s had a severe impact on Spain's economy. The poor performance of industrial companies together with high levels of inflation caused a profound financial crisis in Spain that lasted from 1977 until 1985. In this context, 56 banks were severely disturbed and over 48,000 jobs within the sector were destroyed. After the crisis, the tendency towards integration of institutions was intensified by a new wave of takeovers and mergers. Some of the most significant were the buyout of *Banca Catalana* by *Banco de Vizcaya*, and that of *Banco de Urquijo* by *Banco Hispanoamericano*. This event marketed the beginning of numerous M&As that concluded in the year 2000 with the creation of two of Spain's major banking groups, BBVA and Grupo Santander.

2.2 Savings Banks in Spain

The role of commercial banks in society is known worldwide. Most European countries rely on these financial institutions to provide loans and capture deposits from their citizens. Similarly, a smaller number of nations rely on a dual banking sector. While these countries make use of commercial banks, they also count on the performance of savings banks. In Spain, we refer to these types of banks as *cajas*. To deliver a better understanding of the restructuring process, the following section provides a brief overview of the history of these peculiar entities.[18]

The Introductory Period

The establishment of the first *caja* in Spain took place in 1834. Originally, they were non-profit institutions that would restrict their activities to local markets or provinces. Their role in society was centered on three main aspects: avoiding financial exclusion, boosting the economic development of the region, and carrying out social welfare activities.

The number of *cajas* experienced a sharp increase in 1935. As charitable organizations and wealthy local patrons founded similar institutions, the presence of savings banks expanded to approximately 171 branches in the Spanish territory. Shortly after, local public entities also

[18] This section has mainly relied on information extracted from the book: Garcia-Delgado, JL (2013). *Lecciones de Economia Española*. 11th ed. Madrid: S.L. Civitas Ediciones.

jumped on the bandwagon forming their own *cajas* and holding a diversified portfolio of government bonds and securities on listed companies.

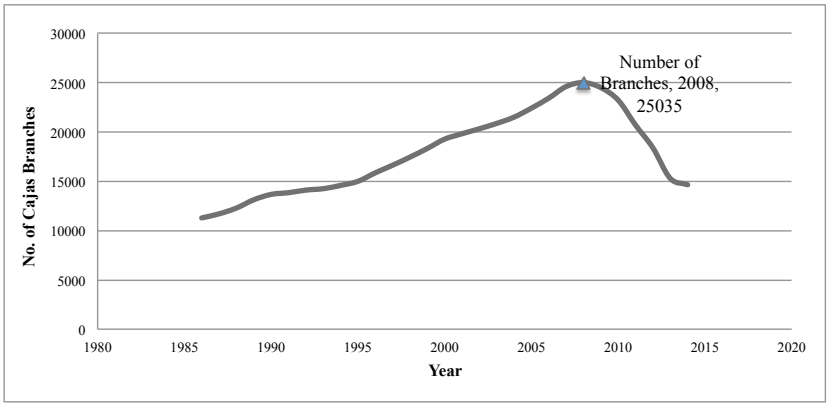
As non-profit institutions, their financial resources were limited and mainly consisted of time deposits and retained profits. However, this scenario enabled *cajas* to carry out their activities away from the up and downs of both domestic and international capital markets. Their limited area of activity, imposed by law, also provided *cajas* with a superior ability to recognize and meet the needs of their customers. Their simple design and safe portfolio of products enabled them to evolve over the course of the years without experiencing any severe crisis - by 1975 these entities represented 30% of the national credit market.

The Expansion Period

Already in 1977 *cajas* were allowed to perform activities that were consistent with those of commercial banks. The enlargement of the range of operations together with the enforcement of Royal Decree-Law 1582/1988 (*cajas* were allowed to open branches with no restrictions within Spain) enhanced the competitive levels of savings banks.

Figure 2.1

Development of the Number of Branches of Savings Banks between 1986 and 2014.



Source: Own elaboration based on data from CECA

Figure 2.1 illustrates the development of the number of branches within the Spanish territory. From the data, we observe that branches experienced positive growth between 1986 and 2008. The economic prosperity that Spain was enjoying in the late 1990s partially explains this growth - over 9,600 branches were opened between 1996 and 2008.[19] In 2009, however,

[19] Fuertes, J. V. (2011). Cajas de ahorros: una historia singular. *Cuadernos de pensamiento político*, 105-116.

branches started to close as a result of the initiation of the restructuring process. This phenomenon is explained in more detail in the section below, *The Restructuring Process.*

As the ability of *cajas* to compete against commercial banks increased, so did their propensity to expand across the country. It is important to notice, however, that *cajas* were becoming more dispersed and possibly less efficient. The increase in the number of branches was not followed by an increase in the number of *cajas*. Numerically, while branches experienced a total increase of 75% between 1993 and 2008, the number of *cajas* remained stable at an average number of 48 *cajas.*[20]

The structure of these entities also became increasingly complex, and so did that of their governing bodies. For instance, the original founders were slowly losing presence in the Board of Directors in favor of public authorities, mainly local governments that were heavily influenced by the political parties in the region. Predictably, this rearrangement led to changes in the goal of *cajas* at the expense of their original non-profit standpoint and prioritized their growth in market share. The late 1990s were hence characterized by an increase in the number of complex products in their portfolios and a substantial rise in the number of branches around the country. On average, savings banks increased their number of branches 5% per year between 1996 and 2000[21], and reached their peak in 2008 with over 25,035 operating branches - see figure above.

The Maturity Period

Like many other advanced economies, Spain also took advantage of the macroeconomic stability of the late 1990s and early 2000s known as The Great Moderation. The steady growth that the country had experienced created a false feeling of eternal luck that drove savings banks towards reckless actions. For instance, they decided to lower interest rates to increase their market share and attract customers whose credit risk was somewhat higher. Furthermore, the boom in the building sector also encouraged savings banks to provide a large number of mortgage credits and to take part in the financing of real estate. By the end of 2007, loans to this sector represented 42% of the assets on their balance sheets compared

[20] Fuertes, J. V. (2011). Cajas de ahorros: una historia singular. *Cuadernos de pensamiento político*, 105-116.
[21] Delgado, J; Saurina, J; Townsend, R. (2008). Estrategias de expansion de las entidades de depósitos españolas. Una primera aproximación descriptiva. *Banco de España. Estabilidad Financiera*. 15, 101-107.

to approximately 10% in 2001.[22] Additionally, the percentage of dubious loans in the portfolio of savings banks increased by 326% between 2007 and 2008 - 18% above the increase experienced by commercial banks.[23] The dangerous nature of these actions was amplified by the approach taken by *cajas* which allowed them to finance the expansion of their books. Instead of choosing more solid ways of financing, such as increasing the number of deposits, they began to be dependent on the wholesale financial market; mainly issuing mortgage bonds that were backed up by their own portfolio of mortgages.

When the world financial crisis finally unfolded in 2007 and the Spanish real estate market collapsed in 2008, savings banks found themselves in a challenging scenario; vast numbers of unpaid loans, difficulties accessing wholesale international markets and insufficient capital to cover losses. At this point, savings banks controlled 53.96% of the market share. Savings banks had become the key player in the Spanish financial sector.[24]

2.3 The Restructuring Process

In 2009, *Caja de Castilla-La Mancha* was the first savings bank to suffer the consequences of accumulated imbalances. The numerous investments in the construction sector led to a lack of liquidity forcing the BdE to intervene. By the end of 2009, it was clear that the accelerated pace at which savings banks had been growing over the past years had led to an oversized structure with a noticeable excess capacity. In fact, Spain was the country with the highest number of branches in relation to its population: approximately one branch per 1000 habitants versus 0.5 in Germany or 0.2 in the United Kingdom.[25]

First Intervention

To deal with the increasingly difficult situation, the BdE and the Spanish government established legal bases to handle the restructuring of the sector. The creation of the Fund for Orderly Bank Restructuring (known as FROB from its Spanish initials) took place in July **2009**. Its role was to handle the rearranging processes of the savings banks, provide equity to entities that were going through any type of integration and provide financial support to

[22] Delgado, J; Saurina, J; Townsend, R. (2008). Estrategias de expansion de las entidades de depósitos españolas. Una primera aproximación descriptiva. *Banco de España. Estabilidad Financiera*. 15, 101-107.
[23] Fuertes, J. V. (2011). Cajas de ahorros: una historia singular. *Cuadernos de pensamiento político*, 105-116.
[24] Cuartas, J. (2012). *El desenlace de las cajas Las cajas actuaron como bancos sin tener la posibilidad de capitalizarse como ellos.*
[25] Barron, I. (2009). *La banca cerrará miles de sucursales.*

savings banks with viability difficulties. Unfortunately, the FROB was unable to restore financial stability by itself.

Second Intervention

In **2010**, the Spanish authorities had to enforce additional Royal-Decree Laws on the route *cajas* had to follow to improve their financial status. Specifically, *cajas* were mandated to improve their corporate governance structure. To avoid banking malpractices and conflicting interests, *cajas* had to reduce the weight of public authorities and increase professionalization in their governing bodies. In addition, new alternatives to perform their activities were introduced. Firstly, *cajas* were allowed to execute their financial services through a bank controlled by the *caja* as it owned 50% of its capital. This adjustment in the legislation led to the first changes in Spain's financial landscape. The section *Map of the Restructuring Process* illustrates these changes clearly. Figure 2.3 shows how mergers began to take place largely in 2010. Finally, *cajas* were allowed to transform into special foundations which would preserve their social program and to transfer their financial business to a bank.[26]

Third Intervention

Unfortunately, the scenario in which the Spanish authorities had to intervene was not an easy one. As branches began to close down to decrease excess capacity and increase efficiency, the unemployment rate soared and macroeconomic conditions worsened. Citizens began to lose confidence in the Spanish financial sector and banks struggled to maintain high solvency ratios. In **2011**, new capital ratios were established to strengthen banks' balance sheets and restore the trust in the Spanish economy. In this sense, the banking sector enforced the new international capital standards, Basel III, before their obligatory establishment in 2013.[27] The stress tests carried out by the European Supervisory Authority revealed that twelve banks (4 commercial banks and 8 savings banks) were unable to meet the requirements established by the BdE - the financial system was 15,152 million euros short.[28]

Fourth Intervention - Europe

The restructuring process of the Spanish banking sector became especially noticeable from June **2012** onwards. The instability that the Spanish economy had experienced in the

[26] BOE. (2010). *Disposiciones Generales*. No169(1), 61427.
[27] BOE. (2011). *Disposiciones Generales*. No43(1), 19213.
[28] Banco de España. (2011). *Financial Stability Report.*

previous years forced Spain to look for help beyond its borders. On June 25, Spain appealed for financial support from the European Financial Stability Facility (EFSF). The Eurogroup approved this request and as a result, the Spanish and European authorities signed the Memorandum of Understanding (MoU) in July 2012 and Spain received a credit line of 100,000 million euros to complete the restructuring process.[29]

This 18-month long program specified the steps that Spain had to follow in order to successfully recapitalize the banking sector and thus be authorized to receive external financial assistance. Within the established guidelines of conduct, Spain had to expose its banks and *cajas* to a bottom-up stress testing analysis to identify undercapitalized banks; increase Common Equity Tier 1 to 9% and significantly increase the provisions recognized for loans assigned to real estate assets. One of the key aspects of this process, however, was the creation of the Company for the Management of Assets evolving from the Restructuring of the Banking System (Sareb).[30] This asset management company was designed to absorb all toxic and most illiquid assets that belonged to troubled banks or *cajas*. More specifically, all banks that enjoyed financial support from the FROB were required to transfer toxic assets to the Sareb - see *Outliers* for further information. The purpose of this asset relocation was to liberate banks and *cajas* from impaired assets in return for securities issued by the Sareb and guaranteed by the state.[31] The Sareb would then be in charge of selling these assets in the most cost efficient manner within 15 years.[32]

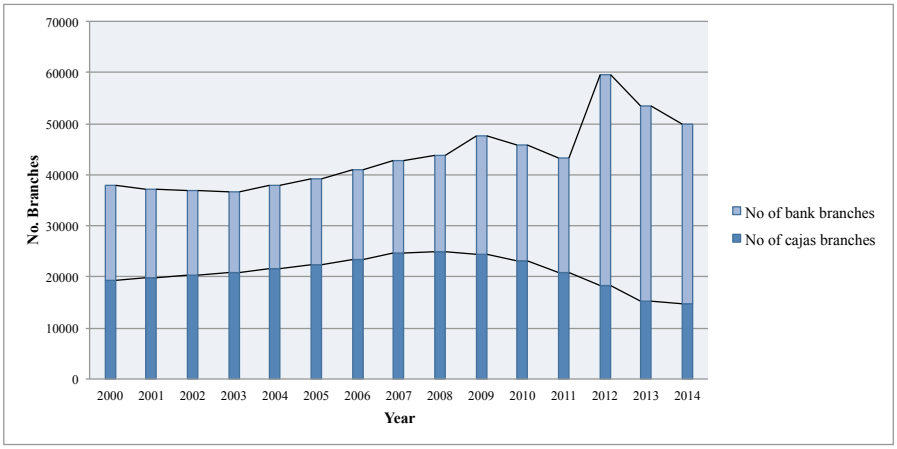
Fifth Intervention

In **2013**, the regulation of savings banks became stricter and additional laws were imposed. Overall, *cajas* were limited to performing their financial activities within their respective province; no member of the governing bodies could have an executive position in any political party and *cajas* with assets that exceeded 10,000 million euros had to transfer their financial activity to a credit institution. These specifications together with the guideline of conduct stipulated in the MoU led to an increase in market concentration. Savings banks began to merge to create larger and more stable commercial banks. Also, banks acquired smaller savings banks to save them from bankruptcy. In 2014, only 11 savings banks

[29] Banco de España. (2012). *Bank recapitalization and restructuring process.*
[30] Idem Note 29.
[31] Peñalosa, J. (2013). Efectos estadísticos sobre los balances de las entidades de crédito españolas de las operaciones recientes de reestructuración y recapitalización. *Boletín Económico*, (FEB).
[32] Veloso, M. (2012). *¿Que es y como funciona el banco malo?.*

remained in the banking landscape in contrast to the 45 *cajas* that existed prior to the crisis.[33] Figure 2.2 reflects these changes and illustrates the sharp increase in the number of branches of banks in contrast to the drop that *cajas* have experienced since 2009.

Figure 2.2
Development of the Number of Branches of Savings Banks and Commercial Banks between 2000 and 2014.



Source: Own elaboration based on data from Editorial Maestre Ediban SL

It is obvious from the above, that while the number of branches of *cajas* decreased by approximately 10% between 2011 and 2012, the number of branches of banks almost doubled.

Financial Recovery

The bailout of the banking sector was formally concluded in January 2014. During the 18 months that had elapsed since the MoU was signed, Spanish authorities had successfully fulfilled all the conditions specified in the agreement. Nonetheless, Spain will continue to be under the vigilance of the European authorities until the totality of the loan of 41,300 million euros is returned. The European Commissioner for Economic and Monetary Affairs, Olli Rehn, pointed out that the challenges facing Spain are still considerable. He also said that although the program had worked, it remained crucial for Spain to continue working on reducing unemployment in a constant and sustainable manner.[34] As of December 2013, the

[33] Romero, A. (2015). *Las cajas de ahorros tras la reestructuración.*
[34] Rtve. (2014). *Se cierra el rescate bancario, aunque España seguirá vigilada hasta que devuelva el préstamo.*

unemployment rate was just over 25%[35] in Spain compared to the average rate in the euro area of 10.9%.[36]

Overall, the restructuring process led to better-capitalized and more solvent financial institutions. The stress test performed by the European Central Bank in October 2014 proved this. In fact, 14 out of the 15 Spanish banks that took part in this analysis exhibited minimum capital ratios (CET1) that were 2 percentage points above the required 5.5% for the adverse scenario. Spanish banks were more stable; they had improved their liquidity and solvency ratios; they had increased deposits on their balance sheets; they had recovered access to financing and had strengthened bank governance policies and regulatory framework procedures.[37] In general terms, the Spanish financial sector had developed the appropriate scenario to slowly regain the citizens' confidence in the Spanish economy.

Map of the Restructuring Process

The financial crisis had a severe impact on Spain's financial landscape. The previous section covered the main legal aspects that were put into place during this restructuring process. The present section, however, focuses on the shaping of this sector. We will show a comprehensive picture of the M&As that took place between 2009 and 2014. Since each deal is characterized by different M&A mechanisms and is prompted by diverse motives, we do not analyze each specific deal. That is not the aim of our study. Instead, we provide a broad representation of the restructuring process to offer the reader a macro view of this event. We believe that this process had an impact on bank performance because banks and *cajas* had to reorganize and adapt to changes in their legal, functional and structural aspects.

Figure 2.3 clarifies the process of integration that began in 2009. As previously mentioned, *Caja de Castilla-La Mancha* (CCM) was the first savings bank to suffer the consequences of accumulated imbalances. Thereafter, the banking sector became overloaded with numerous mergers taking place every year - none of the 44 savings banks involved in the restructuring process were left in 2014.

[35] Munera, I. (2015). *La tasa de paro cierra 2014 por debajo del 24% y con 477.900 desempleados menos.*
[36] Eurostat. (2016b). *Unemployment statistics.*
[37] Expansion. (2014). *Reacciones a los resultados de los test de estrés.*

Figure 2.3

Map of the Restructuring Process in Spain between 2006 and 2014.

Notes: The mapping of the restructuring process is based on the development of the main banking groups provided by the BdE. This process of integration involved 44 savings banks, 8 commercial banks and 2 credit cooperatives as of December 2009. Also, the merger of *Caja San Fernando* and *Monte de Piedad* is not part of the restructuring process.

Source: Own elaboration based on data from BdE

It is clear that the restructuring process has radically changed the Spanish banking sector. The vast number of savings banks that used to characterize the Spanish economy has now been reduced to 11 large commercial banks. This process of consolidation was designed to support bank recapitalization and thereby help these institutions to boost their profitability ratios. Analyzing whether or not this was in fact the end result of this course of action is the aim of our analysis.

Nonetheless, M&As by themselves were not enough for Spain's banking sector to recover its solid banking system. Figure 2.3 illustrates additional mechanisms that were required for banks and *cajas* to achieve appropriate levels of solvency and liquidity and meet the newly set capital requirements. These are identified in three colors: green, blue and red. We identify in green *cajas* that were transformed into banks in accordance with Royal-Decree Law 11/2010. This law allowed savings banks to perform their financial activities through commercial banks. Hence, savings banks such as *La Caixa* changed their legal structure, with this particular entity becoming *Caixabank* in 2011. The main goal of this transformation was to enhance *cajas*' access to capital markets and thus strengthen their capital resources.

Banks that were controlled by the FROB are marked in red. The red boxes in Figure 2.3 therefore represent the time periods in which the FROB controlled over 50% of the capital of the bank.[38] Intervention by the FROB was the result of a banks' inability to meet new capital requirements set in 2011. These banks are referred to as being nationalized. They include: *NCG Banco, BMN, Banco Gallego, Bankia, Catalunya Banc* and *Unnim Banc*. Table 2.1 illustrates the total amount of euros that each entity received from the FROB.

Table 2.1
Nationalized Entities and Financial Aid provided by the FROB.

Commercial Bank	FROB Million Euros
Banco Gallego	245
Unnim Banc	568
BMN	1,645
NCG Banco	9,052
Catalunya Banc	12,052
Bankia	22,424

Source: Own elaboration based on data from BdE

[38] Gonzalo-Alconada, A. (2013). *Las cajas sanas mantendrán el control de sus bancos a cambio de más exigencies.*

For entities to become non-nationalized, they have to be bought from the FROB by private entities. For instance, *Banco Gallego* was acquired by *Banco Sabadell* in 2013 and *Catalunya Banc* was purchased by *BBVA* in 2014.[39] The remaining question, however, concerns the acquirer's ability to remain profitable. *BBVA* paid out 1165 million euros[40] to purchase *Catalunya Banc*. Now, *BBVA* faces the challenge of adequately synchronizing both institutions to ensure that its investment pays out in the long run.

Finally, banks and *cajas* that were intervened by the BdE are colored in blue. The main difference between an intervention and a nationalization is that the former involves the substitution of the bank's administrators and hence takeover of the entity, while the latter does not.[41] Overall, interventions are generally the result of attempted but unsuccessful mergers that did not go through and poor management mechanisms. For instance, *CAM* was intervened because it failed to merge with *Cajastur, Caja Cantabria* and *Caja Extremadura* to constitute *Banco Base*. Similarly, *Cajasur* was intervened after the Board of Directors rejected its merger with *Unicaja*. However, its fragile economic situation resulted in *Cajasur* being finally auctioned and allocated to *BBK* in 2010. *CCM* and *Banco de Valencia* followed a similar process.[42]

[39] FROB. (2014). *The restructuring of the Spanish banking system.*
[40] EUROPA PRESS. (2015). *BBVA completa la compra de Catalunya Banc y asume el control mayoritario de la entidad.*
[41] Rios, S. (2012). *¿Qué diferencias hay entre el rescate a una entidad, la intervención y la nacionalización?.*
[42] Rtve. (2011). *El Banco de España ha intervenido 27 bancos y 16 cajas desde 1978.*

3. Literature Review

The aim of this section is to provide an overview on the main research pursued in the field of bank performance. We will hence review the key measures of bank performance and the main determinants of bank profitability. In addition, we pay a close look at the impact of the financial crisis on the drivers of performance and conclude with an overview of the Spanish banking literature on commercial banks and *cajas*.

3.1 Main Performance Measurements

A key concern in financial analysis is to measure a firm's profitability. Profitability is fundamental to ensure a firm's survival and has a direct impact on its ability to provide satisfactory returns to shareholders. What drives profitability and how to ensure that a firm signals economic strength occupies the minds of many bank managers, especially after suffering the consequences of the recent financial crisis. Hence, the study of the determinants of profitability in the banking sector has continuously been brought up in the economic literature and has proved to be of great interest to researchers and practitioners. Surprisingly few studies have focused on the drivers of shareholder value creation. That is, generally speaking, the economic literature has neglected economic metrics as their performance indicator and overlooked the impact of cost of capital on returns. This is surprising given that banks have repeatedly set their main strategic objectives on creating value for shareholders.

Overall, the literature tends to agree on one main accounting metric to measure bank performance. This is the return on equity (**ROE**). Recent studies on European banks' profitability (Goddard et al., 2004; Athanasoglou et al., 2006; Altunbas and Marques, 2007) have chosen this variable because it provides a simple and straightforward insight on the return available on shareholders' investments. Similarly, the return on assets (**ROA**) has been widely used across research papers that aim to analyze the determinants of bank profitability (Micco et al., 2004; Athanasoglou et al., 2008; Bentum, 2012). However, these metrics ignore the risk that banks are exposed to. Managers can be incentivized to pursue value-destroying decisions to boost returns by taking on excessive risks, at least in the short run.

From a theoretical point of view, financial studies have discussed the advantages of implementing innovative metrics that correct for the limitations of traditional accounting

measures such as the ROA and the ROE. These are known as economic measures of bank performance. The risk-adjusted return on capital (**RAROC**) is a performance measure that takes risk into account. However, it is not a performance measure which practitioners have relied on. This is probably explained by the need for analysts to access banks' internal data, which are rarely made available to the public. On the other hand, the Economic Value Added (**EVA**) also takes risk into account and a small number of studies (Fogelberg et al., 2000; Fraker, 2006; Fiordelisi et al., 2010) have used it as their performance measure. This metric considers risk in the form of cost of capital. If returns exceed the opportunity cost of capital of investing in the firm, a company creates excess return or EVA. The idea is that a bank has to earn an income that is above the minimum acceptable return required by investors to compensate for the risks they bear (Brealey et al., 2014).

Finally, there exists a cluster of studies (Becalli et al., 2006; Eisenbeis et al., 1999) that have set **stock returns** as their performance measure. The main limitation of these reports concerns the possible overstatement of shareholder value since they do not account for the impact of cost of capital. Overall, they tend to focus on the relationship between operating efficiency and stock performance.

3.2 Determinants of Bank Profitability

The empirical work has displayed strong agrement on the main drivers of performance, whether it is understood in terms of profitability (ROA and ROE) or economic performance (mainly EVA). The determinants are commonly split into factors external to individual banks and factors internal to each bank. The former include the general business environment (economic, regulatory, socio-political) in which all banks operate, and the intensity of competition in banking markets (loans and deposits). The internal factors include the quality of governance and management of each bank, the effective and efficient choice and implementation of the business model and strategy, risk preferences of managers and owners, etc.

External Factors

Among the external factors of the general environment affecting the performance of banks over time, previous research has highlighted **inflation**, **GDP growth**, **taxation**, **regulatory changes** and **central bank interest rate** as particularly relevant. Overall, a positive

relationship has been found between GDP growth, interest rates and inflation, and bank profitability (Bourke, 1989; Athanasoglou et al., 2008; Albertazzi and Gambacorta, 2009). Taxation, on the other hand, appears to be more of a challenge. While Albertazzi and Gambacorta (2009) argue that taxation has a small impact on profitability because banks shift part of their tax load to borrowers and depositors, Demirguc-Kunt and Huizinga (1999) conclude that taxation reduces bank profitability.

The degree of **market competition** in loans and deposits market affects the profitability of banks in the sense that higher competition will lower profit margins and rates of return on capital. In empirical research, the most commonly used measures of market competition (in an inverse sense) are market concentration and the Lerner index (relative profit margin). Bourke (1989) has claimed a positive and significant relationship between bank concentration and bank profitability. Similarly, a study carried out on the profitability of banks in the South-Eastern European region (Athanasoglou et al., 2006) concluded that the effect of concentration on ROA is positive. From a more critical standpoint, Demirgüç-Kunt et al. (2004) argue that the relationship between banks margins and concentration is extremely weak. Hence, their research suggests skepticism regarding the use of bank concentration as a proxy to evaluate the degree of market competition.

A further factor that has caught researchers' attention is the impact of **M&As** on productivity. A very large stream of literature has been devoted to the study of these processes and their impact on value creation and/or efficiency improvements (Bernard et al., 2010). Mergers in the banking sector tend to occur during periods of stress as a strategic action to cut costs and improve profitability (Bernard et al., 2010). The empirical evidence, however, does not agree on the aftermath. The outcome of a merger depends largely on strategic and organizational fit, and on the development of the merging process (Jemison and Sitkin, 1986). Likewise, specific factors also explain why certain mergers may tend to be more successful in certain markets (Amel et al., 2004). The time frame considered to study the impact of mergers is also a critical factor to explain performance. While numerous papers focus on stock returns around the time in which the merger takes place (Cybo-Ottone and Murgia, 2000; Aktas et al., 2001; Bruner, 2002; Campa and Hernando, 2004), it is hard to find studies that capture the long-term effect of the integration process (Vennet 1996, 1997;

Bernard et al., 2010). In this sense, studies posit limits to the possibility of observing the emergence of synergies after the merger has been completed.

Recent studies have now begun to focus on the impact of the recent **financial crisis** on bank performance. Xiao (2009) was a pioneer in this field of research. Her study concluded that French banks were affected by the global financial crisis. Likewise, Millon Cornett et al. (2010) claims that, in a study made using a sample of U.S listed banks, all banks suffered the consequences of the financial turmoil, specially larger banks. Beltratti and Stulz (2009), however, argue that larger banks that hold more Tier 1 capital were able to display higher returns during the crisis.

Internal Factors

From an internal perspective, academics such as Brissimis et al. (2008) and Cooper (2003), among others, identify **credit risk** as a relevant factor. While the latter posits a possible relation between changes in the bank's loan portfolio and its impact on the performance of institutions, the former conceives a direct link between increased exposure to credit risk and decreased firm profitability. Research carried out by Millar and Noulas (1997) concluded that financial institutions that are exposed to larger volumes of high-risk loans are more likely to accumulate unpaid loans and hence suffer from low profitability. Similarly, Bourke (1989) identified **operating expenses** as an independent variable with negative impact on returns. That is, as expenses increased, banks' efficiency was reduced and hence shrunk the profitability of institutions. Haslem (1968, 1969), who had previously elaborated on this thought, argued that expense management is the main driver of profitability. In fact, he claimed that an accurate control over expenses provides banks with a critical tool to boost profitability.

