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Supervisory Boards, Financial Crisis and Bank Performance: Do Board Characteristics Matter?

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Abstract

Failures in governance, especially in regard to boards of directors, have been blamed for the 2007-2008 financial crisis. The increased public scrutiny regarding the actions and role of the board of directors in banks, following the crisis, inspires to examine whether and to what extent the characteristics of banks' boards influence their performance in the crisis. Using a sample of 72 publicly listed European banks, we find that banks with more independent and busy boards experienced worse stock returns during the crisis. Conversely, the better performing banks had more banking experts serving as supervisory directors. Additionally, we find that gender and age diversity improved banks' performance during the crisis; hence, diversity matters. We also construct a governance quality index on the basis of board characteristics and conclude that governance quality positively affects banks' returns during the crisis. Overall, we find evidence that banks' performance during the financial crisis is a function of their boards' characteristics.

Keywords: Corporate Governance, Performance, Banks, Financial Crisis.
JEL classification: G01; G21; G34.

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1. Introduction

The 2007-2008 financial crisis has been described as the most serious crisis since the Great Depression,[1-3] having important effects on the real economy and posing challenges for economists, regulators and policymakers.[4] In fact, the US subprime market crisis had a major impact on financial institutions and banks all over the world, causing a drop in market capitalisation, liquidity problems, defaults and bailouts. Many have argued that poor governance contributed to the collapse of a large number of many banks throughout the world. While nearly every bank suffered during the crisis period, some banks were much more affected than others, despite being exposed to the same macroeconomic factors.

In this paper, we explore whether and to what extent certain board characteristics affected banks' performance during the financial crisis. Our work is important for various reasons. First, very little is known about the effectiveness of banking firm governance,[5] and understanding the latter has become even more important in the context of the financial crisis. Most of the studies exclude financial firms from their sample, while the European context is very sparsely analysed by the literature. Second, boards are one of the most important corporate governance mechanisms that monitor and evaluate management (playing a supervisory role), make managerial decisions such as which projects to undertake and which employees to hire (playing a managerial role) and offer valuable advice (playing an advisory role) which is especially important in certain types of firms[a] (e.g., Coles *et al*,[6] Fama and Jensen,[7] Weisbach,[8] Adams and Mehran,[9] Adams and Ferreira,[10] Andres and Vallelado,[11] Adams *et al*[12] and Schwartz-Ziv and Weisbach[13]). Third, panic should be a momentous event for economic research,[4] so the financial crisis constitutes an obvious natural event for investigation which must be carefully analysed. Fourth, our research offers insights to policymakers and bank regulators by showing whether or not governance mechanisms - as features of boards - matter, especially in adverse macroeconomic conditions. Fifth, the existing literature on the relationship between corporate boards and performance shows mixed results. One reason commonly cited for the inconclusive results is that a significant number of these studies fail to account for the endogeneity issue that emerges from the joint determination of board structure and firm value.[14] "*Endogeneity leads to biased and inconsistent parameter estimates that make reliable inference virtually impossible.*"[15(p6)] Thus, the findings of the studies that examine the board structure-performance relationship must be analysed with caution if the empirical methods do not check adequately for all relevant sources of endogeneity.[16] In our research this issue is less likely to be problematic because the financial crisis is an exogenous macroeconomic shock.[17-19] Hence, by testing a set of board characteristics immediately before the external shock in order to explain changes in banks value, we can largely eliminate the endogeneity concern.

Our sample is composed of 72 publicly listed European banks from 17 countries. We have drawn several conclusions from our results. The better performing banks during the financial crisis had, in 2006, less independent and busy boards, but more banking experience and more diversity (gender and age). Interestingly, banks with the highest returns in 2006 had the worst stock returns during the crisis. Moreover, banks' performance during the crisis was positively related to capital and market-to-book ratios and negatively related to institutional ownership before the crisis. Finally, banks with a corporate governance committee in 2006 performed better during the crisis period. This suggests that having a corporate governance committee gives banks greater ability to evaluate and adapt their governance; hence, flexibility matters. Additionally, we construct a governance index to proxy for governance quality, where we find that better governance, according to governance policies, improved banks' performance during the crisis.

Although we focus on bank-level governance mechanisms, we also examine how country-level governance mechanisms - such as the quality of legal institutions, the extent of laws protecting shareholders' rights and creditors' rights protection - influenced banks' performance during the crisis. We find that protection of shareholders' rights is positively related to bank performance, but the general quality of the legal system and creditors' rights protection is not.