Contrastingly, the **level of capital** has been repeatedly identified as an internal explanatory variable with a positive impact on bank profitability. As the level of equity increases, business risk decreases reducing the cost of capital and banks' performances improve (Molyneux, 1993). Moreover, Berger (1995) argues that an increase in equity will reduce the expected costs of financial distress and thus increase the likelihood of earning higher expected profits. In his research, a number of American banks were put to test between 1983 and 1989. His studies proved that higher capital ratios led to higher earnings that

consequently increased banks' ROE. Overall, a large number of studies that set capital ratios as an internal explanatory variable (e.g. Haslem, 1968; Bourke, 1989; Molyneux and Thornton, 1992; Abreu and Mendes, 2002; Goddard et al, 2004; Naceur and Goaied, 2001, 2008; Athanasoglou et al., 2006; Garcia-Herrero et al, 2009) all provide empirical results that support this positive relationship. From a similar perspective, Stiroh and Rumble (2006) and Fiordelisi et al. (2010) posit that the **degree of diversification** of banks' asset portfolios is key for bank performance. In the study carried out by Stiroh and Rumble (2006) from 1997 to 2002, it was shown that improvements in diversification strategies of a group of US financial companies resulted in a sharp increase in their profitability ratios.

On the other hand, there exists a major debate about the impact of **bank size** on performance. Pasiouras and Kosmidou (2007), Alper and Anbar (2011) and Lee (2012) argue that larger banks are more likely to present higher levels of diversification in their portfolios and hence obtain higher returns. Other authors, however, argue that costs are only slightly reduced by economies of scale in large banks and that very large banks often commit scale inefficiencies which drives profitability down (Berger et al., 1987). Similarly, Barros et al. (2007) claim that large and more diversified banks are more likely to perform worse than specialized banks. Their arguments are grounded on small banks' ability to reduce asymmetric information issues connected to lending. Naceur and Goaied (2008) found that Tunisian banks' profitability worsened as asset size increased since they were operating above their optimum size levels. In contrast, Micco et al. (2007) found no significant statistical correlation between bank size and ROA for banks.

The ownership form of banks is another characteristic of banks that explains differences in their performance. The profitability of a bank may be positively or negatively affected by management incentives under different ownership setups (Short, 1979; Molyneux, 1993). Micco et al. (2007) found that state-owned banks in developing countries tend to display lower profitability ratios and higher costs than privately owned banks. In developed economies, however, the distinction was not as clear. Further research pursued by Iannotta et al. (2007) concluded, similarly, that government-owned banks underperformed compared to privately owned banks. In contrast, Bourke (1989) argued that the profitability of banks was independent of their ownership form.

Finally, **liquidity risk** is commonly posited as an important determinant of bank profitability. Banks accommodate their liquid holdings in order to reduce risk during periods of increased uncertainty. Molyneux and Thornton (1992) and Fiordelisi et al. (2010) uncovered a negative relationship between liquidity risk and bank profitability. The former argue that as banks become more illiquid, they face the inability to appropriately accommodate their balance sheet to their varying needs. On the other hand, Eichengreen and Gibson (2001), among others, claim that riskier and more illiquid assets have higher expected returns. Hence, they expect a positive relationship between illiquid assets and bank profitability. Athanasoglou et al. (2006) found, unlike most other researchers, that the liquidity risk was positive but not significant in terms of bank performance. This could potentially be explained by the selection of banks, south-eastern European banks, included in their analysis. They argue that these entities maintain an illiquid position in response to their inability to meet the liquidity requirements of developed banking systems.

3.3 Impact of the Financial Crises on Profitability Determinants

Overall, scholars tend to agree on the main determinants of profitability and value creation. The recent financial crisis has, however, prompted queries regarding the transformation of these determinants. That is, numerous studies are now concerned about changes in the coefficients and the meaningfulness of the variables previously considered.

Europe and the United States

In **Switzerland**, for instance, a study aimed to analyze the profitability of 372 commercial banks over the period from 1999 to 2009. The results showed that variables such as the capital ratio and credit quality did not have a significant impact prior to the crisis. However, they were found to be negative and have a significant impact on ROA after the financial crisis. Contrastingly, the cost-to-income ratio was negative and significant for both time periods, while funding costs were only significant and negative on ROA before the crisis.[43] These results provide evidence that the financial crisis had a significant impact on the Swiss banking industry and on the significance of drivers' coefficients.

Other papers have highlighted the impact of corporate governance on bank profitability.

[43] Dietrich, A; Winzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions & Money*. 21(3), 307-327.

Saghi-Zedek and Tarazi (2015) empirically investigated the effect of excess control rights of shareholders - an ultimate owner with noticeable differences between control and cash flow rights - on 788 **European commercial banks**. Their goal was to find differences between three time periods: before, during and after the global financial crisis of 2007-2008. ROA was set as the dependent variable in an OLS regression together with 19 independent variables that covered both internal and external characteristics. They concluded that excess control rights before and after the financial crisis are associated with lower profitability. Conversely, this variable had a positive impact on ROA during the crisis. They explain this result by arguing that shareholders' opportunistic behavior was temporarily postponed to ensure the bank's survival and benefit from its future profit.

Berger and Bouwman (2013) focused on the impact of capital on the performance of banks in the **United States** over the past quarter century. They claim the importance of adequate capital regulations to prevent future crises. Two opposing conclusions were reached. On the one hand, they concluded that the performance of small banks is improved by increasing the capital held in both normal times and during banking crises - capital acts as a buffer to absorb frequent negative shocks suffered by small banks. On the other hand, they revealed that the performance of medium and large banks is only positively affected by capital during banking crises. These banks tend to face fewer shocks and can rely on financial markets for additional aid in the event of unexpected crises.

Africa

William Bentum (2012) employed a regression analysis to examine the determinants of the profitability of commercial banks in **Ghana**. In order to account for the impact of the crisis on banks' ROA, he considered the pre- and post-financial-crisis periods (2001-2011). According to his research, profitability of banks in the pre-crisis period was only influenced by internal variables such as the capital to total asset ratio and non-interest income to gross income ratio. In contrast, the post-crisis period revealed mainly a relationship between external factors and profitability. For instance, the real GDP growth rate proved to have a positive relationship with ROA while market growth had decreased profitability of the incumbent banks in Ghana.

In **Tunisia**, the generalized method of moments in system was implemented to investigate the impact of bank-specific factors and external factors on bank profitability. Again, the period of study was divided into a pre- and post-crisis period in order to account for the impact of this variable on ROA and ROE. The findings support the argument that the lack of integration of the Tunisian banking industry in the international financial markets protected commercial banks from the negative effects of the crisis. Nonetheless, the economic turmoil modified once again the determinants of bank profitability. Mainly, profitability was positively affected by capital adequacy, liquidity, bank size and real GDP growth during the pre-crisis period. On the other hand, growth of deposits, inflation rate and cost-income ratio had a negative impact on profitability. During the crisis period, however, returns were mainly explained by inflation, GDP growth, operational efficiency and growth of deposits.[44]

It is clear from the above that, overall, every country has a unique set of characteristics that provide researches with the possibility to explore very diverse scenarios. As a result, the determinants of bank profitability and the effect of the financial crisis on bank performance deviates from one country to the other. The following section, therefore, provides a look into the research pursued in relation to the Spanish economy and the peculiarities of its banking sector. The case of Spain is especially unique since the crisis prompted the start of a restructuring process that has not yet reached its end.

3.4 The Case of Spain

The Spanish banking sector provides academics with two distinct setups in which to study profitability. On the one hand, commercial banks offer a scenario similar to that examined in the previous section. On the other hand, savings banks or *cajas* provide an additional field of research to study the determinants of profitability. History has taught us that these entities have become more similar over time. As a result, the financial crisis of 2008 was the first to hit both banks and *cajas* in Spain. This event led to a massive wave of M&As between banks and *cajas*, and between *cajas* themselves.

[44] Rachid, H. (2013). What Determines the Profitability of Banks During and before the International Financial Crisis? Evidence from Tunisia. *International Journal of Economics, Finance and Management*. 2(4), 330-337.

Savings Banks

Mergers between savings banks are, however, not a novel occurrence. Apellaniz et al. (1996) and Fuentes and Sastre (1999) offered the Spanish literature a breakthrough research. Both studies covered the main savings banks' mergers completed in Spain in the 1990s and analyzed the effect of mergers on company performance. While the latter conducted an analysis of accounting ratios during the pre- and post-merger periods, the former focused on the performance of savings banks after the restructuring process and compared their change in profitability to the average of the banking sector. Overall, Fuentes and Sastre (1999) observed no improvements in the profit-generating capacity of the merged institutions. However, they argued that the reduction of costs and improvements in capital-adequacy ratios experienced by these entities improved their overall competitive position. From a similar standpoint, Apellaniz et al. (1996) concluded that the net interest margin over total assets and the profit before tax over total assets after the mergers were below the average of the sector. However, this difference in performance already existed prior to the restructuring process and hence cannot be attributed to the merger *per se*. The same authors also aimed in their study to compare the post-merger performance of banks to that of non-merged savings banks. Similarly, profitability ratios for merged banks were below but productivity per employee was above that of non-merged banks.

Bernard et al. (2010) pursued a similar research on the effect of M&As on the long-run productivity of Spanish savings banks. The study focused on performance improvements that arose from these processes between 1986 and 2004. Their research attempted to capture the longitudinal dimension - when integration proceeds - of the performance effects instead of assessing results after the announcement or completion. The research analyzed productivity by means of an estimate of a Cobb-Douglas production function and traditional OLS and fixed effects estimation. To capture the effect of mergers, they defined a dummy variable representing the resulting firm. In addition, further dummies were included to identify the year in which the merger took place; the year in which the integration is occurring, and a final dummy to indicate the final merger period when synergies have concluded. Their results revealed that in only half of the cases did productivity improve. The remaining *cajas* experienced negative or non-significant effects. Overall, they concluded that the output of a

merger or acquisition is highly firm specific and thus depends on each bank's ability to manage the integration process.

Commercial Banks

Trujillo-Ponce (2013) wrote one of the most relevant papers on bank profitability in Spain. His research covered the performance of Spanish banks for the period from 1999 to 2009. In particular, he analyzed the determinants of ROA and ROE by applying the system-GMM estimator. His study revealed that Spanish banks had experienced high levels of profitability mainly due to: large percentage of loans in total assets, high volume of customer deposits, low credit risk and high operating efficiency. In addition, high capital ratios also led to higher returns but only when ROA was set as the dependent variable. In contrast, bank size and income diversification were not found to be explanatory factors of bank profitability. These findings revealed the lack of either economies or diseconomies of scale in the Spanish banking sector. Among the industry and macroeconomic factors, the most relevant were market concentration, GDP growth, and inflation rate, which all had a positive impact on bank profitability and interest rates, which indicated a negative correlation with returns. Finally, a small section of this paper was devoted to the study of qualitative differences in performance between commercial banks and savings banks. The research concluded that even though savings banks had, overall, a higher proportion of loans and deposits on their balance sheet, their returns were lower because commercial banks were more efficient and had higher quality loans.

Savings Banks and Commercial Banks

Climent (2012) wrote the first paper that measured the impact of the financial crisis on both savings and commercial banks. In his study, "The fall of Spanish Savings Banks", he carried out an analysis of the determinants of bank profitability (ROA and ROE) during the four years prior to the restructuring process that began in 2010. Surprisingly, his research revealed that commercial banks and savings banks diverged mainly due to their sources of income. While expense accounts were not significantly different, commercial banks experienced a strong increase in interest revenue. Furthermore, commercial banks achieved an average return on equity instruments of 5.68%, approximately two percentage points above the return reached by savings banks. Likewise, the weighted average gross margin was an important explanatory factor of bank profitability that positioned, once again, commercial banks ahead

of *cajas*. As a result, he concluded that commercial banks had managed the financial crisis better than savings banks. Hence, he supported the decision of the BdE to form banks out of *cajas* as a strategy to resolve the financial crisis.

Similarly, Climent and Pavia (2014) directed a study on the impact of size and governance structure on Spanish banks' and *cajas*' ROA and ROE between 2004 and 2009. The research concluded that the variable of size was capable of predicting profitability. The regression showed that bank size had a small but positive effect. Larger banks achieved better returns mainly due to higher income of associates, higher commissions, above average exchange gains, lower impairment losses on other assets and lower taxes. It is important to note, however, that larger banks tend to boost their profits as a result of financial activities executed outside of Spain. In terms of governance structure, the research concluded that governance-type only explained differences in returns indirectly. Once again, the research concluded that commercial banks performed better than *cajas*. The former banks achieved, on average, a ROA 23.42% higher than *cajas* and an even larger difference in ROE, of around 32.96%.

Concluding Remarks

Evidently, besides the research papers mentioned in this section, a large number of studies (Maudos, 2001; Carbo et al., 2003; Garrido, 2004; Hernandez and Perez, 2005; Fernandez et al. 2006; Sanchez, 2006; Maravall et al., 2009; Palacio and Navarro, 2009) have already discussed the drivers of bank (and *cajas*) performance before and after the financial crisis. Likewise, the literature that aims to explain the determinants of profitability in Spain is abundant and continues to grow after the restructuring process.

It is surprising, however, that most of the research was carried out immediately after the start of the crisis. Trujillo-Ponce (2013), Climent (2012) and Climent and Pavia (2014) are, among others, academics that have attempted to capture the longitudinal impact of mergers, as proposed by Bernard et al. (2010). Hence, in our study, we aim to develop our analysis in tune with this concept. Borrowing from Apellaniz et al. (1996), we divide banks and *cajas* into merged and non-merged banks. Our objective is to capture differences in performance between both groups of entities. This is already a novelty in the Spanish literature since, to the best of our knowledge, no such distinction had been made before. That is, researchers

considered the performance of commercial banks and *cajas* independently. In addition, we rely on a regression model that is typically applied in policy analysis, the Differences-in-Differences Model. The objective is to control for differences between both groups that might have existed prior to the restructuring process. Hence, we obtain a more precise value of the impact of this event on bank performance. Finally, we set our research apart from the literature covered in Spain by following the study of Fiordelisi et al. (2010). That is, we focus on the effects of the mergers on economic value creation (by means of EVAS) instead of setting non-risk adjusted variables such as ROE and/or ROA as the dependent variable. In this way, we also provide new insight to the economic literature in Spain because we analyze economic value in both listed and unlisted banks, as Fiordelisi et al. (2010) did. For a shareholder-controlled bank, economic value creation is synonymous of shareholder value creation. For not-for-profit banks like *cajas*, it means that their equity has an opportunity cost. Hence, even though it is not privately appropriated, we account for that opportunity cost when evaluating economic performance.

4. Methodology

The aim of this section is to set up the bases for our analysis. Firstly, we introduce the data which we have relied on to perform our study. Secondly, we introduce the main metrics that the banking literature has relied on to measure bank performance. Each includes an analysis of its advantages and disadvantages and how these features have led researchers to develop superior measurements of performance. Special attention is paid to EVA due to its capacity to capture economic value creation. We finally include a set of independent variables that we believe better explain bank performance.

4.1 Data Description

The accounting data on Spanish banks are taken mainly from the Bankscope database compiled by Bureau Van Dijk (BvD). The thorough coverage that this database makes of the banking sector provides us with very detailed information to support our analysis.[45] In certain situations where Bankscope does not deliver data for a specific bank and year, we have completed our dataset with the accounting information provided by the different Spanish banking and savings banks associations, mainly CECA and AEB.[46] Since Bankscope itself retrieves data from these same organizations, the data from the different sources usually match. Some differences are detected in the degree of aggregation that these different databases provide, something that can be usually overcome by closely examining the different accounting items considered in each aggregate.

In our analysis, we look into the period from 2006 to 2014. We choose this time frame as it covers a full economic cycle, including pre-crisis, crisis, and post-crisis years. We then split it into two sub-periods: one covering the years before the restructuring of the Spanish banking system (here considered to be 2006-2009), and another covering the years after the restructuring started (that is, 2010-2014). In our analysis, we refer to these two periods as the pre-restructuring and post-restructuring (or restructuring) years, respectively. We are not able to cover the year 2015 as, at the time of writing, Bankscope has not yet offered information for all banks considered.

[45] According to BvD webpage (2016) and Dietrich et al. (2011), Bankscope database covers 32,000 banks worldwide, that represent 179 countries and roughly 90% of the global banking system's assets.

[46] These include accounting information from the *Asociación Española de Banca* (Spanish Banking Association) and the *Confederación Española de Cajas de Ahorro* (Spanish Confederation of Savings Banks).

Our sample consists of CIs representing around 90% of the Spanish banking system's assets.[47] This includes all the CIs participating in the restructuring (either as acquirers, as acquirees, or as merged institutions)[48], as well as a group of banks and savings banks that did not take part in the integration. The remaining 10% not included in the sample is comprised of small credit unions (cooperatives and rural banks) and foreign banks. We exclude these CIs from our analysis because of their relatively small size and the lack of available information.

As shown in Table 4.1, the number of institutions analyzed changes quite radically. While in 2006 there are 74 CIs, by 2014 there are just 36. This large drop in the number of institutions is caused by the integration process. However, the number of banks increases from 28 in 2006 up to 35 in 2014, as savings banks change their legal form to regular banks.

Table 4.1

Sample of Spanish Credit Institutions, Classified by Type and Year (2006-2014).

Type of Credit Institution (CI)	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Banks	28	28	28	28	31	41	38	36	35
Saving Banks	45	44	44	43	16	4	1	1	1
Credit Unions	2	2	2	2	2	2	1	1	0
Total Number of CIs	**75**	**74**	**74**	**73**	**49**	**47**	**40**	**38**	**36**

Source: Own elaboration based on the BdE's definition of major banking groups and other CIs of the Spanish banking system

The size of the CIs that we analyze can sometimes be very different, and while some of them are big banks with national and international subsidiaries, others are rather small, regional institutions with only national presence and no subsidiaries at all. This results in some banks reporting both consolidated and unconsolidated statements, whereas others just report the unconsolidated ones. Our approach to this issue is to take the consolidated statements whenever available, and the unconsolidated ones when the former are not at our disposal.

In calculating our main dependent variable, EVA Spread (see the section *Economic Value Added* for a definition of EVA and EVAS), we rely on financial data regarding stock prices, returns on treasury bills and government bonds, and market indices. This data was retrieved

[47] Martín-Oliver, A. and Ruano, S. and Salas-Fumás, V. (2015). *The Fall of Spanish Cajas: Lessons of Ownership and Governance for Banks*.

[48] This group of CIs include mostly banks and savings banks. Following the Bank of Spain's definition of "major banking groups", we include also two credit unions. We do so based on their participation in the restructuring process and because of their relatively large size, which is comparable to that of other banks and *cajas*.

from the Bloomberg database. For comparative purposes, we collected betas from the Bankscope and Thomson ONE Banker databases.

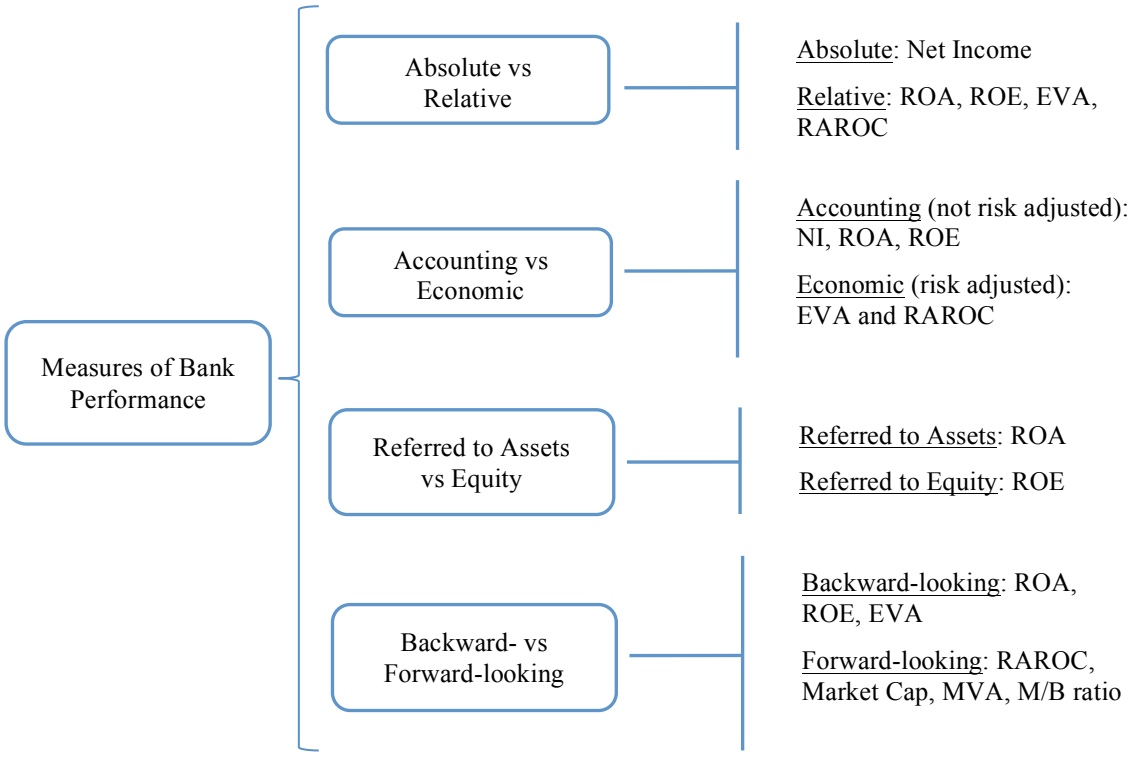
In the empirical analysis, we make use of macroeconomic variables like the inflation of the Consumer Price Index, the 12-month Euribor, and GDP growth. In this regard, we obtained the necessary information from the Spanish Statistical Office (INE), the BdE, and the World Bank (see section *Independent Variables* for additional details).

4.2 Dependent Variables

Since different ways prevail in measuring bank performance, the sections that follow provide a discussion about those that we consider most relevant, viz. ROA, ROE, EVA and RAROC. For the sake of clarity, Figure 4.1 classifies them according to different criteria. In our analysis, we focus on EVA, as we attempt to use a risk-adjusted metric capable of measuring value creation for both listed and non-listed CIs.

Figure 4.1

Classification of Measures of Bank Performance.



Source: Own elaboration

4.2.1 Return on Assets

As mentioned by Mishkin (2016), one of the main problems of using net income in evaluating the performance of a bank is that it is not adjusted for the size of the bank, making it difficult to compare performance among different institutions.

One of the most common and straightforward solutions to the above problem is adjusting performance by a measure of the bank's activities, like total assets. This is what return on assets (ROA) does, by comparing a measure of the bank's profitability to a measure of the bank's size.

There are a number of different ways scholars and practitioners calculate ROA. However, the most commonly and widely used is as follows:[49]

$$ROA = \frac{Net\ Income}{Book\ Value\ of\ Assets} \tag{1}$$

The ROA gives us an idea of how well, or how efficiently, the bank's total assets are being used to generate net income. Thus, it can be viewed as a measure of how able the management of the bank was in generating bottom-line profits with the endowment of assets it had.

More often than not analysts use the above expression to compute ROA. However, as explained by Berk and DeMarzo (2014), it is important that, when using ratios, the items being compared in the numerator and the denominator match, so that they both represent amounts related to the firms as a whole, or amounts related to equity. In this regard, note that while the assets in the denominator represent an amount corresponding to the entire firm, the net income in the numerator is an amount claimable by equity holders after interest has been paid to debt holders.

In their respective works, Berk and Demarzo (2014) and Brealey et al. (2014) argue that ROA should measure the income available to equity *and* debt holders per currency amount of the firm's total assets. This is because the assets in the denominator have been funded both

[49] Assets may be measured as the currency amount of the bank's assets at the beginning of the year, at the end of the year, or as the average currency amount of the assets at the end of the previous and current years. According to Gâdoiu (2014) no single way of measuring assets has been embraced by the experts, and here we adopt the end-of-current-year approach.

by equity *and* debt. Thus, they recommend to add back to the numerator the after-tax interest expense, which is the income generated by the assets used to support the firm's debt obligations[50]. This is expressed in the following equation:

$$ROA = \frac{Net\ Income + Interest\ Expense * (1 - tax\ rate)}{Book\ Value\ of\ Assets} \quad (2)$$

Although more refined and accurate, this specification does not seem to be used in the banking context. Both Mishkin (2016) and Dermine (2009) define ROA as net income divided by total assets, as does the European Central Bank (ECB, 2010).

Since academics and practitioners alike seem to be calculating ROA for banks in a rather simplified way[51], for the purpose of this dissertation we adhere to this practice and make use of equation (1) above.

One of the main advantages of ROA is that, compared to other ratios, it takes into account the financial risk of leverage implicit in a company's capital structure. This makes ROA less sensitive to leverage, which eases the comparison of profitability among companies. Despite that, ROA does not take into account the business risk of the company's operations, like those linked to variations in non-financial costs and revenue levels. In other words, given a company that is fully equity financed, ROA does not correct for the level of risk attached to assets (Brealey et al., 2014).

4.2.2 Return on Equity

Along with ROA, one of the most popular accounting measures of performance is return on equity (ROE). This profitability ratio shows the returns available to equity-holders only. Like any other ratio, ROE can be calculated in numerous ways. For our analysis, however, we rely on the most common and simple definition of this operational measure. That is:

$$ROE = \frac{Net\ Income}{Total\ equity} \quad (3)$$

[50] The after-tax interest expense is used in order to eliminate the benefit of the debt tax shield. This allows us to know the earnings of a firm using only equity financing, which helps comparison between firms with very different capital structures.

[51] That is, ignoring entirely the income that the assets have generated for the debt holders, or using gross interest expense instead of subtracting the benefit of the tax shield.

As illustrated above, ROE is defined as the profit after tax divided by equity. The denominator, total equity, illustrates the end year value of common shareholder equity. In practice, this book value of equity is commonly preferred over the market value of equity since only a small number of banks trade on the market.[52]

On this point, there are 3 main operational features of ROE that explain its worldwide attractiveness:

I. It provides a simple and straightforward insight on the return available on shareholder's investments (as reflected in the balance sheet).
II. Its technical features allow the ratio to be compared with other companies that do not necessarily belong to the same sector by correcting differences in leverage.
III. It can be easily calculated with information that is publicly available.

Nonetheless, like any other metric designed to measure bank profitability, ROE has received abundant criticism in the literature.

Downsides

A common criticism refers to the role of the management team and the drivers of their decision-making strategies. Indeed, certain managerial decisions that take place do not convey improvements in profitability but still lead to an increase in the ROE.

The DuPont Model provides a disaggregation of ROE that allows us to observe the weaknesses of this metric. It provides feedback on 3 main areas: operating efficiency ($\frac{Net\ profit}{Operating\ income}$); asset turnover ($\frac{Operating\ income}{total\ assets}$) and financial leverage ($\frac{Total\ assets}{Equity}$).

Clearly, ROE will increase if there are improvements in operating efficiency, if assets are utilized better and if there is an increase in leverage.[53] Overall, the higher the ratio, the more likely the bank is to generate cash internally and the better it is in terms of profit generation.[54]

[52] Klaassen, P., & Van Eeghen, I. (2014). Analyzing Bank Performance: Linking ROE, ROA and RAROC. *ROA and RAROC.* 3(2).
[53] ReadyRatios. (2015). *DuPont Formula.*
[54] Ally, Z. (2013). Comparative analysis of financial performance of commercial banks in Tanzania. *Research Journal of Finance and Accounting*, *4*(19), 133-143.

However, it seems clear that while an increase in net profit margin can be correlated with shareholder wealth, the remaining two ratios pose weaknesses to the measure. For instance, the impact of **financial leverage** on ROE has been greatly discussed. When financial leverage is increased, the ROE will increase accordingly (if ROA is higher than average cost of debt[55]). A simple example would be to consider an increase in debt, at the expense of equity, that overlooks the subsequent increase in financial risk. In this way, ROE is strongly criticized for two main reasons. Number one: its lack of attachment to financial risk and operational risk. Number two: its inability to be compared accurately between companies or within the same company when the level of gearing diverges.

From a similar perspective, long-term issues that derive from management's incentives have been of great concern. In order to boost profits, managers may execute initiatives that promise **short-term financial returns** in detriment to higher long-term payoffs such as severe cuts in staff to enhance net income.

Further flaws have been found in ROE's ability to correlate with shareholder value. The work of Copeland, Koller and Murrin (1996) introduces a clear criticism of the **short-term nature** of ROE. While this performance metric provides a clear image of banks' current shape, it does not account for the impact of long-term strategies or damages. In fact, a current study carried out by the European Central Bank proved that, overall, institutions with higher ROE ratios before the crisis were hit worst by the financial turmoil. That is, current accounting ROE is not appropriately configured to capture banks' capacity to create sustainable results.[56]

Finally, ROE is **prone to manipulation**. One of the most evident and criticized flaws of this measure of performance is the ability to manipulate earnings through changes in accounting policies. The lack of transparency that has particularly characterized the Spanish banking sector has prompted illegal actions within financial institutions. In this context, banks that hide large unrecognized losses are displayed to the public as well-performing institutions. This also applies to ROA.[57]

[55] ROE=ROA+(ROA-cost of debt)*financial leverage (Penman, S. H, (2001)).
[56] Karr, J. (2005). Performance measurement in banking: beyond ROE. *Journal of Performance Management*, *18*(2), 56.
[57] Idem Note 56.

Despite all the above, ROE is still a popular financial measure of shareholders' wealth and hence is included in our performance scheme. In the words of Monteiro (2006): "ROE is perhaps the most important ratio an investor should consider".

After having discussed the *traditional measures of performance*, the following section focuses on the so called *economic measures of performance* for banks, namely EVA and RAROC. ROE and ROA have proved to be a set of performance measurements which practitioners rely on. As clarified in the previous section, however, they promote short-term goals that could potentially drive a management team to unsuccessful deals. Hence, the EVA and RAROC economic measures are arguably superior to ROA and ROE since they adjust these traditional measures by the opportunity cost of the bank's capital - in the case of EVA - or by the underlying level of risk associated with the bank's activities - in the case of RAROC. Below, we start the discussion with EVA.

4.2.3 Economic Value Added

Economic Value Added (EVA)[58] is generally described as a residual income measure in that it adjusts accounting earning by a charge for the cost of capital, that is, by the opportunity cost of the capital invested in a firm (see, for example, Brealey et al., 2014). This is done since accounting income does not consider the cost of the capital employed to make earnings happen. Thus, EVA is a *net* return to shareholders and, on those grounds, has been claimed by some as a proper measure of the addition to shareholders' wealth; that is, a measure of shareholder value creation.

EVA was developed by the New York-based consulting firm Stern and Stewart & Co. in 1991. Standard corporate finance sources define EVA in the following way (Brealey et al., 2014; Uyemura et al., 1996):[59]

$$\begin{aligned} EVA &= income\ earned - capital\ charge \\ &= EBIT(1-t) - (r_{WACC} * Invested\ Capital) \\ &= (ROC - r_{WACC}) * Invested\ Capital \end{aligned} \tag{4}$$

[58] Economic Value Added is also known as Economic Profit and, more generally, as Residual Income.

[59] Invested Capital is usually defined as Book Value of Equity + Net Debt, where Net Debt = Book Value of Debt - Cash & Short-term Investments. Return on Capital is defined as $EBIT * (1-t) / (Book\ Value\ of\ Equity + Net\ Debt)$. (Berk and DeMarzo, 2014; Brealey et al., 2014).

The idea is that, in order to create economic value a firm has to earn an income that is above the income required by them, that is, above the capital charge. The capital charge is a dollar cost of capital, and is defined as the required rate of return by investors - the weighted average cost of capital (WACC) - times the capital invested in the firm. EVA can also be computed as the spread between return on capital (ROC) and the r_{WACC} times the capital invested. In order for the firm to create value for its investors, the return on the capital invested needs to be higher than the minimum acceptable return required by investors.

However, banks are not *standard* firms. According to Dermine (2009), while nonfinancial firms focus on the revenue from assets and weighted average funding cost of assets, r_{WACC}, banks focus on the revenue from equity and on cost of equity, r_E. The business model of nonfinancial firms consists of generating earning by using their assets, while liabilities are just a way to fund those assets. In this sense, nonfinancial firms are said to create value only on the asset side of the balance sheet. The business model of banks, instead, includes both the asset and the liabilities side, in that they make a profit by borrowing at a low rate and lending at a higher rate – a process known as the intermediation function of banks. Since the volume of deposits that a bank holds varies over time, there is no simple WACC concept in banking. It is because of this complexity attached to a bank's business model that the fundamental approach to bank valuation focuses on the present value of the future dividend payments (equity-related approach), while the standard corporate valuation approach focuses on the discounted value of the future free cash flows (asset-related approach).

For this reason, we need to adjust the definition of EVA to the case of banks. As proposed by Dermine (2009),[60] the bank equivalent of EVA is computed as follows:

$$\begin{aligned} EVA_\tau &= income\ earned_\tau - capital\ charge_\tau = Net\ Income_\tau - \left(r_{E,\tau} * Equity_\tau\right) \\ &= \left(ROE_\tau - r_{E,\tau}\right) * Equity_\tau \end{aligned} \tag{5}$$

The intuition does not change however. A bank creates economic value at a particular point in time, τ, if the return it provides on its current holding, ROE_τ, is above the bank's equity

[60] Dermine (2009) refers to EVA with the name Economic Profit, but the concept is the same.

cost of capital for that period, $r_{E\,\tau}$.[61] We set this spread (ROE minus cost of capital) as the dependent variable for our dissertation. This is simply EVA expressed in percentage points and we refer to it as Economic Value Added Spread (EVAS).

Following Brealey et al. (2014), we outline below some of the main pros and cons of EVA:

Upsides

Starting with the advantages, EVA is clearly a superior measure of performance to net income or income growth since it subtracts the opportunity cost of the capital employed to generate that income. This means that a company that is generating positive bottom-line results, can actually be incurring a loss when accounting for the cost of capital.

In this same line, EVA can be used as a helpful incentive compensation mechanism for the management. EVA helps managers understand that positive earnings growth is not enough in order to create value, and that the company's expected return needs to exceed its cost of capital. EVA helps managers focus on and monitor the opportunity costs of their business units.

While market-based measures of performance - e.g., market capitalization, market value added, or market-to-book ratio - can only be used at the corporate level, accounting measures like EVA can be deployed both at corporate and division levels. This means, also, that EVA can be used as an incentive system for top *and* division managers.

Market-value measures of performance are forward-looking and factor in investors' expectations about the future of the company, as well as many other aspects over which managers do not have control in reality. Accounting-based measures like EVA instead show *current* performance, making them less noisy to future, uncertain events.

Finally, another advantage of EVA is that it can be computed for non-listed companies, while this cannot be done with market-based measures.

[61] In terms of opportunity cost, it is possible to think about the bank's equity cost of capital as the expected rate of returns that shareholders could obtain by investing in shares of other banks with similar risk, or more generally, as the expected return available to shareholders in the stock market.

Downsides

Some of the disadvantages of EVA include the following:

EVA is calculated using book values, meaning that it is exposed to potential biases in the accounting data. One example of this is the inability of accountants to include all assets on the firm's balance sheet. This is the case, for example, of the marketing investments that companies make in order to establish their brand names. While the brand name is an important asset for the company, it is not shown on the balance sheet. A similar case is the R&D investments made by pharmaceutical or technology firms before developing a successful product. This is usually considered an accounting expense even though this kind of company often needs to make large investments during the first years in order to undertake positive-NPV projects. If all these expenses where included as assets instead, the balance-sheet items would increase and the firm's return and EVA would decrease.

Another disadvantage has to do with the depreciation of assets on the balance sheet. The assets that companies hold are usually not marked-to-market, but instead are valued at their original cost less any depreciation. Since it is difficult to assess how rapidly assets depreciate, this may cause them to be over- or under-depreciated. In turn, these differences in judgment will affect the firm's profitability ratios, with over-depreciated assets implying higher returns for the company, and under-depreciated assets, lower ones.

Below, we detail the process that is followed in order to estimate EVA for the main Spanish banks.

Estimation Methodology for EVA

While net income and equity are accounting items that can be obtained from the financial statements, the bank's equity cost of capital, $r_{E\,\tau}$, needs to be estimated. In order to do this, we need to use a slightly different approach for listed and non-listed banks. We start first with listed banks.

Term Structure of a Listed Bank's Equity Cost of Capital, $r_{E,\tau}^{L}$

Because of the risky nature of the bank's dividends and the risk aversion of investors, shareholders will need to be compensated for the extra risk of their investment; that is, a risk

adjustment needs to be done by adding a risk premium to the risk-free rate. By assuming a time-variant risk-free rate, the term structure of the bank's equity cost of capital is computed as

$$r_{E,\tau}^{L} = r_{f,\tau} + RP_{E}^{L} \tag{6}$$

The time-variant risk-free rate, $r_{f\,\tau}$, can be assumed to be, for example, the average interest rate on a treasury bill or on a government bond for a given year. Following the approach suggested by Brenan and Xia (2003), the bank's equity risk premium, RP_{E}^{L}, is assumed to be constant and is computed as

$$RP_{E}^{L} = \beta_{E}^{L} * RP_{M} \tag{7}$$

where β_{E}^{L} is the equity beta for the listed bank, and RP_{M} is a constant market risk premium. β_{E}^{L} is a measure of volatility that indicates the degree of covariation between the return on the bank's shares and the overall return on the market.[62] The market risk premium is the difference between the return on the overall stock market and the return on risk-free securities, such as treasury bills or government bonds.

In order to determine the equity beta for a bank, we use the multi-period setting of the Capital Asset Pricing Model (CAPM), as shown below:

$$r_{E,\tau}^{L} - r_{f,\tau} = \alpha_{E,\tau}^{L} + \beta_{E}^{L} * \left(r_{M,\tau} - r_{f,\tau}\right) + \varepsilon_{\tau} \tag{8}$$

In order to implement this regression, we make use of the time series of the bank's stock returns, a proxy of the risk-free returns and a market index as a proxy for the returns on the overall stock market. As a result, we obtain the coefficient on the market risk premium, β_{E}^{L}, which is then used in equation (7). If the CAPM holds, $\alpha_{E,\tau}^{L}$ is assumed to be equal to zero.

Estimating the market risk premium, RP_{M}, is one of the most difficult things to do, and in reality different market participants have divergent perceptions of what a fair risk premium on the market portfolio is. One of the approaches to estimate it is by directly asking market participants - such as analysts, financial institutions, company managers, and scholars - about their perception of the market risk premium. It is possible to find survey studies of this kind

[62] β_i is commonly calculated as $Cov(r_i, r_M)/\sigma_M^2$.

in the literature (see, for example, Fernandez et al., 2015, for a country approach). Dermine (2009) suggests 5%, as it is a risk premium commonly used in banking around the world. This risk premium is estimated according to historical studies of the excess return of bank shares over the risk-free government bond rate (see Dimson et al., 2006). Fernandez et al. (2015) find a (median) required market risk premium in Spain of 5.5%, to which we adhere.

After estimating β_E^L and having a reasonable RP_M, we are ready to estimate a multi-period equity cost of capital for a listed bank, $r_{E,\tau}^L$.

Term Structure of a Non-listed Bank's Equity Cost of Capital, $r_{E,\tau}^{NL}$

In principle, the path to calculate the equity cost of capital, or opportunity cost, for a non-listed bank should be the same as explained above. The problem, of course, is that non-listed banks are not listed on the stock exchange, and so returns on share prices are not at our disposal. So we need to find an alternative way to compute $r_{E,\tau}^{NL}$. We consider different ways that could help us solve this issue.

The first one is to use a proxy for the equity beta of the non-listed bank. For example, the equity beta of a listed bank with a similar profile. This approach is used by Thampy et al. (2000). However, this is a difficult exercise, and by assigning proxy betas to banks according to certain characteristics, we could be incurring a fairly severe mismatch. Thus, we discard this first alternative.

As explained by Dermine (2009), another approach could be to use the covariance between a measure of accounting income - like ROE - and the return on the market. This is shown below:

$$\beta_E^{NL} = \frac{Cov(ROE^{NL}, r_M)}{\sigma_M^2} \tag{9}$$

The problem with this measure of equity beta is that it depends on annual accounting data, and therefore, the number of observations to work with would be too small as to obtain reliable estimates. Therefore, we require a different method.

A third alternative is to adjust the beta obtained for the listed banks by a measure of the riskiness of the non-listed banks. This can be done, for example, by adjusting the equity beta obtained for the Spanish banking industry proportionally to the level of leverage of non-listed banks. We can use this approach as long as a significantly positive relationship exists between the listed banks' betas and their respective leverage ratios. We check for this relation later in the dissertation.

Once β_E^{NL} is estimated, we can use it in equation (7) to compute RP_E^{NL}, the same as we did for listed banks. Finally, after adding the bank's equity risk premium to the risk-free rate, $r_{E,\tau}^{NL}$ is obtained.

When we have the equity cost of capital and the opportunity cost for the listed and non-listed banks, respectively, all the necessary inputs for calculating EVA are available.

4.2.4 Risk Adjusted Return on Capital

Prior to EVA, the financial industry had already developed a metric that took risk into account. Developed by the US investment bank Bankers Trust in the late 1970s, it is considered nowadays an outstanding measurement of performance. In contrast to EVA, it does not rely on cost capital as a proxy of the banks' overall level of risk. Instead, this risk-adjusted ratio was designed to capture the risk exposed in each activity within the firm and link it directly to the return gained. This ratio offers a clear view of the trade-off between return and risk that, as stated by Kimball (1998), is central to the successful performance of banks' operations.[63] This metric is known as the risk-adjusted return on capital (RAROC).

Formally, RAROC expresses expected returns as a percentage of the capital required to absorb losses. Its formula is:

$$RAROC = \frac{Revenue - operational\ expenses - expected\ loss}{Risk\ based\ required\ capital} \qquad (10)$$

The denominator indirectly displays the probability of failure that a bank is willing to accept.[64] Evidently, activities that are exposed to higher risk and hence higher likelihood to

[63] Beyond, R. O. E. (2010). How to Measure Bank Performance. *Appendix to the report on EU banking structures, European Central Bank*.
[64] Baer, T; Mehta, A; Samandari, H. (2011). The use of economic capital in performance management for banks: A perspective. *McKinsey*

default will require higher levels of capital. Risk can be understood as the volatility of returns, i.e. standard deviation.[65] Hence, risk will be higher when large unexpected losses tend to appear more frequently. Under these circumstances, the bank will need more capital to reduce the risk of financial distress and avoid the destruction of shareholder value.

To ensure that banks hold an adequate level of capital, financial supervisors have established severe regulatory frameworks, such as Basel III, to fight the risk of insolvency. However, the requirements set do not necessarily capture all risks that individual banks can potentially be exposed to. Hence, it is common that banks develop internal models to evaluate their own risk and set specific capital boundaries. This in-house capital measure is known as economic capital.[66]

Typically, financial institutions rely on value-at-risk (VaR) models to calculate this measure. In simplified terms, the economic capital is the difference between the expected losses and unexpected losses that have been calibrated to a certain confidence level. For instance, a bank that sets its risk appetite at a 99.95% confidence level accepts that there is only a 0.05% chance that unexpected losses will not be absorbed.[67]

From a theoretical perspective, RAROC is comparable to the theoretical Sharpe Ratio (SR), the aim of which is to measure risk-adjusted returns. However, the information required to estimate each ratio is significantly different. The SR can be extracted from the one-factor CAPM as the excess return per unit of market risk. Hence, it relies on observable standard deviations from stocks. On the other hand, practitioners face a number of challenges trying to implement RAROC in practice. The reason for this is that RAROC relies mainly on internal figures that are rarely available to the public. As a result, proxies are commonly used to calculate both the nominator and the denominator.

Proxies

As seen in equation (10), the numerator takes risk into account in the form of expected losses (EL). Conceptually, it makes sense that returns are negatively affected by this measure. EL

& Company.

[65] Geyfman, V. (2005). Risk-adjusted performance measures at bank holding companies with section 20 subsidiaries.

[66] Klaassen, P., & Van Eeghen, I. (2014). Analyzing Bank Performance: Linking ROE, ROA and RAROC. *ROA and RAROC.* 3(2).

[67] Cervera Ruiz, P. (2006). La medida de la rentabilidad ajustada al riesgo. Caso práctico. *Estrategia Financiera*, (CA DE EMPRESA), No 229, 22-28.

are calculated as the probability of default (PD) inherent in the operation, times the fraction lost due to default (LGD), multiplied by the amount owed to the bank at the time of default (EAD). Mathematically: EL = PD*LGD*EAD.

In practice, however, these metrics are generally kept within the firm's boundaries. As a result, researchers rely on proxies for both the numerator and the denominator; RAROC is measured as allocated profit divided by allocated equity[68]. The term *allocated* refers to a certain amount of net income and equity that has been gained or assigned to a specific value center within the organization:

$$RAROC = \frac{Allocated\ profit}{Allocated\ equity} \tag{11}$$

The amount of equity allocated will depend on the risk each value center is exposed to. However, assigning risk to each value center is potentially challenging and thus the ratio generally accounts for unexpected losses at an organizational level. Therefore, allocated profit and allocated equity are replaced once again by two proxies: net income and regulatory capital, respectively:[69]

$$RAROC = \frac{Net\ income}{Regulatory\ capital} \tag{12}$$

The outcome of this division is a percentage number that, when compared with the cost of equity, provides information on the return available to shareholders.[70] Similarly to EVA, if the return exceeds the cost of equity then the RAROC figure is believed to be satisfactory.

We intended to follow this simplified version of RAROC and apply it to our sample of banks and data. We experienced, however, technical difficulties regarding the data available on Bankscope. Even though larger banks, such as Santander and BBVA, published their regulatory capital, smaller *cajas* had no information available. Hence, we could only apply this methodology to a limited number of banks.

[68] Jean, D. (2009). Bank Valuation and Value-based Management. Pg 137.
[69] De Miguel-Domínguez, J. C., Miranda-Torrado, F., Pallas-González, J., & Peraza-Fandiño, C. (2003). La medición del riesgo de crédito y el nuevo acuerdo de capital del Comité de Basilea. *Publicación en Universidad de Santiago de Compostela*.
[70] Jean, D. (2009). Bank Valuation and Value-based Management. Pg 137.

We finally concluded that we would not proceed with RAROC in our analysis. The lack of information available would set boundaries to our regression analysis and could give rise to erroneous conclusions. As a result, we continue our study using ROE to calculate our dependent variable, EVAS. Nonetheless, Appendix A illustrates the development of RAROC for those banks and *cajas* that did make their data accessible to the public. The section below also provides an overview on the main pros and cons that the literature has discussed in relation to this ratio.

Upsides

Certainly, the ability to balance risk against returns provides RAROC with key characteristics to position itself as a relevant measure of performance, at least from a theoretical point of view. RAROC enables banks to assign capital to its different business units depending on the level of risk. Also, it identifies projects that at first sight seem profitable but require high levels of capital. Likewise, it recognizes deals that appear too risky but provide returns that outweigh its riskiness. It is also a forward-looking tool. Expected losses, for instance, are calculated as the long-term average default rates and recovery rates of the bank's loan portfolio. Finally, RAROC is a flexible tool that can be implemented both at the company level or can be disaggregated to account for specific deals.[71]

Downsides

On the other hand, RAROC has been described as a complex tool that poses challenges to both analysts and managers. While analysts require access to internal data, risk managers need to accurately identify risks and constantly provide updated volatility assumptions.[72] In this sense, economic capital models such as RAROC present important difficulties for implementation. However, such an analysis is beyond the scope of our thesis.

4.3 Independent Variables

The established empirical literature has relied on two sets of independent variables to explain changes in bank performance (Goddard et al., 2004; Anthanasoglou et al., 2006; Micco et al., 2007; Brissimis et al., 2008; Alper and Anbar, 2011). These variables are divided into internal and external. Internal variables include those metrics that firms can manage to reach

[71] Jean, D. (2009). Bank Valuation and Value-based Management.
[72] Baer, T; Mehta, A; Samandari, H. (2011). The use of economic capital in performance management for banks: A perspective. *McKinsey & Company*.

the highest level of performance. Thus, they are bank-specific and vary according to a firm's particular characteristics. External variables, contrastingly, are macroeconomic- and industry-specific factors that are beyond the control of the company.

To investigate the impact of these metrics on economic performance, we use EVAS as a function of various bank-specific and macroeconomic variables.

Internal Variables

Among the numerous variables that are believed to have an impact on EVAS, we focus on the following seven. These cover the features of: asset structure, asset quality, operational efficiency, revenue diversification, funding, capitalization and bank size. They are calculated as follows:

1) *Net Loans/Loans*: To analyze asset structure, we make use of a liquidity ratio that previous research has shown to have an impact on performance (Millar and Noulas, 1997; Cooper, 2003). This is essentially the ratio of net loans to total assets. Net loans result from deducting non-performing loans from gross loans. The higher the ratio, the larger the percentage of total assets that the bank is tying up as loans.

2) *Loan Loss Provisions/Loans*: Following Anthanasoglou et al. (2008), we use the ratio of loan loss provisions (LLP) to net loans to account for the impact of asset quality on bank performance. Larger values of LLP will indicate that the bank is setting aside a large expense as an allowance to cover for an expected worsening in the quality of the loans. Hence, the higher the ratio, the lower the quality.

3) *Net Loans*/*Customer Deposits*: Eichengreen and Gibson (2001) claim the ability of a liquidity risk metric to explain changes in bank profitability. Following their research, we measure this factor as the percentage of loans to deposits. The larger the fraction, the more the bank is relying on funds that are not deposits. Overall, customer deposits are interpreted as a stable and low-cost financial source. Hence, a higher ratio will also reveal that banks or *cajas* are financing its loan with riskier and more illiquid funds.

4) *Interest&Non-Interest Expenses/Total assets*: As did the literature, we initially considered two ratios as proxies for banks' operational efficiency: cost-to-income ratio (CIR) and the

operating expense ratio (OER). While CIR accounts for the ratio of total non-interest expenses over income before any credit impairment charges, essentially the sum of net interest income and other operating income, the OER measures the amount of both interest expenses and non-interest expenses to total assets. We concluded that the latter ratio is a more accurate approximation for efficiency since it is not affected by cost and revenue factors (Jean Dermine, 2009).

5) *Non-interest Income/(Gross Interest&Dividend Income + Non-Interest Income)*: To account for the impact of revenue diversification on EVAS, we use the ratio of non-interest income to the sum of gross interest plus dividend income, and non-interest income. The research pursed by Climent (2012) revealed that commercial and savings banks diverged mainly due to their sources of income. Indeed, *cajas*' exposure to toxic real estate assets forced a change in their revenue strategy.[73] Hence, we believe this ratio should be able to explain variations in bank performance.

6) *Equity/Total Assets*: To test the impact of bank capitalization on EVAS, we include the ratio equity to total assets (Molyneux, 1993; Berger, 1995). This ratio will indirectly illustrate changes in capital requirements and reveal possible insolvent institutions due to excess leverage. Higher ratios will indicate that banks are better capitalized.

7) *Total Assets*: Finally, the effect of bank size on performance is measured through banks' total assets (Pasiouras and Kosmidou, 2007; Alper and Anbar 2012). We consider this to be an important metric to include because the size of banks in our sample is very heterogeneous, especially due to the presence of *cajas*. Following Trujillo-Ponce (2013), we use the logarithm of bank assets to capture the nonlinear relationship between bank size and value creation. That is, medium-sized banks tend to be more scale efficient than larger or smaller banks.

External Variables

Numerous papers (Bourke, 1989; Athanasoglou et al., 2008; Albertazzi and Gambacorta, 2009; Millon Cornett et al., 2010; Trujillo-Ponce, 2013) have addressed the importance of including macroeconomic variables to explain bank profitability. Compared to the number of

[73] Chislett, W. (2014). *Spain's banking crisis: a light in the tunnel.*

internal variables, however, we decided to include only a small number of macro variables in our analysis. The reason for this is to allow that their regression coefficients differ and hence allow us to pursue a proper interpretation of their values. If too many macro variables had been included, these would have behaved as time dummies with equal coefficients that cannot be adequately read. As a result, we decided that the external variables that most effectively explain value creation and thus indisputably need to be included in the regression are: Euribor 12M, inflation and GDP.

We measure Euribor 12M as the yearly average percentage obtained from the monthly rates provided by the BdE. To account for the effect of the annual inflation rate on value creation, we rely on the consumer price index (CPI) provided by the INE. Finally, the real gross domestic product (GDP) is extracted from data published by the World Bank (TWB). Excluding Euribor 12M, these metrics have been calculated in terms of their interannual growth rate to investigate the effect of their variations on the development of EVAS.

Table 4.2 summarizes the independent variables and their numeral calculations, together with the source from which data was extracted.

Table 4.2

Summary of Explanatory Variables. Definitions and Data Sources.

Variable	Classification	Definition	Source
Internal variables	Asset structure	Net loans as a ratio of total assets	Bankscope, CECA and AEB
	Asset quality	Loan loss provision as a ratio of net loans	Bankscope, CECA and AEB
	Funding	Net loans as a ratio of customer deposits	Bankscope, CECA and AEB
	Operating efficiency	The sum of interest expenses and non interest expenses as a ratio of total assets (Operating	Bankscope, CECA and AEB
	Revenue diversification	Non interest income as a ratio of the sum of gross interest and dividend income plus non interest	Bankscope, CECA and AEB
	Capitalization	Equity as a ratio of total assets	Bankscope, CECA and AEB
	Bank Size	Log(total assets)	Bankscope, CECA and AEB
External variables	Inflation rate	Consumer Price Index	INE
	Euribor 12M	Annual Euro Interbank Offered Rate	BdE
	GDP growth	Economic growth	TWB

Source: Own elaboration

4.4 Dummy Variables

The inclusion of dummies in our analysis is of great relevance. The purpose of these variables is ultimately to provide the final answer to our research question: did the restructuring process create economic value? To properly study this phenomenon, we need to account for two main elements. Firstly, we need to distinguish between a pre- and post-

restructuring process period. Note, however, that we refer to 'post' as the time period in which the rearrangement of the Spanish banking landscape had started but which, in our opinion, had not yet finished. Hence, in our analysis we consider the phase between 2006 and 2009 to be the pre-restructuring process. In contrast, we identify the years between 2010 and 2014, both inclusive, as the post-restructuring period. That is, this period reflects the years in which distinctive policies were and still are being executed to improve the financial strength of the Spanish banking sector. The second element we need to consider contemplates two sets of financial institutions. One group that was involved in the reform process through mergers and/or acquisitions, and another that independently survived the crisis.

Searching through the literature, it is common for researchers (Dietrich and Wanzenried, 2010; Fiordelisi et al., 2010; Trujillo-Ponce, 2013) to rely on the generalized method of moments (GMM) estimator. This models accounts for all possible characteristics of banks that have an impact on banks' profitability. The main purpose of our analysis, however, is not to reveal the determinants of Spanish banks' profitability *per se*. Our aim is to study the impact of the restructuring process on EVAS. The tools we implement in our dissertation hence set our research apart from conventional performance analyses. We rely on a model that is generally applied in policy analysis (Wooldridge, 2013). This is known as the Differences-in-Differences estimator (DID).

The DID Model takes into account our delimitations regarding both time periods and type of financial institution. These are identified through the use of dummy variables: *DummyRestruct* and *DummyMerger*. While the former is responsible for setting apart the two time intervals, the latter differentiates between types of banks. For instance, banks or *cajas* that merged are recognized with *DummyMerger* equal to 1 for the whole period (2006-2014), whereas, the CIs that did not merge take value 0. The DID Model refers to these groups as the treatment group (*DummyMerger*=1) and control group (*DummyMerger*=0). Clearly, the treatment group reveals that these entities were "treated" by means of the restructuring process. The control group, however, is set as the reference point given that this course of action (merger) did not affect them. Finally, following Climent (2012) we identify the start of the restructuring period in the year 2010. Hence, all CIs take value 0 for *DummyRestruct* when they are found in years prior to 2010, and value 1 when located between 2010 and 2014, both inclusive.

A further advantage of executing this model is its ability to capture differences between the treatment and the control group. Stock and Watson (2001) argue that since researchers lack control over randomization, some differences could remain between groups even after controlling for events such as the restructuring process. Randomization refers to the process of assigning banks or *cajas* to one group or the other, and hence being part or not of the restructuring process. Since this allocation is out of our control, it makes sense to believe that there might exist certain differences between them prior to the financial crisis that persist after controlling for the restructuring process. The model captures this anomaly and adjusts it for these remaining differences.

This adjustment enables us to observe differences in bank performance within each group - treatment and control group - and between them. In order to do this, the model compares the average change in EVAS instead of its outcome.

$$
\begin{aligned}
DID\ estimator \\
&= (\overline{EVAS}^{\,treatment,after} - \overline{EVAS}^{treatment,before}) \\
&- (\overline{EVAS}^{control,after} - \overline{EVAS}^{\,control,before}) \\
&= \Delta\overline{EVAS}^{\,treatment} - \Delta\overline{EVAS}^{\,control}
\end{aligned}
\tag{13}
$$

Let $\overline{EVAS}^{\,treatment,after}$ be the average of EVAS for merged banks during the post restructuring process period, and let $\overline{EVAS}^{treatment,before}$ be the average of EVAS for merged banks before 2010. Let $\overline{EVAS}^{control,after}$ and $\overline{EVAS}^{\,control,before}$ be the average of EVAS for non-merged banks after and before the restructuring process, respectively. The DID estimator is then the difference between the average change of EVAS ($\Delta\overline{EVAS}$) within each group over time. It makes sense, hence, that this estimator is known as the differences-in-differences estimator.[74]

In terms of the regression, the DID estimator is calculated as the interaction between *DummyRestruct* and *DummyMerger*. We refer to it as the *Interaction* dummy *(DummyRestruct*DummyMerger=Interaction)*. Clearly, it takes value 0 for banks and *cajas* in the period prior to the restructuring process and that did not merge; and value 1, when they merged as a result of the restructuring process. Focusing on these three dummy variables, we

[74] Wooldridge, J.M. (2013). *Introductory Econometrics: A Modern Approach*. 5th ed. Mason, OH: Cengage Learning.

can perform a simple regression analysis with four coefficients to analyze; a constant and three estimators.

$$EVAS = \beta_0 + \delta_0 * DummyRestruct + \beta_1 * DummyMerger + \delta_1 * Interaction + \mu \quad (14)$$

Each coefficient provides unique information on the interaction between time period and type of bank, and its impact on value creation. In accordance with Stock and Watson (2001), these are interpreted as:

- ***Beta zero*** (β_0): this corresponds to the constant term in the regression and it is known as the constant or intercept. It illustrates the average of EVAS for non-merged banks prior to the restructuring process period.
- ***Delta zero*** (δ_0): this coefficient belongs to *DummyRestruct* and reflects the change in EVAS for non-merged banks after the restructuring process took place.
- ***Beta one*** (β_1): this value explains the variable *DummyMerger* and accounts for the merger effect on EVAS that is not due to the restructuring process. That is, the impact of merged banks on EVAS before 2010.
- ***Delta one*** (δ_1): we consider this to be the most important coefficient since it clarifies the variable *Interaction*. It illustrates the increase or decrease in EVAS caused by the restructuring process, *ceteris paribus*. In order words, it accounts for the impact of merged banks after 2010 on value creation.

The addition of these coefficients results in further interpretations and hence, additional feedback on EVAS:

- ***Beta zero plus Delta zero*** ($\beta_0 + \delta_0$): this refers to the average EVAS among non-merged banks after the restructuring process.
- ***Beta zero plus Beta one*** ($\beta_0 + \beta_1$): this is the average EVAS for merged banks in the period between 2006 and 2009.
- ***Beta zero plus Delta zero plus Beta one plus Delta one*** ($\beta_0 + \delta_0 + \beta_1 + \delta_1$): this summation reflects the average EVAS for merged banks in the period between 2010 and 2014.

These coefficients are of great importance to our analysis. A correct interpretation of them enables us to observe the impact of the restructuring process on bank performance and provides us with the necessary tools to distinguish changes in EVAS across time and across merged and non-merged banks. A final dummy is included that does not belong to the DID Model. This is the *DummyCajas*. The objective of this dummy is to reflect the extent to which being a bank or *caja* has an impact on EVAS. Hence, it takes value 0 for all entities that are not *cajas*, and value 1 for all *cajas*.

The following section describes our predictions with respect to the sign of the coefficients of both the dummy variables and the independent variables.

Hypothesis

As seen in the *Literature Review*, there appears to be a consensus regarding the impact of certain variables on performance. For instance, most of the banking literature agrees that capitalization and asset quality have a positive impact on bank profitability (Bourke 1989; Berger, 1995; Millar and Noulas, 1997; Goddard et al., 2004). On the other hand, variables such as revenue diversification and bank size tend to diverge more frequently. Overall, changes in the period of study, the country analyzed and the dependent variable are examples of factors that may modify the final conclusion reached by each regression analysis. Nonetheless, we elaborate a number of hypotheses on the relationship between each variable and our dependent variable, value creation.

1. ***Asset structure***: in tune with Trujillo-Ponce (2013), we argue that a larger ratio of loans in the assets of a bank will have a positive impact on value creation. That is, as loans are less secure in terms of liquidity risk than other assets we believe that the bank will be compensated for bearing riskier assets and hence will be more likely to earn higher profits.
2. ***Asset quality***: lower quality assets are associated with a higher proportion of resources devoted to provisions to cover expected losses. Hence, we believe that higher quality assets will positively affect banks' ability to create economic value. Again, we agree with the results obtained by Trujillo-Ponce (2013). Given the ratio that we have chosen to study asset quality, we expect that lower ratios will have a positive impact on EVAS.

3. ***Funding***: in agreement with Anthanasoglou et al. (2008) and Fiordelisi et al. (2010), we believe that customer deposits are a stable and cheap financial resource. Hence, as the percentage of net loans increases relative to customer deposits, banks search for more costly borrowed funds. We then argue that as banks become more dependent on the market - higher funding ratio - their ability to create economic value will decrease.
4. ***Operating efficiency***: lower values of OE suggest that banks are operating more efficiently. As banks become more efficient, they are also more likely to earn higher profits. We thus argue in accordance with Bourke (1989), that the lower the percentage of expenses to total assets, the higher the EVAS.
5. ***Revenue diversification***: as various papers have done (Stiroh and Rumble, 2006; Fiordelisi et al., 2010), we claim that the effect of revenue diversification is positive on value creation. We base our argument on the decline in interest rates margin that the Spanish economy has experienced during the last decade. Hence, alternatives sources of non-interest income will provide higher margins to the bank.
6. ***Capitalization***: based on the bankruptcy cost hypothesis, we argue that better capitalized banks earn higher returns. That is, banks that hold a sufficient amount of equity will lower their interest rate expenses in uninsured debt. This relation results from equity being viewed as a safety net that reduces insolvency risk and thus increases expected profits.
7. ***Bank size***: given the history of the Spanish banking system, we believe that bank size is positively related to value creation. Arguably, *cajas* have been severely affected by the financial crisis while larger banks like Santander, have proved to be more sophisticated and take advantage of economies of scale. Hence, we conclude in tune with Climent and Pavia (2014) that larger banks are more likely to experience increases in EVAS.
8. ***Inflation rate***: if the inflation rate is anticipated, the bank has the tools to generate a positive impact on value creation (Trujillo-Ponce, 2013). For instance, the bank's management can increase interest rates to boost revenues before the subsequent increase in costs.
9. ***Euribor 12M***: we believe there exists a positive relationship between the yearly Euribor and value creation because banks' interest income is positively affected by

this factor. That is, 90% of the mortgage loans in Spain are referenced to the Euribor 12M.[75]

10. ***GDP growth***: a country that performs in favorable economic conditions will have solvent borrowers that will increase the demand for credit and thus impact positively on bank profitability (Trujillo-Ponce, 2013). Thus, GDP growth and bank performance have a positive relationship.

On the other hand, dummy variables cannot be interpreted in the same manner as independent variables. The information provided by dummies is hence conceptually different. For instance, an increase of *asset structure* in 1-percentage points will increase EVAS by 0.01 times the coefficient on *asset structure*, with everything else constant. Contrastingly, the coefficient of dummy variables accounts for a specific scenario or category. In fact, it involves a comparison with the reference category identified as those that take value zero.

1. ***DummyCaja:*** this dummy controls for whether entities are or are not *cajas*. Given that the excessive number of branches of these entities and their strong investment in real estate was largely responsible for driving the instability of the banking sector, we believe its coefficient will be negative. That is, *cajas* create less economic value than other entities that are not *cajas*.
2. ***DummyRestruct***: the coefficient of this variable depends largely on the negative effect that the financial crisis had on value creation. Even though non-merged banks were not required to merge to save their banking activities, they still suffered the consequences of an environment characterized by constrains on loans to the private sector and sharp growth in bad debt.[76] Consequently, we believe that the change in EVAS for non-merged banks after 2010, also known as ***Delta* zero**, will be negative. That is, non-merged banks perform worse with respect to the reference scenario of non-merged banks before the crisis.
3. ***DummyMerger***: we believe that ***Beta one*** will display a negative sign. That is, merged banks before the restructuring process perform worse than non-merged banks

[75] Urrutia, C. (2016). *La banca cambia el Euribor.*
[76] BBVA Research. (2015a). *Situación Banca.*

before the crisis. We justify our thoughts on the belief that banks that merged did so due to a weak financial structure that existed prior to the financial crisis.

4. ***Interaction***: in line with the coefficients of *DummyRestruct* and *DummyMerger,* we believe that ***Delta one*** will exhibit a negative sign. Specifically, merged banks in the post-restructuring process period will perform worse than non-merged banks in the pre-period. However, a clarification regarding this interpretation must be highlighted: we do not believe that the restructuring process was not beneficial for these banks. The BBVA Research Paper published in 2015 reveals improvements in liquidity and solvency ratios, improvements in efficiency ratios through superior cost control mechanisms and an overall increase in profitability ratios.

   Nonetheless, the period between 2010 and 2014 was characterized by extreme negative net income values explained by the fragile financial situation in which Spanish banks had performed since 2008. Hence, we need to interpret this dummy with caution. While we believe the government's effort to reboot the economy will pay off in the long-run, the current time span considered is too short to illustrate any improvements in EVAS with respect to the situation of non-merged banks prior to the crisis.

The table below is a summary of the hypotheses corresponding to both independent and dummy variables. Each variable is assigned a positive or negative sign in accordance with the expected relationship with EVAS or its comparison with respect to the reference scenario.

Table 4.3

Expected Relationship between EVAS and Independent and Dummy Variables.

Independent and Dummy Variables	Expected sign (+/-)
Asset structure	+
Asset quality	-
Funding	-
Operating efficiency	-
Revenue diversification	+
Capitalization	+
Bank Size	+
Inflation rate	+
Euribor 12M	+
GDP growth	+
Dummy Caja	-
Dummy Restruct	-
Dummy Merger	-
Dummy Interaction	-

Source: Own elaboration

Special attention has to be paid to certain independent variables that have an inverse relationship with EVAS. That is, metrics such as asset quality, funding and operating efficiency have a negative impact on value creation. A decrease in the ratio of asset quality is equal to an improvement in asset quality. Likewise, a decrease in OER is equal to an improvement in operating efficiency, and so on.

Towards the end of our analysis we are able to compare our predictions with the regression coefficients. This gives us the opportunity to look into the motives that explain divergences between facts and our own perception of the Spanish banking sector.

5. Estimation of EVA and the Dependent Variable EVA Spread

In the following section, we apply the process described in the *Methodology* section of this dissertation in order to estimate EVAS. We start with a section for listed banks, which is followed by a separate section for the non-listed banks.

5.1 Estimation of EVA for Listed Banks

While gathering the accounting data is a necessary first step to calculate EVAS, we are still missing one important variable, which is unobservable and needs to be estimated; namely, the bank's equity cost of capital, $r_{E,\tau}$. For ease of understanding, we reproduce equation (5) below.

$$EVA_\tau = income\ earned_\tau - capital\ charge_\tau = Net\ Income_\tau - \left(r_{E,\tau} * Equity_\tau\right)$$
$$= \left(ROE_\tau - r_{E,\tau}\right) * Equity_\tau$$

Recall that EVAS is simply the spread of ROE minus the cost of capital and it is expressed in percentage points.

For each bank and year, we get equity from the balance sheet and net income from the income statement, and with these two variables we compute ROE. Estimating the equity cost of capital is somewhat more complex and requires making a number of assumptions, as previously explained. It also requires that we make use of a string of bank stock prices, risk-free returns and returns on the market portfolio. A reasonable estimate of the market risk premium in Spain is also needed.

Steps to the estimation of the equity cost of capital

In order to retrieve the necessary data, we make use of the Bloomberg database. First of all, we export the weekly stock prices of the Spanish listed banks, starting from the year 2000 for those that have data available (or from the initial trading date, for those that do not), up till the end of 2014.[77]

[77] At the time of writing, the listed banks in Spain are eight: Banco Santander S.A., Banco Bilbao Vizcaya Argentaria, S.A. (BBVA), CaixaBank, S.A., Bankia S.A., Banco de Sabadell, S.A., Banco Popular Español, S.A., Bankinter, S.A., and Liberbank, S.A.

The second step is to export the weekly prices of different market indices for the above-mentioned time period. We compute estimates of equity beta and equity cost of capital by using four different market indices; the MSCI ACWI, the MSCI Europe, the IBEX 35, and the FTSE Latibex (All-share Index). The first index is used for those banks that have a strong global presence. This is the case of *Banco Santander* and *BBVA*. The second index is intended for banks that have a strong European presence. None of the listed banks is identified as having a purely European presence, and thus this index is not used in isolation but rather in conjunction with the IBEX 35 when the presence of the bank is a mix of both national and European. This is the case of *CaixaBank*, which has presence in some other European countries, and therefore the use of an average of the MSCI Europe and the IBEX 35 seems to be more appropriate. For banks having primarily a national presence, we use the IBEX 35. This is the case of *Bankia*, *Bankinter* and *Liberbank*. Since *Banco Sabadell* and *Banco Popular* have both national and international presence, we use an average of the MSCI ACWI and the IBEX 35 indices. Finally, we use the FTSE Latibex All-share Index for comparison purposes, as some of these banks have a traditional presence in the Latin-American markets. However, the estimation results for this index are rejected, since they show a clear, systematic deviation from the results obtained when using the other indices.

Lastly, we obtain data to proxy for the risk-free returns. Initially, we consider both the returns on Spanish three-month treasury bills and on ten-year government bonds and then choose one of them.

Note that the returns on the weekly stock prices and market indices are calculated as continuously compounded log-returns, following the expression $\rho_\tau = \ln (V_\tau / V_{\tau-1})$.

Once we have all the necessary returns, we can use the CAPM in its multi-period setting, as outlined in equation (8) in the *Methodology*, in order to regress the excess return of the banks' stocks on the market excess return. This allows us to obtain an estimate of equity beta, β_E^L, for each listed bank.

We estimate two sets of betas, one from 2000-2014 and another one from 2004-2014. In the first sample, we try to cover a period of time that is long enough to obtain reliable beta estimates. We call them *full sample estimates*. In the second sample, we choose 2004 as the starting period because this is the default starting year for which Bankscope shows

accounting data for the different banks. With this, we intend to match accounting and market data for the same years, so that an accurate measure of the existing relationship between equity beta and bank leverage can be obtained.[78] We refer to these estimates as *matched sample*.

Tables 5.1 and 5.2 show the different equity beta estimates obtained for each bank by using the different market indices and risk-free rates. Table 5.1 makes use of the full sample data, whereas Table 5.2 uses the matched sample. For comparison purposes, we show as well the beta estimates provided by the Bankscope and Thomson ONE Banker databases. While we performed the regressions using both short- and long-term debt instruments, we decided to choose the returns on the T-bill as our proxy for the risk-free rates. Thus, we use the short-term risk-free rates for the rest of our analysis. The last column of the tables shows our preferred estimates of equity beta. We choose betas based on the market indices attached to each bank, as explained above. So, as an example, the equity beta for *Banco Santander* is the beta obtained by using the MSCI ACWI index, while the equity beta for *CaixaBank* is obtained as a simple average of the betas from the MSCI Europe and IBEX 35 indices.[79] This is done to reflect the exposure that these banks have to different markets. In the last two rows of the tables, we use the median and the average of the parameters in order to estimate industry betas.

Table 5.1

Full Sample Equity-beta Estimates by Listed Bank, Market Index and Risk-free Maturity.

Bank Betas β_E^L	MSCI ACWI		MSCI Europe		IBEX 35		FTSE Latibex		TOB IBEX 35	Bankscope IBEX 35	Choice of β_E^L
	3m Bill	10y Bond	3m Bill	10y Bond	3m Bill	10y Bond	3m Bill	10y Bond			
Santander	**1.22**	1.30	1.12	1.16	1.25	1.29	0.68	0.66	1.28	1.31	**1.22**
BBVA	**1.24**	1.31	1.13	1.16	1.27	1.30	0.68	0.65	1.26	1.29	**1.24**
Caixabank	0.94	0.95	**0.81**	0.81	**0.92**	0.91	0.53	0.50	1.30	1.00	**0.87**
Bankia	1.57	1.73	1.24	1.40	**1.76**	1.79	0.84	0.96	2.11	1.11	**1.76**
B. Sabadell	**0.82**	0.83	0.74	0.73	**0.86**	0.86	0.40	0.38	1.24	1.05	**0.84**
B. Popular	**0.98**	1.06	0.89	0.93	**1.01**	1.05	0.52	0.51	1.29	1.20	**0.99**
Bankinter	1.03	1.06	0.93	0.92	**1.08**	1.09	0.56	0.52	1.22	1.16	**1.08**
Liberbank	1.39	1.17	1.21	1.15	**1.03**	0.99	0.33	0.34	n.a.	0.98	**1.03**
Industry Betas:											
Median β_E^L	**1.13**	1.12	1.02	1.04	**1.06**	1.07	0.54	0.52	1.28	1.14	**1.06**
Av. β_E^L	**1.15**	1.18	1.01	1.03	**1.15**	1.16	0.57	0.56	1.39	1.14	**1.13**

Source: Own elaboration based on data from Bloomberg

[78] As mentioned in the methodology part, we expect this relationship to be significantly positive. This is important as we plan to adjust betas according to leverage for the non-listed banks.

[79] The betas considered for each bank are highlighted in the table in bold.

As can be seen from Tables 5.1 and 5.2, the parameters estimated by using the full and the matched sample data remain rather stable, *Banco Popular* being the only bank showing a perceptible change. It should be noted that, since the matched sample contains data starting from 2004, the betas for the banks that were not listed before that year are the same in both tables.[80] As mentioned before, it can be seen that the parameters obtained using the FTSE Latibex show a clear, systematic deviation from the ones obtained with the other indices. Thus, we dismiss this index as a good proxy for the market returns and do not consider it further.

Table 5.2

Matched Sample Equity-beta Estimates by Listed Bank, Market Index and Risk-free Maturity.

Bank Betas $\beta_E{}^L$	MSCI ACWI		MSCI Europe		IBEX 35		FTSE Latibex		TOB IBEX 35	Bankscope IBEX 35	Choice of $\beta_E{}^L$
	3m Bill	10y Bond	3m Bill	10y Bond	3m Bill	10y Bond	3m Bill	10y Bond			
Santander	**1.24**	1.31	1.12	1.15	1.28	1.30	0.66	0.64	1.28	1.31	**1.24**
BBVA	**1.28**	1.34	1.15	1.17	1.32	1.33	0.65	0.63	1.26	1.29	**1.28**
Caixabank	0.94	0.95	**0.81**	0.81	**0.92**	0.91	0.53	0.50	1.30	1.00	**0.87**
Bankia	1.57	1.73	1.24	1.40	**1.76**	1.79	0.84	0.96	2.11	1.11	**1.76**
B. Sabadell	**0.85**	0.88	0.76	0.77	**0.94**	0.95	0.39	0.38	1.24	1.05	**0.90**
B. Popular	**1.14**	1.24	1.01	1.06	**1.22**	1.27	0.58	0.58	1.29	1.20	**1.18**
Bankinter	1.00	1.03	0.90	0.91	**1.13**	1.14	0.51	0.49	1.22	1.16	**1.13**
Liberbank	1.39	1.17	1.21	1.15	**1.03**	0.99	0.33	0.34	n.a.	0.98	**1.03**
Industry Betas:											
Median $\beta_E{}^L$	**1.19**	1.20	1.07	1.11	**1.18**	1.20	0.56	0.54	1.28	1.14	**1.15**
Av. $\beta_E{}^L$	**1.18**	1.20	1.03	1.05	**1.20**	1.21	0.56	0.56	1.39	1.14	**1.17**

Source: Own elaboration based on data from Bloomberg

Once equity beta has been calculated, the next step is to find a reasonable market risk premium that can be multiplied by the equity beta to obtain a measure of the equity risk premium for each listed bank. This is shown in equation (7) in the *Methodology*, which is reproduced below for ease of reading

$$RP_E^L = \beta_E^L * RP_M$$

As mentioned in the *Methodology*, we opt to follow the result of the research carried out by Fernandez et al. (2015) in which they found a required market risk premium in Spain of 5.5% (in median terms). Table 5.3 shows the results that we obtain for the listed banks' equity risk premium.

[80] That is the case of CaixaBank, Bankia and Liberbank.

Table 5.3

Equity Risk Premium by Listed Bank and Market Index.

Equity RP RP_E^L	MSCI World	MSCI Europe	IBEX 35
Santander	**6.718%**	6.176%	6.900%
BBVA	**6.815%**	6.235%	7.002%
Caixabank	5.166%	**4.477%**	**5.071%**
Bankia	8.660%	6.814%	**9.681%**
B. Sabadell	**4.516%**	4.048%	**4.717%**
B. Popular	**5.398%**	4.907%	**5.530%**
Bankinter	5.687%	5.088%	**5.958%**
Liberbank	7.669%	6.674%	**5.649%**

Source: Own elaboration based on data from Bloomberg

We show in bold the equity risk premium associated to each bank. As explained in the methodology, the equity risk premium - as with the equity beta - is assumed to be constant over time.

The final step to estimate equity cost of capital is to add the above equity risk premiums to the risk-free rate, as outlined in equation (6) and reproduced below.

$$r_{E,\tau}^{L} = r_{f,\tau} + RP_E^L$$

We do this by using an average yearly risk-free return, thereby allowing us to calculate a yearly term structure for the equity cost of capital of each bank.

Table 5.4

Annual Equity Cost of Capital by Listed Bank and Year.

Equity CoC r_E^L	Av 3m r-f return	Santander	BBVA	CaixaBank	Bankia	Banco Sabadell	Banco Popular	Bankinter	Liberbank
2000	4.296%	11.014%	11.111%	9.070%	13.977%	8.912%	9.760%	10.254%	9.945%
2001	4.114%	10.832%	10.929%	8.888%	13.795%	8.730%	9.578%	10.072%	9.763%
2002	3.205%	9.923%	10.020%	7.979%	12.886%	7.821%	8.669%	9.163%	8.854%
2003	2.220%	8.938%	9.035%	6.994%	11.901%	6.836%	7.684%	8.178%	7.869%
2004	2.007%	8.725%	8.822%	6.781%	11.687%	6.623%	7.471%	7.965%	7.656%
2005	2.083%	8.801%	8.899%	6.858%	11.764%	6.700%	7.547%	8.042%	7.733%
2006	2.956%	9.674%	9.771%	7.730%	12.637%	7.572%	8.420%	8.914%	8.605%
2007	3.914%	10.632%	10.730%	8.689%	13.595%	8.531%	9.378%	9.873%	9.564%
2008	3.726%	10.444%	10.541%	8.500%	13.407%	8.342%	9.190%	9.684%	9.375%
2009	0.690%	7.408%	7.505%	5.464%	10.371%	5.306%	6.154%	6.648%	6.339%
2010	0.740%	7.458%	7.556%	5.515%	10.421%	5.357%	6.204%	6.698%	6.390%
2011	1.813%	8.531%	8.628%	6.587%	11.493%	6.429%	7.277%	7.771%	7.462%
2012	1.110%	7.828%	7.926%	5.885%	10.791%	5.727%	6.574%	7.069%	6.760%
2013	0.396%	7.114%	7.211%	5.170%	10.077%	5.012%	5.860%	6.354%	6.045%
2014	0.185%	6.903%	7.000%	4.959%	9.866%	4.801%	5.649%	6.143%	5.834%

Source: Own elaboration based on data from Bloomberg

The second column in Table 5.4 above shows the yearly risk-free returns that we use. The subsequent columns present the estimates of the equity cost of capital for each listed bank. To obtain the equity cost of capital for the banks that have two indices attached to them we add the corresponding risk-free rate to the average of the equity risk premiums obtained with each index.[81]

With these results, we are ready to use equation (5) to obtain an estimate of EVA and EVAS for the listed banks.

In what follows we apply a similar procedure to estimate EVA for non-listed banks. There are however some differences in the process that we would like to emphasize.

5.2 Estimation of EVA for Non-listed Banks

Since the regression approach to the estimation of beta does not help in this case, we intend to approximate the betas for the non-listed banks by adjusting the betas obtained in the previous section for a measure of the leverage of the non-listed banks. We take this measure to be their debt-to-equity (D/E) ratio.

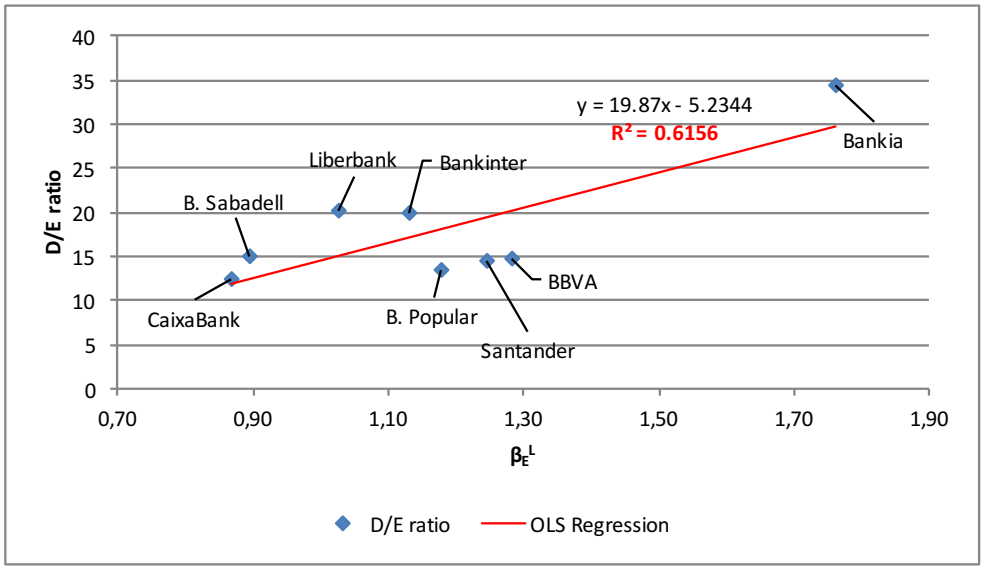
As predicted by the theory, we expect that a positive relation exists between debt-to-equity ratio and equity beta. However, before we start making any adjustments, it is important that we confirm that this relationship holds in our sample of listed banks. With this in mind, we compute their debt-to-equity ratios and plot them together with their respective betas. To do this, we use the aforementioned matched sample, to make sure that betas and leverage ratios refer to the exact same time period. The results are shown below.

As we can see in Figure 5.1, the relation between equity beta and D/E ratio is clearly positive, and a simple OLS regression shows that beta explains around 62% of the variation in leverage. This gives some insight into the relation between leverage and the level of risk, and we can use this link to adjust an industry beta with the level of leverage of each non-listed bank. In this way, we are able to have a suitable approximation of their equity betas.[82]

[81] The banks for which we consider two market indices are *CaixaBank*, *Banco Sabadell* and *Banco Popular*.
[82] While this measure is only capturing differences in financial risk among banks, the discrimination is based upon objective data, and we consider this to be as a proper approximation of equity beta for non-listed banks.

Figure 5.1

Leverage Ratio Against Equity Beta: "Matched" Data Sample and β_E^L Choice.



Source: Own elaboration based on data from Bankscope and Bloomberg

The next step is to estimate an equity beta for the Spanish banking industry. In doing so, we return to the results shown in Tables 5.1 and 5.2 above, where we computed industry betas based on the median and average of the equity betas for the listed banks. We concentrate on the betas estimated based on the MSCI ACWI and IBEX35, since these are the indices that represent most of the banks. The reported results are largely similar between median and average calculations, so we choose the average ones. Table 5.5 summarizes the relevant results and provides an average equity beta which represents our final estimate for the industry.

Table 5.5

Average Equity Beta for the Spanish Banking Industry.

Av. β_E^L	MSCI ACWI	IBEX35
Full Sample	1.15	1.15
Matched Sample	1.18	1.20
β (Industry)	**1.17**	

Source: Own elaboration based on data from Bloomberg

It is worth noting that this estimate is in line with those reported by financial analysts. For comparison purposes see, for example, Damodaran (2016) who reports a beta of 1.11 for the US banking sector, and Buenaventura (2015) who reports a beta of 1.15 for the Spanish banking sector. Thus, our estimate seems reasonable.

Similarly, we report below the average industry debt-to-equity ratios, which are then used to compute the beta adjustments.

Table 5.6

Average Debt-to-Equity Ratios for the Spanish Banking Industry.

	Av. D/E ratio
Full Sample	17.66
Matched Sample	18.08
Ind D/E ratio	**17.87**

Source: Own elaboration based on data from Bankscope

Finally, we compute the beta adjustment simply as the quotient of the non-listed bank's leverage ratio to that of the industry. This adjustment is then multiplied by the industry beta obtained above in order to obtain a specific equity beta for each non-listed bank. This is shown below in equations (15) and (16).

$$Adjustment^{NL} = \frac{Leverage^{NL}}{Leverage^{Industry}} \tag{15}$$

$$\beta_E^{NL} = \beta_E^{Industry} * Adjustment^{NL} \tag{16}$$

At this point, we only need to compute the leverage ratio for each non-listed bank in order to obtain its equity cost of capital in the same way as for the listed banks. Appendix B reports the non-listed banks' leverage ratios and final computations of their equity cost of capital.

6. Quantitative Analysis and Empirical Results

We reach two sets of conclusions in this section. One based on ratio evolution and the other on regression analysis. The first part, *Basic Results,* relies on simple numerical calculations drawn from ratios calculated on the data. Graphs are used to identify patterns in the evolution of independent variables and its impact on value creation. The second part, *Regression Analysis*, requires the use of panel data to assess the effect of mergers and other variables on EVAS. Thus, more elaborate procedures such as the DID model are taken into account.

6.1 Basic Results

Our first conclusions are drawn from a selection of metrics that were covered in the *Methodology* section. Specifically, we focus our attention on 10 variables: ROA, ROE, Asset Structure (AS), Asset Quality (AQ), Funding (F), Operating Expenses (OE), Revenue Diversification (RD), Capitalization (Cap), Bank Size (LogTA), Cost of Capital (CoC) and EVAS. We consider this to be a good starting point prior to the regression analysis since it provides us with some knowledge on the behavior of these metrics over time. Graphically capturing the evolution of these variables allows us to get an approximate idea of their expected coefficients in the *Regression Analysis* section.

To proceed with our analysis, we separate banks and *cajas* into two groups. The first group, compromises all banks and *cajas* that merged between 2006 and 2014. This accounts for a total of 8 banks, 44 *cajas* and 2 credit cooperatives in 2006 and 12 banks, 0 *cajas* and 0 cooperatives in 2014. The second group, in contrast, includes those financial institutions that did not undergo any merger or acquisition. Overall, we find 1 *caja* and 20 banks in 2006 and 23 banks and 1 *caja* in 2014. The aim of this classification is to capture disparities between both groups. Table 6.1 illustrates the entities that belong to each cluster between 2006 and 2014.

In order to piece together all the data for a specific group and year, we carefully-edit the data and gather all ratios for each entity in each year. To observe an evolution of those ratios belonging to a specific group, we obtain an average value. To account for differences in bank

Table 6.1

Classification of Merged and Non-Merged CIs between 2006 and 2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Merged Banks and Cajas	Bancaja	Bancaja	Bancaja	Bancaja	Banca Civica	Banca Civica	Banco CEISS	Banco CEISS	Banco Popular
	Banco de Valencia	Banco de Valencia	Banco de Valencia	Banco de Valencia	Banco de Valencia	Banco CAM	Banco Etcheverria	Banco Popular	Banco Sabadell
	Banco Etcheverria	Banco Etcheverria	Banco Etcheverria	Banco Etcheverria	Banco Etcheverria	Banco de Valencia	Banco Gallego	Banco Sabadell	BBVA
	Banco Gallego	Banco Gallego	Banco Gallego	Banco Gallego	Banco Gallego	Banco Etcheverria	Banco Grupo Caja 3	BBVA	BFA - Bankia
	Banco Guipuzcoano	Banco Guipuzcoano	Banco Guipuzcoano	Banco Guipuzcoano	Banco Pastor	Banco Gallego	Banco Popular	BFA - Bankia	BMN
	Banco Pastor	Banco Pastor	Banco Pastor	Banco Pastor	Banco Popular	Banco Grupo Caja 3	Banco Sabadell	BMN	Caixabank
	Banco Popular	Banco Popular	Banco Popular	Banco Popular	Banco Sabadell	Banco Pastor	BBVA	Caixabank	Cajas Rurales Unidas
	Banco Sabadell	Banco Sabadell	Banco Sabadell	Banco Sabadell	BBK	Banco Popular	BFA - Bankia	Cajas Rurales Unidas	Ibercaja Banco
	BBK	BBK	BBK	BBK	BBVA	Banco Sabadell	BMN	Catalunya Banc CX	Kutxabank
	BBVA	BBVA	BBVA	BBVA	BFA - Bankia	BBK	Caixabank	Ibercaja Banco	Liberbank
	CAI	CAI	CAI	CAI	Caja 3	BBVA	Cajas Rurales Unidas	Kutxabank	NCG Banco
	Caixa Catalunya	Caixa Catalunya	Caixa Catalunya	Caixa Catalunya	Caja Cantabria	BFA - Bankia	Catalunya Banc CX	Liberbank	Unicaja Banco
	Caixa Galicia	Caixa Galicia	Caixa Galicia	Caixa Galicia	Caja España de Inversiones	BMN	Ibercaja Banco	NCG Banco	
	Caixa Girona	Caixa Girona	Caixa Girona	Caixa Girona	Caja Extremadura	Caixabank	Kutxabank	Unicaja Banco	
	Caixa Laietana	Caixa Laietana	Caixa Laietana	Caixa Laietana	Caja Sol	Caja España Inversiones	Liberbank		
	Caixa Manlleu	Caixa Manlleu	Caixa Manlleu	Caixa Manlleu	Caja Vital	Caja Vital	NCG Banco		
	Caixa Manresa	Caixa Manresa	Caixa Manresa	Caixa Manresa	Cajastur	Catalunya Banc CX	Unicaja Banco		
	Caixa Nova	Caixa Nova	Caixa Nova	Caixa Nova	CAM	CR Mediterraneo			
	Caixa Penedes	Caixa Penedes	Caixa Penedes	Caixa Penedes	Catalunya Caixa	Grupo Cooperativo Cajamar			
	Caixa Sabadell	Caixa Sabadell	Caixa Sabadell	Caixa Sabadell	CR Mediterraneo	Ibercaja Banco			
	Caixa Tarragona	Caixa Tarragona	Caixa Tarragona	Caixa Tarragona	Grupo Coop Cajamar	Kutxa			
	Caixa Terrasa	Caixa Terrasa	Caixa Terrasa	Caixa Terrasa	Ibercaja	Liberbank			
	Caja San Fernando	Caja Badajoz	Caja Badajoz	Caja Badajoz	Kutxa	NCG Banco			
	Caja Badajoz	Caja Burgos	Caja Burgos	Caja Burgos	La Caixa	Unicaja Banco			
	Caja Burgos	Caja Canarias	Caja Canarias	Caja Canarias	Mare Nostrum	Unnim Banc			
	Caja Canarias	Caja Cantabria	Caja Cantabria	Caja Cantabria	Novacaixagalicia				
	Caja Cantabria	CCC de Burgos	CCC de Burgos	CCC de Burgos	Unicaja				
	CCC de Burgos	Caja de Avila	Caja de Avila	Caja de Avila	Unnim				
	Caja de Avila	Caja Duero	Caja Duero	Caja Duero					
	Caja Duero	Caja España	Caja España	Caja España					
	Caja España	Caja Extremadura	Caja Extremadura	Caja Extremadura					
	Caja Extremadura	Caja Granada	Caja Granada	Caja Granada					
	Caja Granada	Caja Guadalajara	Caja Guadalajara	Caja Guadalajara					
	Caja Guadalajara	Caja Insular de Canarias	Caja Insular de Canarias	Caja Insular de Canarias					
	Caja Insular de Canarias	Caja Jaen	Caja Jaen	Caja La Rioja					
	Caja Jaen	Caja La Rioja	Caja La Rioja	Caja Madrid					
	Caja La Rioja	Caja Madrid	Caja Madrid	Caja Murcia					
	Caja Madrid	Caja Murcia	Caja Murcia	Caja Navarra					
	Caja Murcia	Caja Navarra	Caja Navarra	Caja Segovia					
	Caja Navarra	Caja Segovia	Caja Segovia	Caja Sol					
	Caja Segovia	Caja Sol	Caja Sol	Caja Vital					
	Caja Vital	Caja Vital	Caja Vital	Cajastur					
	Cajastur	Cajastur	Cajastur	CajaSur					
	CajaSur	CajaSur	CajaSur	CAM					
	CAM	CAM	CAM	CCM					
	CCM	CCM	CCM	CR Cajamar					
	CR Cajamar	CR Cajamar	CR Cajamar	CR Mediterraneo					
	CR Mediterraneo	CR Mediterraneo	CR Mediterraneo	Ibercaja					
	Ibercaja	Ibercaja	Ibercaja	Kutxa					
	Kutxa	Kutxa	Kutxa	La Caixa					
	La Caixa	La Caixa	La Caixa	Sa Nostra					
	CA de Huelva y Sevilla	Sa Nostra	Sa Nostra	Unicaja					
	Sa Nostra	Unicaja	Unicaja						
	Unicaja								
Non Merged Banks and Cajas	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA	Aresbank SA
	Banca March SA	Banca March SA	Banca March SA	Banca March SA	Banca March SA	Banca March SA	Banca March SA	Banca March SA	Banca March SA
	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA	Banca Pueyo SA
	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA	Banco Alcala SA
	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA	Banco Caminos SA
	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA	Banco Coop Español SA
	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA	Banco de Depositos SA
	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas	Banco Europeo de Finanzas
	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA	Banco Finantia Sofinloc SA
	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA	Banco Inversis SA
	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA	Banco Mediolanum SA
	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA	Bancofar SA
	Bankinter	Bankinter	Bankinter	Bankinter	Bankinter	Bankinter	Bankinter	Bankinter	Bankinter
	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA	Bano de Madrid SA
	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA	Banque Marocaine SA
	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA	Barclays Banc SA
	Citibank España SA	Citibank España SA	Citibank España SA	Citibank España SA	Citibank España SA	Citibank España SA	Cecabank SA	Cecabank SA	Cecabank SA
	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Citibank España SA	Citibank España SA	Citibank España SA
	EBN Banco de Negocios SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa	Caixa Destalvis de Pollensa
	General Electric Bank SA	General Electric Bank SA	General Electric Bank SA	General Electric Bank SA	General Electric Bank SA	General Electric Bank SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA	EBN Banco de Negocios SA
	Santander	Santander	Santander	Santander	Santander	Renta 4 Banco SA	General Electric Bank SA	EVO Banco SA	EVO Banco SA
						Santander	Renta 4 Banco SA	General Electric Bank SA	General Electric Bank SA
							Santander	Renta 4 Banco SA	Renta 4 Banco SA
								Santander	Santander

Source: Own elaboration

size, we proceed with the weighted mean instead. That is, to assign more weight to larger banks, data is adjusted by the fraction of a bank's assets divided by total assets belonging to a specific group. Finally, to account for the average value in a given year the weighted ratios are added up[83].

This arrangement over time provides us with two sets of patterns that clearly reveal variations over time and divergences in bank type - merged or non-merged. Table 6.2 summarizes the weighted average results that we obtain for ROA, ROE, AS, AQ, FS,

[83] See Appendix B and C for calculations.

Table 6.2

Metrics for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.

Merged Banks and Cajas (%)											
Years	wROA	wROE	wCoC	wEVAS	wAS	wAQ	wRD	wOE	wF	wCap	LogTA
2006	0.99	15.79	8.87	6.91	70.78	0.46	20.35	3.40	153.31	6.55	9.46
2007	1.02	16.32	9.88	6.43	71.22	0.55	17.55	4.12	156.22	6.46	9.62
2008	0.67	9.15	9.71	-0.57	70.65	0.86	13.32	4.83	149.07	5.75	9.68
2009	0.46	5.30	6.66	-1.37	67.70	1.28	17.17	3.34	141.27	6.16	9.77
2010	0.47	7.39	8.28	-0.89	67.48	0.92	20.55	2.71	147.45	5.91	10.42
2011	-0.11	-7.88	9.19	-17.07	65.82	1.24	16.23	3.19	147.47	5.77	10.60
2012	-2.35	-100.64	8.15	-108.8	59.90	5.37	16.19	3.17	134.37	4.47	10.96
2013	0.24	3.60	7.32	-3.72	58.91	1.62	21.73	3.02	113.49	6.36	11.42
2014	0.39	5.53	6.54	-1.02	58.67	1.24	24.17	2.56	107.54	7.18	11.53
Average	**0.20**	**-5.05**	**8.29**	**-13.34**	**65.68**	**1.50**	**18.59**	**3.37**	**138.91**	**6.07**	**10.38**

Non-Merged Banks and Cajas (%)											
Years	wROA	wROE	wCoC	wEVAS	wAS	wAQ	wRD	wOE	wF	wCap	LogTA
2006	0.92	16.54	9.72	6.82	63.07	0.45	20.29	4.26	182.44	5.53	7.16
2007	1.00	16.47	10.66	5.81	62.80	0.56	19.64	4.75	189.80	6.14	7.42
2008	0.83	14.81	10.46	4.35	60.45	1.14	17.61	4.94	164.04	5.63	7.48
2009	0.78	11.99	7.47	4.52	60.78	1.80	19.56	3.90	144.65	6.50	7.45
2010	0.70	10.54	7.51	3.03	59.97	1.53	21.57	3.47	129.20	6.53	7.36
2011	0.44	6.84	8.61	-1.78	59.16	1.50	18.80	4.02	133.34	6.59	7.43
2012	0.21	3.45	7.94	-4.49	55.06	2.54	19.46	3.89	123.35	6.37	7.57
2013	0.43	6.23	7.27	-1.03	56.67	1.79	20.94	4.15	118.57	7.05	7.61
2014	0.53	7.56	7,00	0.56	56.50	1.33	20.65	3.77	127.59	7.09	7.58
Average	**0.65**	**10.49**	**8.52**	**1.98**	**59.38**	**1.40**	**19.84**	**4.13**	**145.89**	**6.38**	**7.45**

Notes: All the data provided illustrates the weighted average sum of each metric per year. Except for LogTA, which is the normal average of the logarithm of total assets per year. Also, LogTA is not shown in percentage form.

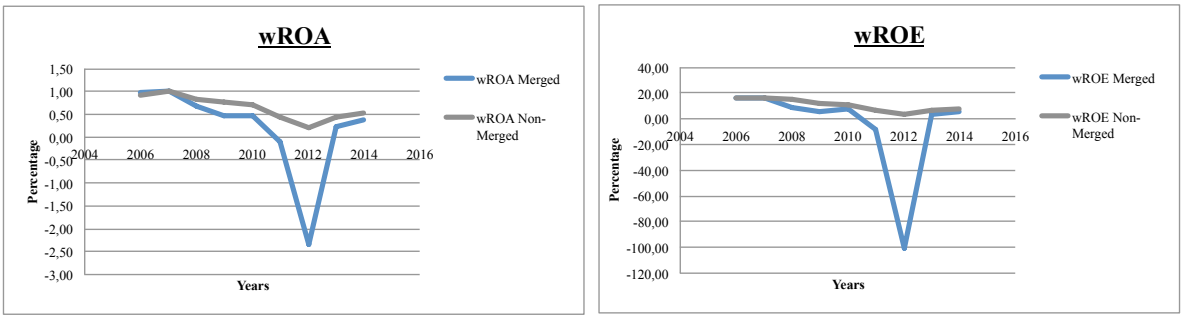
Source: Own elaboration based on data from Bankscope

OE, RD, Cap, LogTA, CoC and EVAS between 2006 and 2014. These metrics are divided into those banks and *cajas* that merged and those that did not merge. For instance, EVAS for merged banks in 2008 is -0.57%. By contrast, banks or *cajas* that did not merger have, on average, an EVAS of 4.35%.

Figure 6.1 illustrates the progress of **ROA** and **ROE** for merged and non-merged banks and *cajas*. Overall, the evolution of these dependent variables followed analogous patterns across the study period. In terms of *non-merged banks*, ROA followed a downward trend since 2007 that was reversed in 2012 with an increase of 104%. ROE for *non-merged banks* charted a similar trend but experienced a lesser increase in 2012 (80%). Looking into the data, this change resulted from a sizeable increase in net income for all *non-merged banks* and *cajas*. Likewise, equity suffered a relative smaller increase but still above that experienced by total assets. For instance, *Banco Cooperativo Español SA* increased its net income from 20.5 million euros to 42.5 million euros between 2012 and 2013. That is, a growth of approximately 107%. On the other hand, total assets and equity improved by 13% and 17%, respectively. Hence, ROA suffered a sharper increase than ROE.

Figure 6.1

Evolution of ROA and ROE for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

With respect to *merged banks*, ROA and ROE developed in a comparable manner to that of non-merged banks; generally, a downward trend that was inverted in 2012. Evidently, there exists a major difference between the pattern followed by *merged* and *non-merged* banks. In 2012, *merged banks'* ROA and ROE abruptly descended into negative numbers while *non-merged banks*' ratios remained stable.

Clearly, *merged banks* experienced a major setback during 2012 that led to a substantial fall in their performance measures. To understand the drivers of this anomaly, we look into the specific banks that experienced large variations in ROE. The outliers identified present a common feature; they had received funds from the FROB and Oliver Wyman had identified them as in immediate need of financial support in 2012. The section *Outliers* - see below - provides an in- depth analysis of this set of banks. These outliers are treated when we consider the regression analysis. By means of the Winsorize technique, we aim to soften the impact of these abnormal observations on the dependent variable.

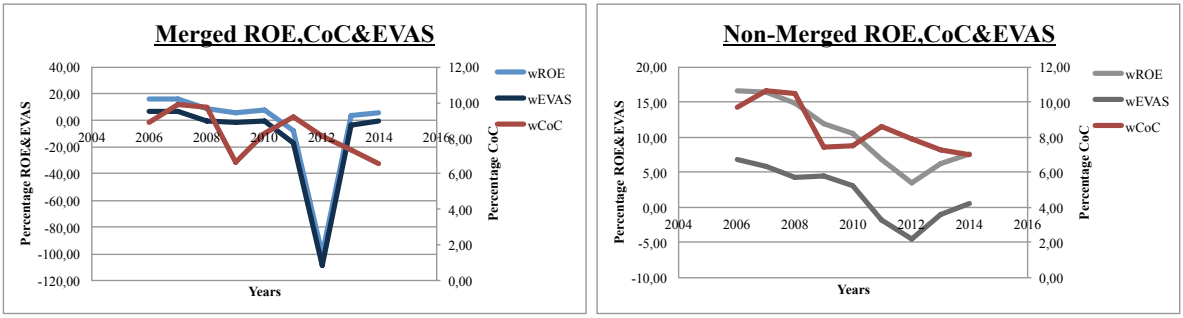
To observe the evolution of **EVAS**, the focus of our research, we need to account for the impact of **CoC**. The CoC variable followed a relatively stable development through the years - mainly a descending trend. This pattern is largely, but not entirely, explained by the evolution of risk-free rates. Numerically, we observed that while risk-free rates remained steady at an average level of 3.5% between 2006 and 2008, it decreased thereafter. In this context, we could conclude that the start of the financial crisis motivated an increased demand for liquid and risk-free assets. This change in behavior could hence result in a decline in yields on assets that are considered to be close to risk-free rates and thus explain the evolution of CoC.[84]

This is illustrated in Figure 6.2 where CoC is included together with ROE and EVAS. Graphically, EVAS is obtained by a parallel move of ROE that results from the effect of CoC.

[84] European Central Bank. (2014). *Euro Area Risk Free Interest Rates: measurement issues, recent developments and relevance to monetary policy.*

Figure 6.2

Evolution of ROE, CoC and EVAS for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

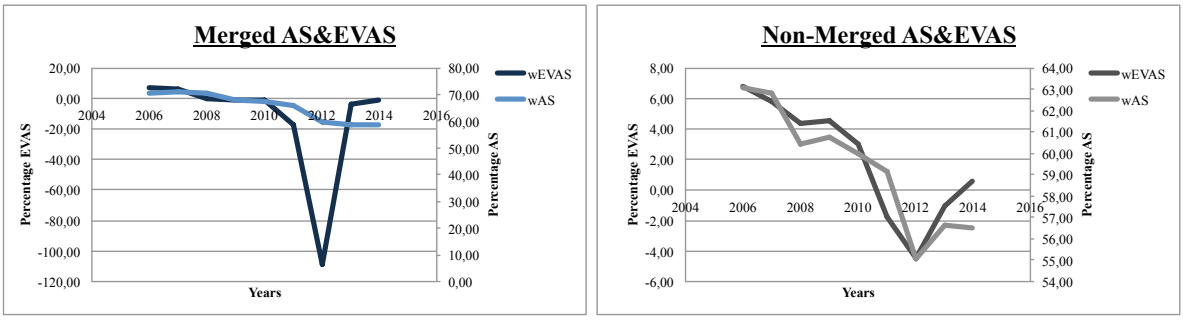
Overall, *merged banks* and *non-merged banks* experienced a comparable CoC of 8.29% and 8.52%, respectively. The minor differences between the clusters are the result of discrepancies in entities' leverage integrated in the calculus of the metric, CoC.

Further examination of the data of EVAS shows that the outliers previously recognized have shaped the evolution of this metric. In fact, these outlying data points provide inaccurate conclusions if we to compare the mean average value of EVAS for *merged* and *non-merged banks* for the time period between 2006 and 2014. Hence, we look to the median values of EVAS. In this sense, *merged banks'* EVAS is below that of *non-merged banks,* taking values of -1.02% and 3.03%, respectively. We can then conclude that banks and *cajas* that did not merge created, on average, more economic value than those that did. In fact, banks and *cajas* that merged repeatedly destroyed economic value between 2008 and 2014 (see Table 6.2).

In relation to the impact of independent variables on EVAS, certain metrics are seen to have a superior ability to explain changes in economic-value-creation than others. For instance, we can conclude from Figure 6.3 that **asset structure** succeeds in explaining fluctuations in EVAS.

Figure 6.3

Evolution of EVAS and AS for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

In tune with our hypothesis, there exists a positive relationship between both metrics; EVAS tends to decrease as the ratio for AS falls and vice versa. This pattern is especially clear for *non-merged banks* and *cajas*. Nonetheless, both metrics follow a common downward trend in AS. It could be argued that the solvency and liquidity issues that Spanish banks and *cajas* were experiencing after the start of the financial crisis explain this development. It would hence make sense to speculate that CIs lowered the percentage of total assets tied up as loans to boost liquidity. In fact, the data at our disposal shows that the downward trend in AS stemmed from a larger increase in total assets relative to net loans.

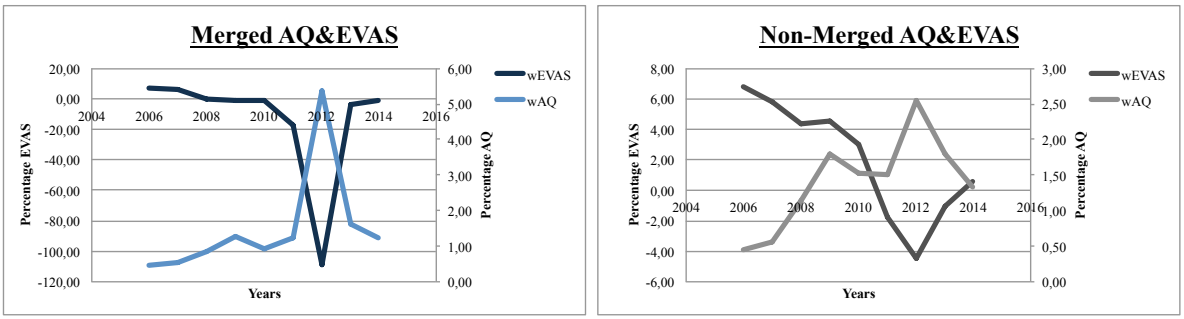
The BBVA Research on the Spanish banking sector clarifies this event, revealing that loans to the private sector - families and entities - decreased sharply between 2008 and 2014, by approximately 47% of GDP.[85] In the research it is argued that the negative year-on-year rate of change is largely explained by three factors. Firstly, the transfer of loans related to real estate to the Sareb in accordance with the MoU in 2012. Secondly, the commencement of a debt reduction process by citizens and companies. Lastly, a fall in the number of loans granted by banks and *cajas* due to a worsening of customers' credit quality that resulted from the macroeconomic conditions.[86] This event can be exemplified by the evolution of *Banco de Madrid SA* between 2011 and 2012. This entity reduced loans from 219.8 million euros to 123.7 million euros, approximately -43%, while it increased total assets by roughly 57%.

[85] BBVA Research. (2015a). *Situación Banca.*
[85] Banco de España. (2012a). Informe de Estabilidad Financiera, p21.

In terms of **asset quality**, Figure 6.4 succeeds in capturing the inverse relationship between AQ and EVAS. While an increase in AQ (asset quality worsens) is followed by a decrease in EVAS, a decrease in AQ (increase in quality) is translated into a rise in EVAS. This pattern is especially clear in 2012. On the one hand, certain *merged banks* suffered a hefty rise in LLP as undercapitalized banks were required to raise provisions in accordance with the MoU. On the other hand, *non-merged banks* set aside a larger expense as an allowance to cover for an expected worsening in the quality of loans. On average terms, the AQ ratio for both *merged* and *non-merged* was practically identical, 1.50% and 1.40% respectively. The slight dissimilarity, however, indicates that banks that underwent the restructuring process had worse asset quality than those that did not.

Figure 6.4

Evolution of EVAS and AQ for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

Figure 6.5 exemplifies the upward trend of the **Capitalization** ratio. This progress was expected after having analyzed changes in ROA and ROE through time. When we looked into these variables, we concluded that equity was increasing at a higher speed than total assets. Consequently, banks were becoming more capitalized and Cap grew over time. This pattern matches the change in capital requirements covered in the section *The Restructuring Process*. Indeed, CIs had to rely more on equity and less on debt to reduce their probability of default and be considered healthy.[87]

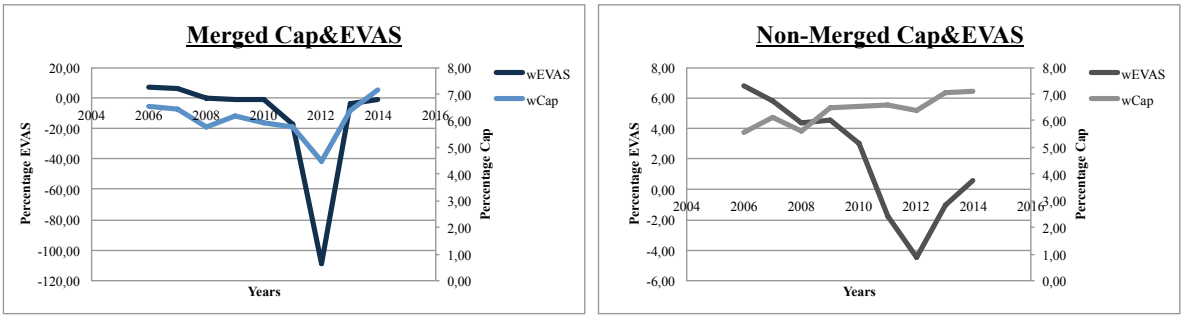
Graphically, it is clear that *merged banks* follow the estimated direct relationship between EVAS and Cap. Actually, the pattern even reveals a drop in Cap in tune with the sharp

[87] IMF. (2013). *Changes in bank funding patterns and financial stability risks.*

decline in EVAS in 2012. This change is explained again by the impact of outliers on the data, which suffer a sharp drop in equity. Conversely, *non-merged banks* chart a constant upward trend that does not match the evolution of EVAS. We could however claim that the increase in Cap drove the increase in *non-merged banks'* EVAS after 2012. Overlooking the anomaly suffered by *merged banks*, we can then conclude that *merged* and *non-merged banks* are characterized by an upward trend with a Cap ratio of approximately 6%.

Figure 6.5

Evolution of EVAS and Cap for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

As previously described, banks have suffered a decrease in loans since 2008. It is therefore not surprising to observe a downward trend in **funding** given that customer deposits increased, on average, or experienced small shortenings. For instance, *Citibank España SA* decreased loans by 6% and increased deposits by 12%, thereby leading to a decrease of the F ratio. This change in funding structure matches the start of the financial crisis. The instability of Spain's banking sector led to a decline of foreign holdings of bank debt securities hindering banks' access to wholesale funding. As a result, CIs had to increasingly rely on customer deposits to fund their loans.[88]

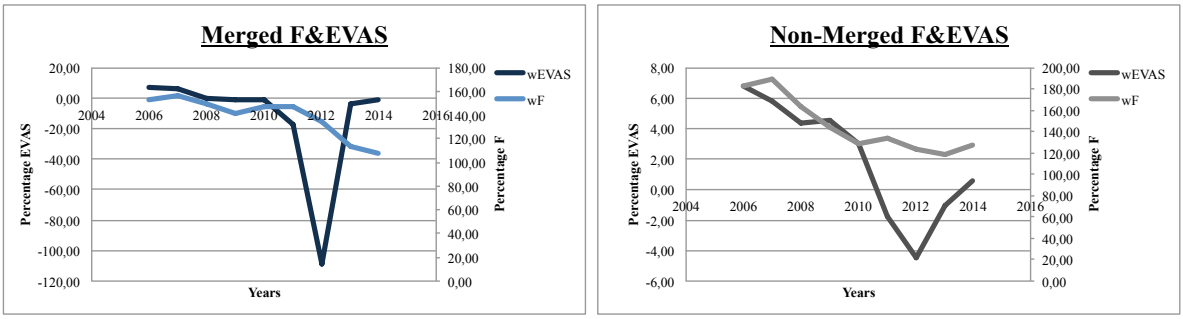
We therefore find it surprising that in an attempt by banks and *cajas* to accommodate their funding structures to the environment, no direct relationship is found between F and EVAS. Figure 6.6 illustrates a downward trend in F that does not match the evolution of EVAS. We need to point out, however, that the different evolution of the two metrics may result from an

[88] IMF. (2013). *Changes in bank funding patterns and financial stability risks.*

overreliance of banks on the wholesale market - *merged* and *non-merged* banks displayed F values above acceptable levels, 139% and 145% respectively.

Figure 6.6

Evolution of EVAS and F for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.

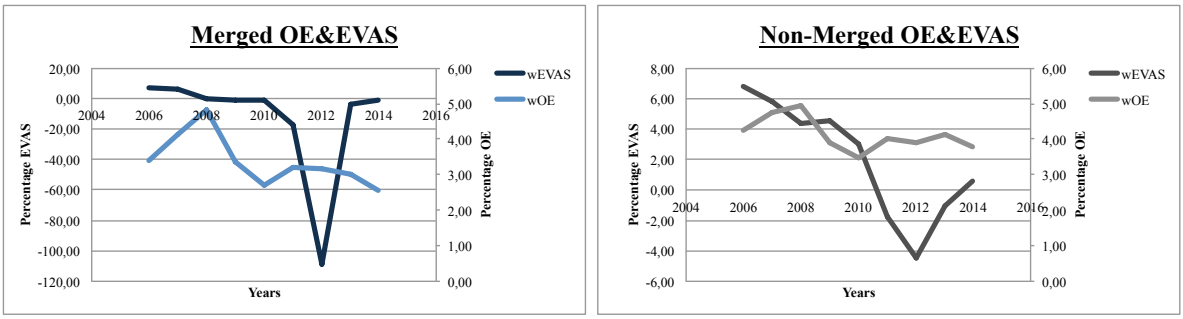


Source: Own elaboration based on data from Bankscope

Similarly, the impact of **operational efficiency** on value creation does not meet the expected development. While we estimated that improvements in efficiency levels would increase EVAS, no inverse relationship is observed between EVAS and OE. Nonetheless, it is clear that banks' balance sheets were significantly transformed after the start of the crisis in 2008. Figure 6.7 illustrates a sharp rise in OE between 2006 and 2008. The increase is a result of the faster growth of interest expenses compared to total assets. Conversely, the period between 2009 and 2014 is characterized by an increase in total assets above interest expenses. In this sense, the ratio OE decreases because its denominator is increasing.

Figure 6.7

Evolution of EVAS and OE for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



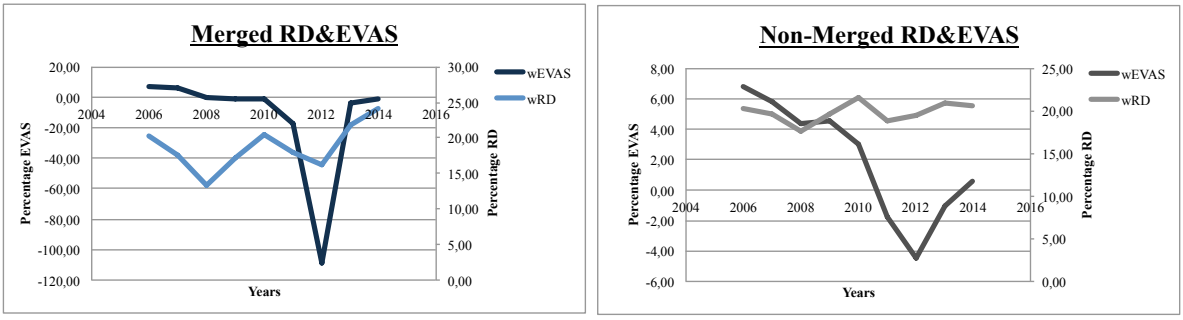
Source: Own elaboration based on data from Bankscope

Merged and *non-merged banks* also illustrate an analogous pattern in terms of **revenue diversification**. In fact, Figure 6.8 reveals how both CIs experienced falls and rises at the same time. The main disparity between the clusters concerns the variability levels. While *non-merged banks* experienced relatively minor fluctuations per year of roughly 8% *merged banks* underwent, on average, 20% fluctuations per year, showing a stronger upward trend.

The search by *merged banks* for alternative sources of income is in tune with the decline in the interest rates margin observed in the Spanish economy. In this sense, we could argue that the weaker financial situation of *merged banks* compared to *non-merged banks* explains their stronger need to search for non-interest income to achieve higher margins. In 2014, this becomes especially clear as *merged banks* increased RD by 150% between 2012 and 2014. However, we find no clear pattern between the evolution of RD and EVAS.

Figure 6.8

Evolution of EVAS and RD for Merged and Non-Merged Banks and *Cajas* between 2006 and 2014.



Source: Own elaboration based on data from Bankscope

Finally, the data for **bank size** reveals that *merged banks* had, on average, a larger volume of total assets compared to *non-merged banks*. In addition, the former group experienced an increase of approximately 3% per year while the latter remained fairly steady between 2006 and 2014. This data illustrates a relationship between EVAS and bank size opposite to our hypothesis; *non-merged banks* were on average smaller but still created more value than merged banks. In this sense, we could assume that *merged banks* do not become more efficient with size and hence they potentially lack economies of scale.

Final Remarks

The goal of this section is to observe how differences in EVAS between merged and non-merged banks are explained by a bank's characteristics; AS, AQ, F, Cap, OE, LogTA and RD. Throughout the analysis, we have encountered metrics that meet our hypothesis and others that significantly diverge from it. Overall, we have graphically observed that asset, asset quality and capitalization moved as expected with EVAS. The economic value creation of non-merged banks could potentially be explained by their holding, on average, better quality assets and being better capitalized. However, merged banks had a better asset structure and still destroyed value. This relation is contrary to our hypothesis. We can hence deduce that Spanish banks are not compensated for bearing riskier assets.

Contrarily, F, OE, LogTA and RD illustrate an unclear ability to explain changes in value creation and hence do not meet our hypothesis. In this context, we can anticipate that these variables will not be significant in the regression analysis. That is, while merged banks were better funded, larger and more efficient they still destroyed more value, on average, than non-merged banks.

Even though significant differences were observed between the evolution of merged and non-merged banks' metrics, a further disaggregation of the data reveals a surprising finding. In an attempt to capture differences in performance and banks' characteristics before and after the start of the restructuring process, we divide our previous results into a pre- and post-period. In this context, we observe a pattern that both merged and non-merged banks follow. After the start of the restructuring process in 2010, all banks suffered a decrease in their profitability and economic measures; decreased their asset structure; held lower quality assets; increased revenue diversification; became more efficient; improved their funding and increased their size. The only exception found was capitalization. While merged banks became less capitalized, non-merged banks were more capitalized. In this context, we can conclude that while being merged or not does have an impact on EVAS, the distinction between a pre- and a post-period leads to no significant differences.[89]

[89] See Appendix D.

It is important to point out that the lack of statistical research in this section means that the results have to be interpreted with great caution. We have based our conclusion on the evolution of ratios through time and hence no causal relationship can be established between variables. The section *Regression Analysis* thus provides the bases for our final conclusions.

6. 1. 1 Outliers

The analysis of ROA and ROE revealed an anomalous pattern in 2012. Evidently, this irregularity was transferred to EVAS and hence hindered our ability to proceed with an accurate evaluation of value creation. This section aims to provide an understanding of the drivers of this anomaly. We identify the merged banks and *cajas* that show bizarre ratios and look into the data. Specifically, we found that eight banks were mainly responsible for driving the change in the trend. In accordance with Hawkins (1980), we define outliers as observations which due to their large deviation from the dataset, suggest strongly to us that they result from an independent event. These are: *Catalunya Banc CX, BMN, Banco Grupo Caja 3, NCG Banco, Liberbank, Banco CEISS, Bankia* and *Banco Gallego.* We refer to these banks as outliers.

Table 6.3
Entities Identified as Outliers and their EVAS in 2012.

Outliers	EVAS(%)
Catalunya Banc CX	-2,031
BMN	-1,510
Banco grupo caja 3	-967
NCG Banco	-611
Liberbank	-183
Banco CEISS	223
Bankia	306
Banco Gallego	464

Source: Own elaboration based on data from Bankscope

Table 6.3 illustrates EVASs with both outstanding positive values - explained by negative net income and equity - and deep negative returns. It is not surprising, however, to observe unusual ratios belonging to these banks. The poor performance of these financial institutions was already revealed in June 2012 when an analysis was conducted on Spanish banks' financial strength. This stress testing analysis was part of the MoU signed between Spain and the European authorities in July 2012. The agreement specified the steps that Spain had to

follow in order to successfully recapitalize the banking sector and thus be authorized to receive external financial assistance. Within the provided guidelines of conduct, Spain had to expose its banks and *cajas* to a bottom-up stress testing analysis.[90]

The report was prepared by the consultancy firm Oliver Wyman and assessed the performance of 14 banking groups, corresponding to approximately 90% of Spanish banking assets.[91] Two scenarios were considered to test banks' level of solvency. Number one, a base scenario that required banks to have a minimum capital ratio of 9% and assumed an accumulated drop in real GDP of 1.7% between 2012 and 2014. Number two, an adverse scenario that established a minimum capital ratio of 6% and that contemplated an accumulated drop in real GDP of 6.5% until 2014. The likelihood of this event, however, was very unlikely - lower than 1%.[92]

Table 6.4 illustrates the projected capital requirements of the 14 banking groups. The conclusions reached were based on the review of credit portfolio losses as of 2011, mainly performing and non-performing loans, foreclosed assets portfolio losses, existing provisions in stock and estimated profit generating capacity.[93] Overall, Oliver Wyman estimated that Spanish banks required approximately 60.000 million euros of capital to survive during a hypothetical worsening of the current macroeconomic conditions.[94]

[90] Peñalosa, J. (2013). Efectos estadísticos sobre los balances de las entidades de crédito españolas de las operaciones recientes de reestructuración y recapitalización. *Boletín Económico*, (FEB).
[91] Wyman, O. (2012). *Asset quality review and bottom-up stress test exercise.*
[92] Banco de España. (2012b). Nota de Prensa: Oliver Wyman estima que las necesidades de capital del sistema bancario español se acercan a 60.000 millones de euros.
[93] Wyman, O. (2012). *Asset quality review and bottom-up stress test exercise.*
[94] Idem Note 92.

Table 6.4

Estimated Capital Needs for Spanish Banking Groups.

Estimated Capital Needs after Taxes (million euros)		
Banking Groups	**Base Scenario**	**Adverse Scenario**
Grupo Santander	19,181	25,297
BBVA	10,945	11,183
Caixabank+Civica	9,421	5,72
Kutxabank	3,132	2,188
Sabadell+CAM	3,321	915
Bankinter	393	399
Unicaja+CEISS*	1,3	128
Ibercaja+Caja3*+Liberbank*	492	-2,108
BMN*	-368	-2,208
Popular	677	-3,223
Banco de Valencia	-1,846	-3,462
NCG Banco*	-3,966	-7,176
Catalunya Banc*	-6,488	-10,825
Bankia*	-13,23	-24,743
Total Capital Needs	-25,898	-53,745

* Outliers

Source: Own elaboration based on data from BdE

As we can observe from the table above, 7 banking groups proved to be sufficiently capitalized to survive during extreme macro situations. These institutions represented more than 62% of the portfolio analyzed and thus confirmed that the Spanish banking sector was largely solvent and viable.[95] Nonetheless, the study revealed that 7 of the 14 banking groups did require financial support in the adverse scenario. These undercapitalized entities were: *Ibercaja+Caja3+Liberbank*, *BMN, Banco Popular, Banco Valencia, NCG, Catalunya Banc and Bankia.*

These findings leave us with a scenario in which we can distinguish two groups of banks. Firstly, banks that require financial support and that we classify as outliers. Note that all outliers are in need of financial aid. Secondly, banks that require additional capital but that we did not recognize as outliers.

The first group of banks is recognized as requiring additional capital and experiencing unusual EVAS. These are marked in Table 6.4 with an asterisk (*) and include: *Banco CEISS*, *Caja 3*, *Liberbank*, *BMN, NCG, Banco Gallego* (which belongs to the banking group *NCG*), *Catalunya Banc and Bankia.* In fact, *NCG Banco*, *Catalunya Banc* and *Bankia* were

[95] Banco de España. (2012b). Nota de Prensa: Oliver Wyman estima que las necesidades de capital del sistema bancario español se acercan a 60.000 millones de euros.

recognized as the three institutions with the greatest financial needs. Also, these banks were already under the control of the FROB and hence nationalized.[96]

Secondly, *Banco Valencia* and *Banco Popular* required additional capital but surprisingly displayed no anomalies in EVAS. Looking into the data, *Banco Popular* did however experience a negative EVAS of 31.29% in 2012. This was the result of a pronounced fall in net income, which dropped from 484 million euros to -2,460 million euros between 2011 and 2012. This plunge in profits was the outcome of an increase in LLP in accordance with the MoU. That is, banks that were recognized as in need of additional capital were required to increase their provisions. This is a pattern that we also observe in outliers and that we cover later on. The uniqueness of *Banco Popular*'s EVAS, however, is that the potential severe drop that this ratio could have experienced was successfully dampened by an increase in equity of 20% between 2011 and 2012. Unfortunately, this is a pattern that we do not observe in the outliers' balance sheets.

Finally, the situation regarding *Banco de Valencia* is somewhat unusual. Given that Oliver Wyman relied on data revisited in 2011, *Banco de Valencia* was still considered as an independent entity. However, we base our calculation of EVAS on data obtained from its balance sheet in 2012. In that year, *Caixabank* absorbed *Banco de Valencia* and hence Bankscope provides information on a single institution. As a result, the ROE achieved by the entity constituted by *Banco de Valencia-Caixabank* is 1%.

We now return the focus to our 8 outliers keeping in mind that Oliver identified them all as in need of financial support. The data reveal that EVAS was mainly driven by changes in net income and equity. In fact, all outliers display sharp declines in equity and negative net income in 2012. The table below illustrates the percentage change in both net income and equity between 2011 and 2012. Overall, these values were normalized in 2013.

[96] Banco de España. (2012b). Nota de Prensa: Oliver Wyman estima que las necesidades de capital del sistema bancario español se acercan a 60.000 millones de euros.

Table 6.5

Outliers. Percentage Change in Net Income and Equity between 2011 and 2012.

Outliers	Net Income (%)	Equity (%)
Banco CEISS	-9,011	-173
Banco grupo caja 3	-7,005	-91
BMN	-3,055	-94
Liberbank	-721	-62
NCG Banco	-98	-51
Banco Gallego	-92	-128
Catalunya Banc CX	-89	-74
Bankia	-84	-148

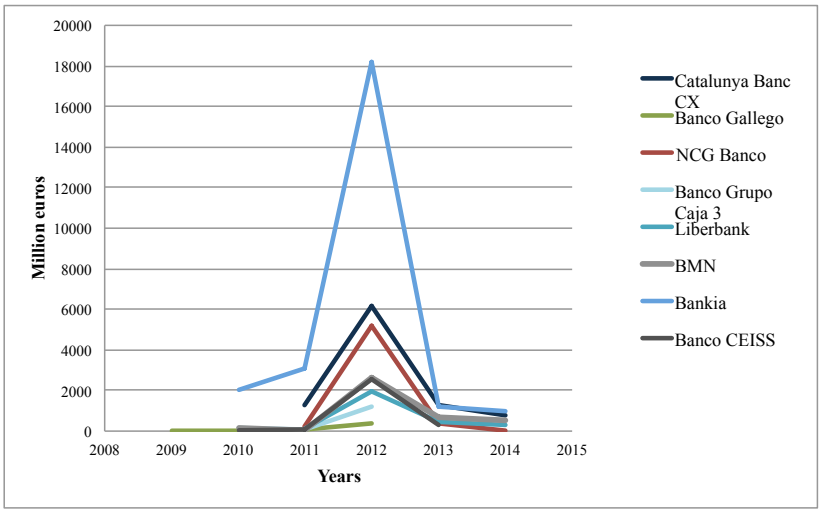
Source: Own elaboration based on data from Bankscope

Comparably to *Banco Popular*, a common pattern was identified when we looked into the income statement of these outliers. Not surprisingly, the loan impairment charge or LLP experienced a steep increase in the year 2012, which had a negative impact on net income. As previously mentioned, this variation is the result of the agreement signed between Spain and the European authorities, the MoU.[97] This agreement established two clear directives. Firstly, Spain had to perform a stress test analysis on its major banking groups. Secondly, banks that failed to meet the test were required to significantly increase provisions recognized for loans assigned to real estate developments and foreclosed assets.[98] The changes in the level of provisions were meant to be re-evaluated based on each banks' performance during the financial crisis and the EU accounting framework.[99] Figure 6.9 provides a visual aid on the development of the loan impairment charge between 2009 and 2014 - *Banco Gallego* and *Banco Grupo Caja 3* merged once again in 2013 and hence no further data is provided in the graph.

[97] Peñalosa, J. (2013). Efectos estadísticos sobre los balances de las entidades de crédito españolas de las operaciones recientes de reestructuración y recapitalización. *Boletín Económico*, (FEB).
[98] BOE. (2012). Memorando de Entendimiento sobre condiciones de Política Sectorial Financiera. No296(1), 84550-84620.
[99] Idem Note 98.

Figure 6.9

Outliers. Development of Loan Impairment Charge between 2009 and 2014.



Source: Own elaboration based on data from Bankscope

The MoU established further delimitations on the road map towards an accurate restructuring of banks' balance sheet. Not only were banks required to increase Common Equity Tier 1 to 9% but also to transfer all assets that were considered potentially problematic to the aforementioned asset management company, Sareb - see *The Restructuring Process*. More specifically, all banks that enjoyed financial support from the FROB were required to transfer toxic assets to the Sareb. Toxic assets were defined as those with a market value far below their book value. For instance, real estate assets that lost value after the housing crash. Thus, it makes sense that these assets were bought by the Sareb at a discount price.[100]

This act had, undoubtedly, a negative impact on banks' balance sheets as these assets were deregistered and registered back again at a lower value. In particular, the outliers were heavily influenced by this arrangement since they received 88% - just over 47,000 million euros - of the total support provided to the banking sector by the FROB. By the end of 2012 all nationalized banks (*Bankia, NCG Banco, Catalunya Banc CX* and *Banco Gallego*) had transferred diverse assets that accounted for a nominal value of 71,000 million euros to the Sareb. These assets, however, were bought for approximately 35 million euros and returned as securities issued by the Sareb guaranteed by the state.[101] In other words, banks' assets

[100] Peñalosa, J. (2013). Efectos estadísticos sobre los balances de las entidades de crédito españolas de las operaciones recientes de reestructuración y recapitalización. *Boletín Económico*, (FEB).
[101] Idem note 100.

suffered a change in nature and in value that led to mismatches in their balance sheets and a resulting drop in equity. The remaining four outliers (*Banco CEISS*, *BMN*, *Liberbank* and *Banco Grupo Caja 3*) transferred 14 million euros of toxic assets in February 2013. As a result, the European Stability Mechanism agreed to provide financial support to these banks in accordance with the completion of the restructuring map established in the MoU.[102] The year 2013 was hence characterized by an improvement in net income and equity as monetary aid arrived and banks adjusted their provisions to better quality assets that made up their balance sheets.

To conclude this section, we believe that there is an important observation that needs to be made. After the analysis performed for the outliers, it feels reasonable to judge the change in EVAS as the reflection of an isolated market event. That is, the steps in the process of reforming weak banks were unique to a particular time period and hence only had an impact on bank performance in 2012. Consequently, we consider that this event fails to provide information about mergers' ability to create value. In the following section we therefore treat the presence of outliers in our dataset by using a statistical procedure called *Winsorization*. Given that anomalies are driven by changes in LLP, net income and equity, we decided to *winsorize* the variables that are directly affected by these factors. Specifically, we reduce the impact of outliers on EVAS, *AssetQuality*, and *Capitalization* at the 1st and 99th percentiles of their sample distributions following the research of Fahlenbrach et al. (2016).[103] In this sense, we develop a regression that limits extreme values and provides more consistent results.

With this in mind, the following section relies on *winsorized* data to develop an empirical analysis of the question at hand. Namely, whether CIs have created economic value as a result of the mergers. We begin the analysis by offering some descriptive statistics, and continue by applying the DID method, a model typically used in policy analysis, to the case of the Spanish CIs. We use this model as it allows us to gauge the difference in value creation

[102] Peñalosa, J. (2013). Efectos estadísticos sobre los balances de las entidades de crédito españolas de las operaciones recientes de reestructuración y recapitalización. *Boletín Económico*, (FEB).

[103] Winsorizing is statistical technique that consists in modifying extreme values in a data sample, which are considered to be beyond a reasonably expected range, by bringing them closer to other sample values.
This is done in order to correct and limit the effect that outlier values have on the distribution of statistics. We use a 98% winsorization, which is considered enough to remove the effect of most of the outliers. This means that the data below the 1st percentile is set to the 1st percentile, while the data above the 99th percentile is set to the 99th percentile. For applications of this technique to bank performance studies see, for example, Ayadi et al. (2016), Fahlenbrach et al. (2016), or Berger et al. (2013).

between bank types (merged and non-merged) and periods of time (pre-restructuring and post-restructuring). In doing so, we follow the approach used in Wooldridge (2013).

6.2 Descriptive Statistics and Regression Analysis

Descriptive Statistics

Table 6.6 provides summary statistics - mean, standard deviation, minimum, maximum and number of observations - for the bank-level independent variables, as well as the dependent variable EVAS. We divide the data into three Panels: Panel A, Panel B and Panel C. Panel A provides these statistics for all CIs regardless of whether they merged or not, while Panels B and C consider merged and non-merged CIs separately. Comparing the three panels, it is interesting to see firstly that, on average and considering all time periods in our sample, merged banks and *cajas* seem to have been destroying value (not creating it) and seem to have done so at a higher rate than non-merged CIs. The **asset structure ratio** is remarkably higher for merged institutions than for non-merged ones (0.72 vs. 0.45), meaning that on average they hold larger amounts of (net) loans relative to assets. This reveals that entities that merged had a more *traditional* banking model than non-merged bank and *cajas*, where most of their assets are devoted to loans. The difference in asset structure was already observed in the cluster analysis and proves that savings banks, which represent the bulk of the group merged banks and *cajas*, had a more traditional approach to banking than commercial banks.

Contrarily, the **asset quality ratio** is lower for merged banks (0.01 vs. 0.04), denoting that, on average, they have a smaller percentage of LLP over (gross) loans. This seems to suggest that merged banks have higher-quality assets than non-merged banks. Not surprisingly, this conclusion is opposite to the results obtained in the cluster analysis. This event is explained by the *winsorizing* technique that we implement in the regression analysis to correct for the impact of outliers in our data. More specifically, we normalize the value of LLP that experienced a sharp increase in 2012.

In terms of liquidity, the loan-to-deposit **funding ratio** is also lower for merged than for non-merged banks (1.31 vs. 1.38). However, these values are above the ideal level of liquidity that is generally agreed upon in the literature, that is, taking the value one or lower than

one.[104] In this context, we can conclude that generally Spanish CIs depend not only on their customers' deposits but also on wholesale or market funding to provide loans to customers. This conclusion is equivalent to the interpretation reached in the cluster analysis section. From a similar perspective, the **operating efficiency ratio** of merged banks is slightly below that of non-merged banks (0.035 vs. 0.040). This result is once again in tune with the pattern observed in the cluster analysis. We can hence conclude that merged banks were, on average, more efficient than non-merged CIs.

When considering income, the **revenue diversification ratio** shows that merged banks are less diversified than non-merged banks (0.16 vs. 0.24). This implies that merged CIs rely less on non-interest income sources as compared to non-merged banks. Again, this seems to indicate that merged banks have a less diversified and more traditional banking model. As for the **capitalization ratio**, it is remarkably lower for merged institutions (0.06 vs. 0.16). This may be caused by merged institutions having an initially lower capitalization level, the *per se* rationale of the merging process being to increase their solvency. Similar to AQ, the *winsorization* of Cap leads to differences between the conclusions reached in the cluster analysis and the regression analysis. While the latter displays a notable difference, the former concludes that ratios for both merged and non-merged banks were practically identical. Finally, as indicated by **bank size**, merged CIs appear to be larger on average than non-merged banks (10.00 vs. 7.45). This outcome makes sense since large banks tend to absorb smaller ones, thereby becoming even larger. This, again, is in tune with the section *Cluster Analysis*.

Overall, the analysis reveals that merged banks are characterized with more favorable ratios than non-merged banks. Indeed, merged banks had better asset quality, relied less on wholesale market, were more efficient and were larger banks. We thus find it surprising that merged banks destroyed more value than non-merged banks. In this context, the regression analysis will reveal the level of significance of each factor, which will in turn provide a more accurate rationalization of the development of EVAS.

[104] Bureau Van Dijk. (2014). *Bankscope - User Guide.*

Table 6.6

Summary Statistics.

	Mean	Std. Dev.	Minimum	Maximum	Obs
Panel A: all CIs					
EVAS	-0.0615625	0.3382791	-2.687718	0.2207504	506
AssetStructure	0.6117795	0.2600553	0.0003166	1.73435	506
AssetQuality	0.0233741	0.1134311	-0.1053459	1.024752	506
Funding	1.333778	1.394957	0	15.18644	506
OperatingEfficiency	0.037569	0.018377	0.0033436	0.2554827	506
RevenueDiversification	0.1871997	0.148417	0	0.8878905	506
Capitalization	0.0987583	0.1197088	0.0079389	0.8134921	506
logBankSize	9.008271	2.143031	3.165475	14.05421	506
Panel B: merged CIs					
EVAS	-0.0856469	0.4241047	-2.687718	0.2207504	310
AssetStructure	0.7165308	0.095213	0.3651456	0.9329147	310
AssetQuality	0.0121287	0.0223281	-0.0036872	0.1924923	310
Funding	1.307338	0.3723549	0.3861355	2.565573	310
OperatingEfficiency	0.0354894	0.0085131	0.0033436	0.0780323	310
RevenueDiversification	0.155505	0.0644954	0.0513313	0.4138601	310
Capitalization	0.0620532	0.0222941	0.0079389	0.1665848	310
logBankSize	9.991257	1.415165	5.991102	13.36576	310
Panel C: non-merged CIs					
EVAS	-0.0234699	0.0946271	-0.4053101	0.2207504	196
AssetStructure	0.4461015	0.3402086	0.0003166	1.73435	196
AssetQuality	0.0411603	0.1789197	-0.1053459	1.024752	196
Funding	1.375597	2.194725	0	15.18644	196
OperatingEfficiency	0.0408581	0.0272397	0.0071625	0.2554827	196
RevenueDiversification	0.2373291	0.2152477	0	0.8878905	196
Capitalization	0.1568123	0.1754838	0.0131239	0.8134921	196
logBankSize	7.453547	2.18047	3.165475	14.05421	196

Notes: See continuation of this table on next page

Table 6.6

Summary Statistics (Continued), Correlation Matrix of Main Variables.

	EVAS	DM	DR	Int	Dcaja	AS	AQ	Fun	OE	RD	Cap	logBS
EVAS	1											
	(506)											
DummyMerger	-0.0896**	1										
	(506)	(810)										
DummyRestruct	-0.1421***	0	1									
	(506)	(810)	(810)									
Interaction	-0.2390***	0.4920***	0.7511**	1								
	(506)	(810)	(810)	(810)								
DummyCaja	0.0756*	0.5540 ***	-0.0707**	0.2013***	1							
	(506)	(810)	(810)	(810)	(810)							
AssetStructure	0.0128	0.5071*	-0.2936***	0.0708	0.3900***	1						
	(506)	(506)	(506)	(506)	(506)	(506)						
AssetQuality	-0.1096**	-0.1248*	0.0634	-0.0049	-0.1156***	-0.2299***	1					
	(506)	(506)	(506)	(506)	(506)	(506)	(506)					
Funding	0.0187	-0.0239	0.0328	-0.0369	-0.0417	0.1935***	-0.0597	1				
	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)				
OperatingEfficiency	-0.0642	-0.1425*	-0.1751***	-0.2104***	-0.0380	0.0865*	0.0786*	-0.0763*	1			
	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)			
RevenueDiversification	0.0816*	-0.2688*	0.2807***	0.0341	-0.2905***	-0.3924***	0.0314	0.2171***	0.0336	1		
	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)		
Capitalization	0.1023**	-0.3860*	0.0953***	-0.1811***	-0.2178***	-0.4199***	0.057	0.0377	0.0822*	0.1403***	1	
	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	
logBankSize	-0.0941**	0.5774*	0.0093***	0.4037***	0.1734***	0.3924***	-0.1055**	-0.0128	-0.1403***	-0.1416***	-0.0128	1
	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)	(506)

Notes: Sample includes all CIs in all time periods. Number of observations is reported between brackets. *, **, and *** denote significance of each entry at 10%, 5% and 1% levels, respectively.

Source: Own elaboration based on data from Bankscope and Bloomberg

Next, Table 6.6 continues to provide a correlation matrix for the main bank-level variables, as well as the dummy variables used in the regression analysis. These correlations are for all CIs, both merged and non-merged.

The dependent variable **EVAS** is, not surprisingly, positively related to revenue diversification and capitalization, implying that more diversified and better-capitalized CIs should create more value in terms of EVA. It is also positively related to the variable *DummyCaja*, suggesting a positive relation between EVAS and the ownership form of a CI being a savings bank.

On the other hand, EVAS shows a negative relation with *DummyMerger*, *DummyRestruct*, *Interaction*, *AssetQuality* and *logBankSize*. This suggests a negative relation between the value creation levels and:

- Banks and *cajas* that merged over the period of study (2006-2014).
- The restructuring of the Spanish banking system.
- The restructuring period (2010-2014) conditional on banks and *cajas* having merged.
- The level of loan loss provisions relative to total assets.
- The size of the bank.

Of course, these are just correlations and no causal effect can be derived from them - the regression analysis should be clearer in that regard. Another important variable which may be worth paying attention to is ***Capitalization***. It is positively related to the variables *DummyRestruct*, *OperatingEfficiency* and *RevenueDiversification*. These correlations suggest a positive association between capitalization levels and: CIs after the restructuring; the operating (in)efficiency of banks as measured by their operating expense ratio and the diversification of the banks' revenue sources. Similarly, *Capitalization* is negatively related to the variables *DummyMerger*, *Interaction*, *DummyCaja* and *AssetStructure*. This implies a negative relation between capitalization and: CIs having merged; the post-restructuring period, conditional on banks having merged; CIs being savings banks; and finally, the intermediation activity of the bank as reflected by the loans-to-assets ratio.

Next, we turn to the regression analysis part. In what follows, we use the econometric technique explained in the *Methodology* section, namely the Difference-in-Differences (DID)

estimator. We then extend the basic DID model to include additional factors that are believed to affect value creation for CIs, and we estimate it by using different panel data procedures, namely polled OLS, fixed effects, and finally, random effects, with the latter yielding the most efficient approach.

Regression Analysis

As stated in our research question, we are trying to determine whether the mergers that took place in the Spanish banking system had a significant impact on value creation, as measured by EVA or, in this case, by EVAS.

To analyze this inquiry, we first rely on a very simple model with a constant and a dummy variable that looks as follows

$$EVAS = \beta_0 + \beta_1 DummyMerger + u, \tag{17}$$

where *DummyMerger* is a binary variable equal to 1 if a bank merged over the period of study (2006-2014), and 0 otherwise.[105] To estimate this equation, we rely solely on data from 2010 onwards to capture the time period in which mergers started to occur. As exemplified by Wooldridge (2013), this would be a naïve approach to analyze the issue at hand. Nonetheless, we proceed with its estimation to observe what a simple model would conclude and later develop more suitable approaches. Relying on our sample of banks, this equation delivers

$$\begin{gathered} \widehat{EVAS} = -0.0242413 - 0.202138\, DummyMerger \\ (0.040887) \quad (0.0598524) \\ n = 210,\ R^2 = 0.0520 \end{gathered} \tag{18}$$

Since this is a simple regression on a single dummy variable, the intercept is the average EVAS for non-merged banks for the restructuring period (-2.42%), and the coefficient on *DummyMerger* is the difference in the average EVAS between merged and non-merged banks. The estimate shows that, for the restructuring period (2010-2014), the average EVAS

[105] Note here that we make use of the word "merged" in a broad sense. As emphasized in the methodology section, *DummyMerger* takes the value of one for all periods when a CI has been involved in the merging process, this CI being either the acquiring company, the acquired company, or a company that decides to merge with another one.

for the merged banks was 20.21% points lower than that of the non-merged ones. The *p*-value is equal to 0.001, and thus we can reject the null hypothesis that the average EVAS for merged and non-merged banks is the same.

Unfortunately, equation (18) does *not* imply that the restructuring process was causing merged banks to create less value. This is because merged banks could have different characteristics than non-merged ones and thus be creating less value prior to the start of the restructuring process. We can check this by performing the same type of regression as in equation (18), but this time using only data for the period *before* the start of the restructuring, that is 2006-2009. Estimating such an equation, we obtain

$$\widehat{EVAS} = -0.0224412 + 0.0018078\ DummyMerger$$
$$(0.0251241) \quad (0.0296872) \tag{19}$$
$$n = 296,\ R^2 = 0$$

The coefficient on *DummyMerger* is now not significant, implying that merged and non-merged banks were not statistically different from each other before the restructuring in terms of value creation. That is to say, that the difference in value creation levels between the two types of banks seems to have occurred *after* the restructuring process started.

The way to statistically test for whether this is really the case or not is by running a regression of the DID Model. Using the DID Model, we define two groups: a control group, comprised of banks that did not merge, and a treatment group, comprised of banks that did merged. In principle, these two groups could be different from each other, and the model will control for that. Our intention with this is to assess whether the restructuring process has had a significantly different effect on the two groups of CIs. The application of the DID Model looks as follows:

$$EVAS = \beta_0 + \delta_0 DummyRestruct + \beta_1 DummyMerger + \delta_1 Interaction + u, \tag{20}$$

where *DummyRestruct* (*DR*) is a binary variable equal to one over the restructuring period (2010-2014), and zero before that (2006-2009), and the variable *Interaction* represents the product of *DummyRestruct* and *DummyMerger* (*DM*). As explained below, the coefficient on

the interaction allows us to test for the difference in value creation between the two types of CIs occurring *due to the restructuring*. Estimating equation (20) gives

$$\widehat{EVAS} = -0.0224 - 0.0018\,DR + 0.0019\,DM - 0.2040\,Interaction$$
$$(0.035946)\quad (0.0475521)\quad (0.0424746)\quad (0.0622953) \qquad (21)$$
$$n = 506,\ R^2 = 0.0260$$

The estimates from the above regression can be interpreted in the following way:

The constant term represents the average EVAS for the control group (the non-merged institutions) before the start of the restructuring process. Thus, non-merged banks showed an average EVAS of -2.24% before the restructuring of the banking sector began.

The coefficient on *DummyRestruct* captures the change in EVAS for the non-merged banks after the restructuring process started. Although not statistically significant, this coefficient is negative and equal to -0.0018, meaning that non-merged banks experienced an insignificant decrease in EVAS during the restructuring. Thus, their average EVAS after the restructuring process was equal to -0.0224 + (-0.0018) = - 2.42%. Overall, this tells us that the value creation of non-merged banks was not significantly affected by the restructuring process, and continued to be negative on average.

The coefficient on *DummyMerger* takes account of the merger effect that is *not due to the restructuring* process itself. As an example, this coefficient would be positive (negative) if the CIs that merged were creating more (less) value than those that did not, *already before* the restructuring started. The parameter estimate is positive, although not statistically significant, implying that there is no significant merger effect prior to the restructuring. The sum of the coefficients on the intercept and *DummyMerger* (-0.0224 + 0.0019 = -2.05%) represents the average EVAS for the treatment group prior to the restructuring taking place in 2010.

Looking into our main parameter of interest, the variable *Interaction*, we can capture systematic differences in pre-treatment characteristics. These can occur because treatment is not randomly assigned; that is, the fact that a bank merges or not is not random, but can depend on, for example, bank characteristics and performance levels. Hence, this parameter

measures the difference in the increase (decrease) in EVAS between merged and non-merged CIs that is *due to the restructuring*, provided we assume that EVAS for merged banks and non-merged banks did not change at different rates for other reasons. As seen in equation (21), the coefficient on *Interaction* is negative (-0.2040) and strongly significant. This suggests that, after the restructuring, Spanish banks that merged experienced a significant drop in their value creation levels as compared to those that did not merge. A possible explanation for this effect is that most of the banks that were absorbed or merged had solvency and performance problems, thereby causing merged institutions to show lower levels of value creation.

Finally, the average EVAS for merged banks during the restructuring is equal to the sum of the four estimated coefficients, -0.0224 + (-0.0018) + 0.0019 + (-0.2040) = -22.64%. This is certainly a surprisingly high level of value destruction. Since the results from the regression analysis are interpreted in terms of the *simple* average effect on EVAS, in contrast to the weighted average in the cluster analysis, it could be that this exceptional negative value was capturing the effect of relatively small banks with negative levels of value creation.

Below, Table 6.7 offers a summary of the three regressions estimated so far. The column identified as (1) represents the data from the simple regression estimated during the restructuring process; column (2) the data from the simple regression estimated before the restructuring process; and finally, column (3) the coefficients of the DID Model.

Table 6.7

EVAS as explained by the Variables *DummyMerger* and the DID Model.

Dependent Variable: *EVAS*			
Independent Variables	**(1)**	**(2)**	**(3)**
Constant	-0.0242413	-0.0224412	-0.0224412
	(0.0102444)	(0.0079415)	(0.0079461)
DummyMerger	-0.202138***	0.0018498	0.0018498
	(0.0637334)	(0.0200326)	(0.0200442)
DummyRestruct	-	-	-0.0018001
			(0.0129583)
Interaction	-	-	-0.2039878***
			(0.0667614)
Estimator	Pooled OLS	Pooled OLS	Pooled OLS
Period	2010-2014	2006-2009	2006-2014
Observations	210	296	506
R-squared	0.0520	0.0000	0.0571

Notes: A detailed definition of the variables can be seen in the Methodology section. All columns report standard errors (and significance levels) that are robust to heteroskedasticity. *, **, and *** denote significance of each variable at 10%, 5% and 1% levels, respectively.

Source: Own elaboration based on data from Bankscope and Bloomberg

Subsequently, Table 6.8 summarizes the average EVAS for the merged and non-merged banks, classified by pre- and post-restructuring periods. It is clear from the data that while non-merged banks experienced a relatively constant level of value creation, merged banks suffered a severe drop in performance. Nonetheless, both CIs were destroying economic value before and after the restructuring process had begun.

Table 6.8

Average EVAS Classified by Bank Type and Pre- and Post-Restructuring Periods.

Average EVAS	**Pre-restructuring**	**Post-restructuring**
Control Group: Non-merged CIs	-2.24%	-2.42%
Treatment Group: Merged CIs	-2.06%	-22.64%

Source: Own elaboration based on data from Bankscope and Bloomberg

The models presented above do not account for the fact that the dependent variable, EVAS, could be explained by other additional factors. If this were the case, all the three previous models could suffer from omitted variable bias. In order to reduce this possibility, below we extend the DID Model by adding additional regressors that are believed to have an important

effect on EVAS. In total, we introduce 14 variables to the regression analysis. As seen in Table 6.9, these have been classified into three categories.

Table 6.9

Independent and Dummy Variables Included in the Regression Analysis.

Dummy Variables	Dummy Restruct Dummy Merger Dummy Interaction Dummy Cajas
Internal Variables	Asset Structure Asset Quality Revenue Diversification Operating Expenses Funding Capitalization Bank Size
External Variables	Euribor 12M GDP Growth Inflation CPI

Source: Own elaboration

The first of these, dummy variables, is perhaps the most important. As explained above, the coefficient of the dummy set as the interaction between *DummyRestruct* and *DummyMerger* is responsible for providing the final answer to our research question. Secondly, internal variables describe inherent characteristics of each bank and *caja*. Finally, we include external variables to account for changes that have taken place through the years but that have remained unchanged between institutions. In running different specifications of our DID Model, a set of year dummies is used in place of the external variables in order to account for and summarize all the possible macroeconomic circumstances that change over time and have an effect on value creation.

Below, we expand equation (20) by adding these additional explanatory factors, as follows

$$EVAS = \beta_0 + \delta_0 DummyRestruct + \beta_1 DummyMerger + \delta_1 Interaction + other\ factors + u \quad (22)$$

Table 6.10

Estimation of EVAS on the Extended DID Model.

Dependent Variable: *EVAS*				
Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**
Constant	-0.1111668*	-0.0895935	-0.11382	-0.2020144*
	(-0.0650667)	(0.066115)	(0.1014804)	(0.1205863)
DummyMerger	-0.0554089*	-0.031206	-0.0662036*	-0.0854328*
	(0.0314318)	(0.0255624)	(0.0390586)	(0.0455728)
DummyRestruct	-0.0364971*	0.0302045	0.023728	0.0706663*
	(0.0202145)	(0.0381131)	(0.0376815)	(0.0419803)
Interaction	-0.1759715***	-0.1983859***	-0.1771585***	-0.1561278***
	(0.0540317)	(0.0590041)	(0.0544637)	(0.0479074)
DummyCaja	0.0311414	0.0090699	0.0396615	0.057984
	(0.0281481)	(0.0230724)	(0.0358742)	(0.0397027)
AssetStructure	0.1932669**	0.1336706*	0.1449762*	0.1995793**
	(0.0808144)	(0.0686578)	(0.0859515)	(0.1020221)
AssetQuality	-0.2381031*	-0.2239913*	-0.219825	-0.2003665
	(0.138506)	(0.128711)	(0.1408128)	(0.1482269)
Funding	-0.0174163**	-0.0102283	-0.0096645	-0.0161283
	(0.0083417)	(0.0077216)	(0.0090794)	(0.010814)
OperatingEfficiency	-2.773573**	-2.170262*	-2.625511*	-3.097926*
	(1.117742)	(1.164266)	(1.550988)	(1.601643)
RevenueDiversification	0.3714879***	0.2781536***	0.3080307***	0.3811036***
	(0.098886)	(0.0822204)	(0.1062973)	(0.1317773)
Capitalization	0.3385096***	0.2794762***	0.3697711**	0.3944081**
	(0.1117159)	(0.1054256)	(0.1806941)	(0.1898226)
logBankSize	0.0035875	0.0040452	0.0060132	0.0049343
	(0.0051471)	(0.0055057)	(0.0096176)	(0.0097223)
Euribor12m	-	-	-	4.552091**
				(2.22968)
GDPgrowth	-	-	-	1.457717***
				(0.4973219)
InflationCPI	-	-	-	-4.184118***
				(1.536635)
Year Dummies (F-test)	-	2.30**	15.34**	-
Macro Variables (F-test)	-	-	-	13.04***
Estimator	Pooled OLS	Pooled OLS	RE	RE
θ (median)	-	-	0.2088	0.1897
R-squared	0.1097	0.1568	0.1549	0.1249
Hausman test	-	-	5.18	6.36
Breusch-Pagan test	-	-	2.12*	1.82*

Notes: A detailed definition of the variables can be seen in the Methodology section. Full sample, N = 506. All columns report standard errors (and significance levels) that are robust to heteroskedasticity. Standard errors in Columns (3) and (4) are also robust to any form of serial correlation. *, **, and *** denote significance of each variable at 10%, 5% and 1% levels, respectively.
Source: Own elaboration based on data from Bankscope and Bloomberg

Table 6.10 presents the results of the estimation of the extended DID Model presented above. All the models are estimated on the 506 observations available in our dataset throughout the period 2006-2014. Columns (1) and (2) use traditional pooled OLS (POLS), whereas Columns (3) and (4) present the results of a random effects (RE) estimation. In order to account for heteroskedasticity, Columns (1) and (2) report the White standard errors, robust to heteroskedasticity in the error term. Columns (3) and (4) report standard errors that are robust to any form of serial correlation and heteroskedasticity.

Column (1) and Column (2)

Column (1) in Table 6.10 includes all the dummy and internal variables, but does not include any external variables. Column (2) includes yearly dummy variables to control for the macroeconomic conditions, which change over time. Column (2) is preferred to Column (1) in terms of explanatory power, as shown by the increase in the value of the adjusted *R*-squared (0.0899 vs 0.1256; not shown in Table 6.10) and the significance of the *F*-test on the year dummies. Thus, we focus our first set of comments on Column (2).

In tune with our hypothesis, we notice that all independent variables appear with the expected signs although some seem to be not significant. As can be observed, *OperatingEfficiency* is the variable with the largest effect on EVAS. Its reported sign is negative and the coefficient is significant, meaning that more efficient banks (those operating with the least relative level of expenses) are associated with higher levels of value creation. *RevenueDiversification* and *Capitalization* have a similar positive effect on EVAS, implying that more diversified and better capitalized CIs create more value. *AssetQuality* is shown with a negative, significant sign, suggesting that higher proportions of LLPs are associated with CIs destroying economic value. *AssetStructure* has a positive sign, thereby suggesting that banks with higher relative loan levels contribute to value creation. On the other hand, the specification of model (2) reveals that *Funding* and *logBankSize* are not significant. These findings are in tune with the results obtained by Trujillo-Ponce (2013) and Fiordelis, F. (2010). While the latter posited that funding lacks the ability to explain changes in economic value creation, the former showed that bank size was not an explanatory factor of bank profitability in Spain.

In terms of the dummy variables, we found that *Interaction* is the only factor that appears to be significant. This variable is reported to have a negative effect on EVAS, hence implying

that the restructuring process of the banking sector had a negative effect on economic value creation levels of the Spanish CIs.

The problem with the models presented in Columns (1) and (2) is that they do not account for the fact that the CIs included in our sample might be heterogeneous in non-observable, firm-specific characteristics. This might be the case if, in addition to the variables that we include in the model, there were other important variables that were both unobserved and correlated with the observed variables - something referred to in econometrics as unobserved heterogeneity. In order to (partially) account for that potential source of specification bias, we estimate Columns (3) and (4) using the RE panel data technique.[106] While Column (3) replicates the model from Column (2), Column (4) modifies that from Column (3) by substituting the year dummies for the three external macro variables.

Hence, to test the existence of differences across CIs, we implement the Breush-Pagan Lagrange Multiplier test. The null hypothesis of this test states that there is no evidence of significant differences and hence, that there is no panel data effect in the data sample. When we ran this test for RE, however, we rejected the null hypothesis at the 10% significance level for both columns, (3) and (4) (p-values = 0.0728 and 0.0885). In this context, we conclude that RE is preferred over pooled OLS. In addition, we performed a Hausman test to compare fixed effects (FE) and RE. We conclude with this test that the RE versions of columns (3) and (4) are preferred to their FE counterparts. That is, we accept the null hypothesis of the Hausman test. [107] [108]

[106] The random effects technique (or quasi-demeaned data model) is a panel data estimation version of the unobserved effects model, which is rather flexible, with outcomes that range from those obtained with pooled OLS to those obtained with fixed effects, θ being the parameter determining the position within that range ($\theta = 0$ is equivalent to POLS and $\theta = 1$ to FE). RE's main assumption is $Corr(x_{itj}, a_i) = 0$, meaning that the unobserved effect a_i is uncorrelated with each explanatory variable. This is a strong assumption, but it may be a reasonable one if we control for enough factors in our model, or if the unobserved heterogeneity is believed to be small. One of its main advantages is that, unlike FE, RE allows for the estimation of time-constant variables, something convenient in our case in order to estimate the variables *DummyMerger* and *DummyCaja*.

[107] The FE counterparts of Columns (3) and (4) are estimated by using dummy variable (DV) regressions that incorporate a set of year dummies (the external macro variables in the case of Column (4)) and a set of bank dummies. This model (estimated without a constant) produces identical results to the FE estimator. Perhaps it is worth noting that the R-squared is remarkably higher in the DV regressions than in the RE, but this does not mean much since it is due to the inclusion of a dummy variable for each cross-sectional unit, which explains a substantial proportion of the variation in the data.

[108] It is worth noting that the reported θ parameters from the RE estimations in Columns (3) and (4) are, in both cases, around 0.20, implying that the estimation performed with RE is closer to that of POLS than to FE. This tells us that the model identifies the unobserved bank effects as being relatively unimportant and that, although there is a panel data effect in our sample, it is not extraordinary. This is an idea reinforced by the weak rejection (at the 10% level) of the Breusch-Pagan LM test. However, even if the unobserved heterogeneity is small, POLS estimation has the problem that the composite error term is serially correlated, generally rendering the standard errors and test statistics invalid. This is not the case with the RE estimation technique, which corrects for serial correlation in the errors.

Column (3) and Column (4)

Looking into the data, Column (3) preserves the same signs as Column (2), but some significance levels have changed. We find it surprising that *AssetQuality* now becomes not significant. The specification of the model has a noticeable impact on the conclusions reached. However, the literature tends to agree on the importance of this variable to explain bank performance. Even the small number of studies that set EVA as the dependent variable tend to reach the same outcome. In terms of *Funding* and *logBanksize*, these factors remain not significant.

A further notable change with respect to Column (2) is the case of *DummyMerger* becoming significant. Column (3), hence, reflects that there is a significant negative merger effect prior to the restructuring, meaning that merged banks were showing lower levels of performance already before the restructuring. Contrastingly, *DummyRestruct* and *DummyCaja* remain not significant. That is, non-merged banks do not perform (create value) significantly different after mergers began, and *cajas* do not create value in a significantly different manner than other CIs. Nonetheless, we believe that the level of significance of *DummyRestruct* could have been anticipated. If we recall the evolution of EVAS in the cluster analysis, we observed that non-merged banks experienced little changes in value creation before and after the start of the restructuring process. In this sense, it would have been rational to estimate that *DummyRestruct* was not significant.

In terms of the size of the coefficients, these remain fairly similar except for the case of *OperatingEfficiency* and *Capitalization.* While the former shows an even larger negative effect, the latter has a greater positive effect on EVAS. The coefficient on *Interaction* decreases slightly, from -0.19 to -0.17, thereby reducing the negative effect of the restructuring on the value creation levels of merged CIs. Again, the year dummies turn out to be jointly significant, and so worth including in the regression.

Next, Table 6.11 summarizes the average EVASs for the merged and non-merged banks, classified by pre- and post-restructuring periods, according to the coefficients obtained in Column (3). Comparing Table 6.11 with Table 6.8, we can see that the pre-restructuring average value destruction levels of both merged and non-merged institutions increase considerably (from -2.06% to -18.00% for merged CIs, and from -2.24% to -11.38% for non-merged ones). Now, however, non-merged banks destroy less value after the restructuring,

and not the same, as was the case in Table 6.8. Merged banks, on the other hand, show on average a higher level of value destruction after the restructuring (-33.35% compared with -22.64%).

Table 6.11

Average EVAS Classified by Bank Type and Pre- and Post-Restructuring Periods, as Based on Column (3).

Average EVAS	Pre-restructuring	Post-restructuring
Control Group: Non-merged CIs	-11.38%	-9.01%
Treatment Group: Merged CIs	-18.00%	-33.35%

Source: Own elaboration based on data from Bankscope and Bloomberg

Finally, Column (4) substitutes the year dummies with the three external macroeconomic variables, which are individually and jointly significant. The size of the coefficients of these variables is also large and their signs are as expected, except for the variable *InflationCPI*. While we predicted this variable would have a positive impact on EVAS, the empirical results show a negative sign. We believe this may be the outcome of CIs' inability to successfully anticipate changes in the inflation rate. As a result, they fail to take advantage of possible opportunities to boost performance and hence create value. In addition, we need to be aware that these three macro variables do not account for all the possible macroeconomic conditions. We believe that in this context there exists an abscense in explanatory capability that is captured by the remaining variables. That is, Column (4) illustrates a model in which the absolute value of the coefficients on the dummy and internal variables increases in nearly all cases. We argue that the reason for this is the lower ability of these three variables to explain changes in EVAS, since *R*-squared is lower in Column (4) than in Column (3). However, we need to be cautious with this interpretation given that Column (3) includes a larger number of variables than Column (4) and hence will automatically increase *R*-squared.

One exception to the increase in coefficients is the dummy *Interaction*. This factor decreases in magnitude although it continues to be strongly significant. Banks that merged after the start of the restructuring process experienced a drop in their value creation levels of 15 percentage points compared to those that did not merge. From a similar perspective, the

coefficient of *DummyRestruct* and intercept increase and become significant at the 10% level. We find it surprising, however, that *DummyRestruct* has a positive value. This outcome is opposite to our hypothesis and suggests that non-merged banks destroyed less value after the start of the restructuring process. Again, the specification of the model varies the level of significance of the coefficients although their signs have remained stable during the analysis.

In a similar fashion as on Table 6.11, Table 6.12 below summarizes the average EVAS by bank type and period, based on the coefficients from Column (4). Now, we can see that the average pre-restructuring EVASs for both groups of banks are even larger than in Table 6.11 (respectively, -20.20% vs. -11.38% and -28.74% vs. -18.00%). The post-restructuring period, however, show a similar effect as that seen on Table 6.11. That is, on average, non-merged banks destroy less value after the restructuring, while merged CIs experience a large drop on the average EVAS.

Table 6.12

Average EVAS Classified by Bank Type and Pre- and Post-Restructuring Periods, as Based on Column (4).

Average EVAS	Pre-restructuring	Post-restructuring
Control Group: Non-merged CIs	-20.20%	-13.13%
Treatment Group: Merged CIs	-28.74%	-37.29%

Source: Own elaboration based on data from Bankscope and Bloomberg

7. Concluding Remarks

As a result of the global financial crisis and the bursting of the Spanish real-estate bubble, the banking industry in Spain has undergone a profound integration process that has produced radical changes in the banking landscape. The drastic reduction in the network of bank branches, the fall in the number of bank employees, and the virtual disappearance of the savings banks, one of the most entrenched forms of CIs in the history of Spanish banking, are living proof of this ongoing transformation.

After a reasonable time has passed since the first merger took place in 2009, and now that the Spanish economy and banking sector seem to be showing clear recovery signs, an analysis of the outcome of the mergers for the Spanish banking system seems to be justified. With this premise in mind, we begin an analysis of the Spanish banking industry and state our basic research question: *have merged banks created or destroyed economic value as a result of the restructuring process?*

In order to answer this question, we propose a financial model to estimate a measure of value creation for CIs, namely the Economic Value Added Spread (EVAS). We make a point of showing that this measure is more advanced than other traditional accounting ratios, as it takes into account an important and often overlooked cost, viz. the bank's equity cost of capital.

After estimating this ratio in the case of Spanish CIs, we group them according to whether they were involved in the merging process (either as the acquirers, as acquirees or merged companies) or were not. Similarly, we develop ratios to measure bank-specific characteristics that we believe have an impact on value creation. These cover the concepts of: asset quality, asset structure, revenue diversification, capitalization, funding, operating efficiency, capitalization and bank size. In this context, we graphically observe differences between the evolution of EVAS and bank-specific variables, and between merged and non-merged banks. This cluster analysis reveals that merged banks were, on average, more efficient, better financed, larger and possessed a better asset structure, but destroyed economic value. In contrast, non-merged banks held, on average, better quality assets, were better capitalized and more diversified, and seem to have created economic value. Nonetheless, this first

insight into the drivers of EVAS posits questions regarding the level of significance of certain variables. While asset quality, asset structure and capitalization moved in tune with EVAS, we observed that funding, operating expenses and revenue diversification did not follow any clear pattern.

The econometric analysis confirms our suspicions about funding. This variable does not explain the evolution of EVAS. In contrast, the remaining metrics are found to be explanatory of economic value creation, expect for bank size. Further variables are tested in this section, namely, macroeconomic variables and dummies variables. The regression analysis reveals that these factors (except for the external variable *InflationCPI*) have the expected relation with value creation.

In terms of the dummy *Interaction*, our main research focus, its analysis suggests that merged institutions were unable to create economic value as a result of the restructuring process, *ceteris paribus*. This is indicated by the negative sign of the coefficient on *Interaction*, which is significant across specifications. Thus, from an EVA point of view and according to the data at our disposal, we do not see evidence of value creation among merged institutions due to restructuring. Conversely, we see signs that the restructuring of the banking sector may have caused merged institutions to destroy economic value. These results concur with those of Apellaniz et al. (1996). That is, the performance of merged banks after the restructuring process was not only below that of non-merged banks, but also below their own levels of performance prior to the restructuring process.

Nonetheless, these results need to be interpreted with caution. While the period of study reveals no positive outcome of this event, the increase in market concentration might be beneficial for banks' competitiveness in the long run, as argued by Fuentes and Sastre (1999). Likewise, the restructuring of the banking sector led to a reduction of costs and improvements in capital-adequacy ratios. In this context, we could argue that the Spanish banking system is better prepared to deal with potential future financial crises. However, the results of this dissertation suggest that mergers that take place during a crisis period are extremely challenging, especially when the integration processes involve entities of different nature. Moreover, the mechanism followed to pursue mergers is also a factor that explains the output of this event. In Spain, the strongest banks and *cajas* have absorbed the weakest

performing entities. As a result, merged entities have faced the challenge of managing not only the complex process of the integration process, but also the financial pressure to improve the viability of these entities.

Clearly, specific factors explain why certain mergers may tend to be more successful in certain markets (Amel et al., 2004). In this sense, people working with mergers of banks in a future crisis need to evaluate the environment in which they are working and keep in mind that while mergers may not create immediate economic value, they may have other positive outcomes.

Limitations

While these are the conclusions we reach based upon the quantitative analysis, there are certain limitations we need to be aware of. Data availability, the factors included, the model used and changes in macroeconomic conditions are some of the numerous aspects that could potentially modify our results.

The bulk of the analysis is based on the data provided by Bankscope. Clearly, we rely on the accuracy of the information offered by this database to perform our analysis. We encountered, however, missing data for certain years that we corrected for with data from supplementary sources, like the AEB and CECA. In this context, we are aware that the information provided by Bankscope may potentially include errors that could interfere with the accuracy of our results. A further limitation regarding data may be the shortage of years that could have possibly failed to capture the long-term effect of synergies. We would have benefitted from additional time periods in the post-restructuring phase to perform a more accurate analysis like the one carried out by Bernard et al. (2009). Indeed, taking more years into account would have allowed for the restructuring process to be more complete, which could have potentially modified our conclusions - that is, if synergies were truly in place. Unfortunately, at the time of writing this dissertation, Bankscope was unable to provide complete information for the year 2015.

Furthermore, we need to be aware of changes in the regulatory environment that may interfere with our ability to interpret results accurately. As we observed in the analysis of ROE and EVAS, certain regulatory changes had a significant impact on the evolution of

these metrics. For instance, the year 2012 was characterized by a sharp increase in LLP that drove net income to negative values. In our empirical results, we *winsorize* these values to obtain a more robust view of the ability of banks and *cajas* to create economic value. In this context, different approaches to correct for outliers might lead to significant changes in the final results. Similarly, the method selected to estimate EVAS has a relevant impact on the conclusions reached. Surprising results could be explained by an inaccurate computation of the banks' equity cost of capital, $r_{E,\tau}$. To calculate this factor for non-listed banks we exploit the positive relation between leverage and equity beta, thus only taking financial risk into account. However, other potential sources of risk, like the banks' operational risk, were not explicitly included when modelling equity cost of capital, and thus, the variable EVAS could have been estimated with some error.

Another factor that might have been interesting to include in the model of equity cost of capital would be the effect of inflation. Thus, we compute equity cost of capital in nominal terms and not in real terms. This could be done by subtracting the average annual inflation rate from the yearly risk-free return, before adding it to the bank-specific equity risk premium. Once a version of the *real* equity cost of capital was calculated, we would need to make a decision on whether ROE is calculated in nominal or real terms. This is somewhat more difficult to argue, since the accounting data used to compute ROE is a mix of marked-to-market and historical values.

In terms of the model specification, the linear regression is a functional form that may interfere in the accuracy of the results. This arrangement may obscure the real nature of the relationship between EVAS and the explanatory variables. Likewise, the coefficients obtained in the regression analysis may be affected by the definition of the independent variables. It is common to observe that the literature relies on different ratios to capture specific bank characteristics. For instance, Athanasoglou et al. (2006) present different proxies for the banks' liquidity risk, like loans to assets, liquid assets to total assets, and alternatively the ratio of loans to deposits. Analogously, the definition of the dummy variables requires that results are interpreted with caution. While we identify the restructuring process as a period that started in 2010, other researchers may reject this judgment and consider that it started before.

As described above, the analysis that we develop has its weaknesses and limitations, and could certainly be improved. In this sense, we identify below several aspects that further research could build upon in order to develop a richer model of value creation in the context of banking.

Further Research

The first potential development identified would be to distinguish between the kinds of mergers that took place in the Spanish banking industry, and not just between merged and non-merged institutions, as we do. This could be done in at least two different ways. One would be to differentiate between those CIs participating in the restructuring process as acquirers from those that participate as acquirees. Since it is very likely that differences exist between these two groups of banks (e.g., the latter may be less efficient institutions with solvency and profitability issues, while the first may be more sophisticated and have better performance profiles) an analysis of this kind could reveal interesting associations between types of merging institution and value creation levels. Another way would be to distinguish between mergers that were encouraged by the BdE after the injection of public financial resources, and those that happened naturally because of market conditions.

An additional interesting expansion would be to allow for some explanatory variables to change over time, for example by having them interact with year dummies or, alternatively, with the variable *DummyRestruct*. By doing so, we could assess how value creation is explained by different factors at different points in time. In this regard, a review of the literature shows that the impact of the financial crisis has led to changes in the parameter estimates of the explanatory variables.

Finally, we could consider alternative measures of value creation that take other aspects into account. In this sense, it would be interesting to see if the banking mergers have had an effect not just on shareholder value but also on measures of value creation for other stakeholders as, for example, the banks' clients and employees or, society as a whole. Taking into account that vast amounts of public financial resources have been used to rescue insolvent CIs, a broader measure that captured the creation of value to other stakeholders would be strongly justified.

8. Outlook for the Spanish Banking System

The deep restructuring process, in which the Spanish banking system has been immersed since 2009, is slowing paying off. The economic recovery has taken hold and financial entities have begun to deliver satisfactory economic returns. For that purpose, however, over 31% of the branches have closed and 25% of the jobs have been destroyed.[109] Spain now faces a new era of changes and challenges. To boost the economy, new strategies need to be developed in a scenario of high public deficit, low profitability, increasing competition and a unified regulatory regime.

The reorganization of the banking sector required the equivalent of 9.6% of the GDP in public aid between 2008 and 2014. The public deficit increased as a result of the financial aid, accounting for 5.08% of the GDP by the end of 2015.[110] The European Central Bank has consequently expressed its concern over budgetary slippage in Spain. However, the initiative to impose fees on Spain's excessive deficit - potentially adding up to 2,000 million euros - corresponds to the European Commission. Two main alternatives have been posited. On the one hand, Spain could be provided with an additional extension to the time frame to reduce its deficit to below 3%.[111] This threshold was already agreed upon in the MoU signed in 2012. The fragile political situation in which Spain finds itself poses difficulties for the current government to apply effective measures to correct the deficit. In fact, new parliamentary elections will be held on June 26th 2016.[112] Consequently, Brussels is strongly contemplating its second alternative; to go ahead with sanctions. The final resolution is still, however, unknown to the Spanish population given Brussels' decision to postpone its verdict until a new government is constituted.[113]

In terms of profitability, our analysis revealed an improvement in bank performance since its plunge in 2012. The average ROE in the sector is, however, still low compared to its level prior to the crisis. It seems that this is not a complication exclusive to the Spanish banking sector. The last financial stability report published by the IMF in October 2015, revealed that

[109] Maudos, J. (2015). *Retos del sector bancario español tras la reestructuración.*
[110] Manjón, P.L. (2016). *Eurostat confirma que España cerró 2015 con un déficit del 5% e incumplió por ocho décimas el objetivo fijado por Bruselas.*
[111] Sanhermelando, J. (2016). *El BCE apremia a España a corregir el déficit fiscal.*
[112] Alberola, M. (2016). *El Rey no propone a ningún candidato y aboca a nuevas elecciones en junio.*
[113] Sanhermelando, J. (2016). *El BCE apremia a España a corregir el déficit fiscal.*

the ROE of developed countries had fallen from an average of 13.2% for the period 2000-2006 to 8.2% in 2014.[114] This fall can be mainly explained by stricter capital requirements. Likewise, the average ROE of the Eurozone is performing poorly (2.5%) compared to North America returns (9%) in 2014.[115] The lower profitability of the Eurozone banking sector results from the high number of non-performing assets. In this context, Spain faces the challenge of reaching higher profitability ratios in a scenario of reduced interest rates that hampers the widening of interest margins. One alternative that is being developed to boost bank performance is greater efficiency. To become more efficient, it is essential that banks cut costs. In this sense, it is likely that we will continue to observe new merger processes aimed at taking advantage of economies of scale and additional branches being closed. At the moment, the Savings Banks Foundation (known as Funcas from its Spanish initials) has estimated that the banking sector will close 3,000 branches by 2019 and will reduce its staff by a total of 14,500. This additional restructuring can already be observed in the major banking groups such as Santander and BBVA.[116]

Similarly, online banking services have recently become an important tool to reduce costs. The organizational model is changing and this novel approach of conducting business is expected to deliver profits in the long run. Its objective is to offer a broad diversity of services and improve customers' satisfaction. This new era of online banking poses, however, potential hazards to bank profits. Indeed, competition is increasing as new companies use technology to offer more cost efficient financial services in an exclusively digital manner: the so-called FinTech companies. The business volume that these entities is generating is still far from that of major banks. However, their rapid development and growth is beyond question and many Spanish banks are redesigning their strategies. In this sense, we expect an increase in cooperation between traditional banks and digital companies. As an example, BBVA has already established a strategic alliance with Dwolla, an American leading e-commerce company.[117]

Finally, Spain has to tackle these challenges in a new unified regime. The Single Supervisory Mechanism (SSM) ensures the consistent application of regulations, supervision and

[114] Maudos, J. (2015). *Retos del sector bancario español tras la reestructuración.*
[115] Idem Note 114.
[116] El Confidencial. (2016). *La banca enfila el cierre de 9.000 oficinas a rebufo del Santander y BBVA.*
[117] BBVA Research. (2015b). Banks and FinTech: Towards a Collaborative Ecosystem.

corrective measures. In this sense, we expect Spain to prove once again - after successfully completing the stress tests conducted by ECB and EBA in 2014 - its growing financial strength and meet the requirements of the SSM.

In summary, while the financial crisis is thought to be over, the existing challenges and the increasing regulatory pressure suggest a future in which entities need to gain efficiency and develop new business models. Spanish financial entities need to reconsider the future viability of the current retail-banking model supported by an extensive network of small-sized branches. The final reform that Spain should undertake must have the potential to restore public trust in governmental and financial institutions.

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V. Appendix

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Appendix A: ROA, ROE, RAROC and Bank-Specific Variables for Merged and Non-Merged Banks.

Appendix C: Weighted Bank-Specific Variables for Merged and Non-Merged Banks.

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Appendix B: Debt-to-Equity Ratio and Cost of Equity Capital for Non-Listed Banks.

Appendix D: Differences between Pre- and Post-Restructuring Period.

Appendix B: Debt-to-Equity Ratio and Cost of Equity Capital for Non-Listed Banks.

Non-listed CIs (NL)	Period	D/E ratio	Equity CoC (r_E^{NL})								
			2006	2007	2008	2009	2010	2011	2012	2013	2014
Caixa Catalunya	2006-09	17.69	9.323%	10.282%	10.093%	7.058%	7.108%	8.180%	7.478%	6.763%	6.552%
Caixa Manlleu	2006-09	21.64	10.744%	11.702%	11.514%	8.478%	8.528%	9.601%	8.898%	8.184%	7.973%
Caixa Manresa	2006-09	16.42	8.863%	9.822%	9.633%	6.598%	6.648%	7.720%	7.018%	6.303%	6.092%
Caixa Sabadell	2006-09	16.46	8.878%	9.836%	9.648%	6.612%	6.662%	7.735%	7.032%	6.318%	6.107%
Caixa Tarragona	2006-09	18.32	9.550%	10.509%	10.320%	7.284%	7.335%	8.407%	7.705%	6.990%	6.779%
Caixa Terrasa	2006-09	12.91	7.602%	8.561%	8.372%	5.336%	5.387%	6.459%	5.757%	5.042%	4.831%
Catalunya Banc CX	2011-13	39.33	17.108%	18.066%	17.878%	14.842%	14.892%	15.965%	15.262%	14.548%	14.337%
Catalunya Caixa	2010	35.36	15.680%	16.638%	16.450%	13.414%	13.464%	14.537%	13.834%	13.120%	12.909%
Unnim	2010	34.95	15.534%	16.493%	16.304%	13.269%	13.319%	14.391%	13.689%	12.974%	12.763%
Unnim Banc	2011	23.83	11.532%	12.490%	12.302%	9.266%	9.316%	10.389%	9.686%	8.972%	8.761%
Banca Cívica	2010-11	24.25	11.683%	12.642%	12.453%	9.417%	9.468%	10.540%	9.838%	9.123%	8.912%
Banco de Valencia	2006-11	16.09	8.746%	9.705%	9.516%	6.481%	6.531%	7.603%	6.901%	6.186%	5.975%
CA de Huelva y Sevilla	2006	13.27	7.731%	8.690%	8.501%	5.465%	5.516%	6.588%	5.886%	5.171%	4.960%
Caixa Girona	2006-09	15.38	8.491%	9.449%	9.261%	6.225%	6.275%	7.347%	6.645%	5.931%	5.719%
Caja de Burgos	2006-09	10.45	6.717%	7.676%	7.487%	4.451%	4.502%	5.574%	4.872%	4.157%	3.946%
Caja de Canarias	2006-09	14.12	8.039%	8.997%	8.809%	5.773%	5.823%	6.896%	6.193%	5.479%	5.268%
Caja de Guadalajara	2006-09	19.81	10.086%	11.045%	10.856%	7.821%	7.871%	8.943%	8.241%	7.526%	7.315%
Caja Navarra	2006-09	14.65	8.229%	9.187%	8.999%	5.963%	6.013%	7.086%	6.383%	5.669%	5.458%
Caja San Fernando	2006	12.62	7.497%	8.455%	8.267%	5.231%	5.281%	6.353%	5.651%	4.937%	4.726%
Caja Sol	2007-10	19.31	9.905%	10.863%	10.675%	7.639%	7.689%	8.762%	8.059%	7.345%	7.134%
Bancaja	2006-09	23.27	11.328%	12.287%	12.098%	9.063%	9.113%	10.185%	9.483%	8.768%	8.557%
Caixa Laietana	2006-09	17.78	9.355%	10.314%	10.125%	7.090%	7.140%	8.212%	7.510%	6.795%	6.584%
Caja de Ávila	2006-09	14.57	8.198%	9.156%	8.968%	5.932%	5.982%	7.055%	6.352%	5.638%	5.427%
Caja de Segovia	2006-09	17.31	9.183%	10.142%	9.953%	6.918%	6.968%	8.040%	7.338%	6.623%	6.412%
Caja Insular de Canarias	2006-09	20.66	10.390%	11.349%	11.160%	8.124%	8.175%	9.247%	8.545%	7.830%	7.619%
Caja La Rioja	2006-09	14.61	8.213%	9.171%	8.983%	5.947%	5.997%	7.070%	6.367%	5.653%	5.442%
Caja Madrid	2006-09	16.65	8.946%	9.904%	9.716%	6.680%	6.730%	7.803%	7.100%	6.386%	6.175%
Banco CAM	2011	27.64	12.901%	13.860%	13.671%	10.636%	10.686%	11.758%	11.056%	10.341%	10.130%
Banco Gallego (Grupo NCG)	2006-12	18.38	9.569%	10.528%	10.339%	7.303%	7.354%	8.426%	7.724%	7.009%	6.798%
Banco Guipuzcoano	2006-09	15.05	8.371%	9.330%	9.141%	6.105%	6.156%	7.228%	6.526%	5.811%	5.600%
Caja de Ahorros del Mediterráneo CAM	2006-10	18.94	9.772%	10.731%	10.542%	7.507%	7.557%	8.629%	7.927%	7.213%	7.001%
Banco Pastor	2006-11	16.62	8.936%	9.894%	9.706%	6.670%	6.720%	7.793%	7.090%	6.376%	6.165%
Caja Duero	2006-09	15.17	8.414%	9.372%	9.184%	6.148%	6.198%	7.271%	6.568%	5.854%	5.643%
Caja España	2006-09	18.74	9.700%	10.659%	10.470%	7.435%	7.485%	8.557%	7.855%	7.140%	6.929%
Caja España de Inversiones CEISS - Banco CEISS	2010-13	57.37	23.600%	24.559%	24.370%	21.334%	21.385%	22.457%	21.755%	21.040%	20.829%
Caja Jaén	2006-08	14.55	8.190%	9.149%	8.960%	5.924%	5.975%	7.047%	6.345%	5.630%	5.419%
Unicaja - Unicaja Banco	2006-14	13.37	7.769%	8.727%	8.539%	5.503%	5.553%	6.625%	5.923%	5.209%	4.998%
Caja 3 - Banco Grupo Caja 3	2010-12	22.95	11.214%	12.173%	11.984%	8.948%	8.999%	10.071%	9.369%	8.654%	8.443%
Caja Badajoz	2006-09	11.85	7.219%	8.178%	7.989%	4.954%	5.004%	6.076%	5.374%	4.660%	4.448%
Caja Círculo Católico de Burgos	2006-09	8.47	6.004%	6.962%	6.774%	3.738%	3.788%	4.861%	4.158%	3.444%	3.233%
Caja de Ahorros de la Inmaculada CAI	2006-09	11.28	7.014%	7.973%	7.784%	4.749%	4.799%	5.871%	5.169%	4.454%	4.243%
Ibercaja - Ibercaja Banco	2006-14	16.88	9.030%	9.988%	9.800%	6.764%	6.814%	7.887%	7.184%	6.470%	6.259%
BBK	2006-11	6.60	5.329%	6.288%	6.099%	3.063%	3.114%	4.186%	3.484%	2.769%	2.558%
Caja Vital	2006-11	10.03	6.565%	7.523%	7.335%	4.299%	4.349%	5.422%	4.719%	4.005%	3.794%
CajaSur	2006-09	24.20	11.664%	12.622%	12.434%	9.398%	9.448%	10.521%	9.818%	9.104%	8.893%
Kutxa	2006-11	8.20	5.906%	6.864%	6.676%	3.640%	3.690%	4.763%	4.060%	3.346%	3.135%
Kutxabank	2012-14	11.78	7.194%	8.152%	7.964%	4.928%	4.978%	6.051%	5.348%	4.634%	4.423%
Banco Etcheverría (Grupo Apollo)	2006-12	17.34	9.196%	10.155%	9.966%	6.931%	6.981%	8.053%	7.351%	6.636%	6.425%
Caixa Galicia	2006-09	14.01	7.996%	8.954%	8.766%	5.730%	5.780%	6.853%	6.150%	5.436%	5.225%
Caixa Nova	2006-09	13.11	7.674%	8.632%	8.444%	5.408%	5.458%	6.531%	5.828%	5.114%	4.903%
NCGBanco - Abanca	2011-14	21.55	10.711%	11.669%	11.481%	8.445%	8.495%	9.568%	8.865%	8.151%	7.940%
Novacaixagalicia	2010	40.53	17.541%	18.500%	18.311%	15.276%	15.326%	16.398%	15.696%	14.982%	14.770%
BMN	2010-14	28.20	13.104%	14.063%	13.874%	10.839%	10.889%	11.961%	11.259%	10.544%	10.333%
Caixa Penedés	2006-09	22.66	11.112%	12.070%	11.882%	8.846%	8.896%	9.969%	9.266%	8.552%	8.341%
Caja Granada	2006-09	16.62	8.936%	9.894%	9.706%	6.670%	6.720%	7.793%	7.090%	6.376%	6.165%
Caja Murcia	2006-09	14.81	8.285%	9.244%	9.055%	6.020%	6.070%	7.142%	6.440%	5.725%	5.514%
Sa Nostra	2006-09	21.02	10.520%	11.479%	11.290%	8.255%	8.305%	9.377%	8.675%	7.961%	7.749%
Caja Cantabria	2006-10	21.14	10.561%	11.520%	11.331%	8.296%	8.346%	9.418%	8.716%	8.002%	7.790%
Caja Extremadura	2006-10	14.15	8.049%	9.007%	8.819%	5.783%	5.833%	6.906%	6.203%	5.489%	5.278%
Cajastur	2006-10	8.87	6.148%	7.107%	6.918%	3.883%	3.933%	5.005%	4.303%	3.589%	3.377%
CCM	2006-09	23.89	11.554%	12.513%	12.324%	9.288%	9.339%	10.411%	9.709%	8.994%	8.783%
C.R. Cajamar	2006-09	12.61	7.492%	8.451%	8.262%	5.226%	5.277%	6.349%	5.647%	4.932%	4.721%
C.R. Mediterráneo - Ruralcaja	2006-11	16.69	8.960%	9.919%	9.730%	6.695%	6.745%	7.817%	7.115%	6.401%	6.189%
G.C. Cajamar - CRU-Cajas Rurales Unidas - G.C. Cajamar	2010-14	13.06	7.654%	8.612%	8.424%	5.388%	5.438%	6.511%	5.808%	5.094%	4.883%

Appendix B (continued)

Non-listed CIs (NL)	Period	D/E ratio	Equity CoC (r_E^{NL})								
			2006	2007	2008	2009	2010	2011	2012	2013	2014
Barclays Banks S.A.	2006-14	22.15	10.926%	11.884%	11.696%	8.660%	8.710%	9.782%	9.080%	8.366%	8.155%
Aresbank S.A.	2006-14	1.98	3.667%	4.626%	4.437%	1.402%	1.452%	2.524%	1.822%	1.108%	0.896%
Banca March S.A.	2006-14	12.86	7.582%	8.541%	8.352%	5.316%	5.367%	6.439%	5.737%	5.022%	4.811%
Banca Pueyo S.A.	2006-14	11.08	6.943%	7.902%	7.713%	4.678%	4.728%	5.800%	5.098%	4.383%	4.172%
Banco Caminos S.A.	2006-14	12.42	7.425%	8.384%	8.195%	5.160%	5.210%	6.282%	5.580%	4.866%	4.654%
Banco de Depositos S.A.	2006-14	4.72	4.655%	5.614%	5.425%	2.390%	2.440%	3.512%	2.810%	2.095%	1.884%
Banco de Madrid S.A.	2006-14	16.96	9.061%	10.019%	9.831%	6.795%	6.845%	7.918%	7.215%	6.501%	6.290%
Banco Europeo de Finanzas	2006-14	0.20	3.029%	3.987%	3.799%	0.763%	0.813%	1.886%	1.183%	0.469%	0.258%
Banco Finantia	2006-14	6.97	5.464%	6.423%	6.234%	3.198%	3.248%	4.321%	3.619%	2.904%	2.693%
Banco Inversis S.A.	2006-14	9.22	6.274%	7.232%	7.044%	4.008%	4.058%	5.131%	4.428%	3.714%	3.503%
Banco Mediolanum	2006-14	4.77	4.672%	5.630%	5.442%	2.406%	2.456%	3.529%	2.826%	2.112%	1.901%
Bancofar S.A.	2006-14	15.09	8.388%	9.346%	9.158%	6.122%	6.172%	7.245%	6.542%	5.828%	5.617%
Banque Marocaine	2006-14	4.03	4.406%	5.365%	5.176%	2.141%	2.191%	3.263%	2.561%	1.846%	1.635%
Cecabank	2012-14	14.19	8.063%	9.022%	8.833%	5.797%	5.848%	6.920%	6.218%	5.503%	5.292%
EBN Banco de Negocios	2006-14	10.89	6.873%	7.832%	7.643%	4.608%	4.658%	5.730%	5.028%	4.313%	4.102%
EVO Banco	2013-14	21.28	10.615%	11.574%	11.385%	8.350%	8.400%	9.472%	8.770%	8.055%	7.844%
Renta 4 Banco	2011-14	11.19	6.983%	7.942%	7.753%	4.718%	4.768%	5.840%	5.138%	4.423%	4.212%
Banco Alcalá	2006-14	4.85	4.700%	5.659%	5.470%	2.434%	2.485%	3.557%	2.855%	2.140%	1.929%
Banco Cooperativo Espa˜nol	2006-14	52.85	21.974%	22.933%	22.744%	19.709%	19.759%	20.831%	20.129%	19.414%	19.203%
Citibank Espa˜na	2006-14	8.58	6.044%	7.003%	6.814%	3.779%	3.829%	4.901%	4.199%	3.484%	3.273%
Caixa d'Estalvis	2006-14	13.59	7.845%	8.803%	8.615%	5.579%	5.629%	6.702%	5.999%	5.285%	5.074%
GE Capital bank	2006-14	3.89	4.354%	5.312%	5.124%	2.088%	2.138%	3.211%	2.508%	1.794%	1.583%

Appendix D: Differences between Pre- and Post-Restructuring Period.

Merged Banks and Cajas (%)											
Period	wROA	wROE	wCoC	wEVAS	wAS	wAQ	wRD	wOE	wF	wCap	LogTA
Pre	0,78	11,64	8,78	2,85	70,09	0,79	17,10	3,92	149,97	6,23	9,63
Post	-0,27	-18,40	7,90	-26,30	62,16	2,08	19,77	2,93	130,06	5,94	10,99

Non-Merged Banks and Cajas (%)											
Period	wROA	wROE	wCoC	wEVAS	wAS	wAQ	wRD	wOE	wF	wCap	LogTA
Pre	0,88	14,95	9,58	5,38	61,78	0,99	19,28	4,46	170,23	5,95	7,38
Post	0,46	6,92	7,67	-0,74	57,47	1,74	20,28	3,86	126,41	6,73	7,51