[a] Complex firms, such as those that operate in multiple segments, are large in size, or have high leverage are likely to have greater advising requirements.[6]

Our paper contributes to the academic governance studies that have attempted to understand the role of corporate boards in the crisis period, such as those of Erkens *et al*,[18] Francis *et al*[19] and Adams.[20] We complement the existing literature by showing that bank-level differences in boards are crucial to determining changes in bank performance during the crisis. Moreover, our study provides evidence consistent with the financial crisis, being a unique event in which board members play a critical role. While the vast majority of the existing studies analyses United States (US) firms, our research focuses on European banks from several different countries. Additionally, our research extends the literature by examining a broad set of bank's board characteristics, namely experience, education, diversity, busyness and activity. It is, to the best of our knowledge, the first that examines diversity in its multiple dimensions: gender, nationality and age.

The remainder of the study proceeds as follows. Section 2 presents the literature review and the hypotheses development, Section 3 describes the data and methodology, Section 4 provides the empirical results, Section 5 presents the robustness tests and Section 6 provides the conclusion.

2. Literature review and hypotheses development

2.1. Board independence and performance

The emphasis on the board independence in both academic and practitioner work suggests that independent directors are better monitors of the management because they have concerns about their personal reputation affecting their ability to receive additional director appointments.[7] Gilson[21] supports the importance of director reputation by finding evidence that "*directors who resign from financially distressed firms subsequently serve on fewer boards of other companies*."(p386) However, the empirical findings are mixed on the relation between independence and performance. Some academic literature provides evidence that the contribution of independent directors to firm performance is positive. Rosenstein and Wyatt[22] examine shareholder wealth effects surrounding the appointment of an outside director and conclude that the stock price reacts positively to the nomination. Moreover, O'Connell and Cramer[23] find a positive and significant association between quoted Irish firms' performance and the percentage of non-executives on the board. More recently, Francis *et al*[19] find no significant relationship between traditional board independence and non-financial firms' performance during the crisis. Nevertheless, when the authors redefine independent directors as outside directors who preceded the current Chief Executive Officer (CEO), named "strong independent" directors, they find a significant and positive relationship between board independence and performance.

However, notwithstanding these findings, there is a relative scarcity of empirical evidence indicating a significant positive association between firm performance and board independence. A stream of theoretical research suggests however that the effectiveness of outsiders may depend on the information environment and be limited by their inferior information compared to corporate insiders. Thus, in a context of high information asymmetry the inclusion of more inside directors may be beneficial, as they have greater specific information about the firm's activities.[7] In addition, for Adams and Ferreira[10] the potential disadvantage of outside directors is that they may lack relevant firm-specific information.[b] Similarly, Coles *et al*[6] provide evidence that firms for which the firm-specific knowledge of insiders is relatively important are likely to benefit from greater insider representation on the board. This is relevant for firms operating in more uncertain environments; namely, those that have a greater need for specialised knowledge,[24] as is the case for banks. In fact, "*independent directors are less likely to have an in-depth knowledge of the internal workings of the banks on whose boards they sit. They are also less likely to have the financial expertise to understand the complexity of the securitization processes banks were engaging in or to assess the associated risks banks were taking on.*"[20(p32)] Consistent with this view, Erkens *et al*[18] find that financial

[b] The problem associated with outside directors' lack of firm-specific knowledge may be exacerbated for banks because regulatory restrictions may act to limit the pool of directors from which they can choose[5] and because of the complex nature of their businesses.[20]

firms with more independent boards experienced worse stock returns during the crisis period, while Adams[20] gives evidence that banks receiving bailout money had boards that were more independent than in other banks. Following the same line, Pathan and Faff[24] note that independent directors decrease US bank's performance. Given the regulatory nature and complexity of the banking business, whose activity is developed in a high information asymmetry environment, the inclusion of more independent directors might be not reflected in an increased performance as they may not always have the knowledge required. Hence, the above discussion leads to our first hypothesis (H_1): **H_1**: More independent directors had a negative impact on bank performance during the financial crisis.

2.2. Board size and performance

The negative relation between board size and firm performance is one of the most common findings in the research into the governance of non-financial firms'.[14] This has been attributed to lack of cohesiveness of larger boards, as well as to their higher coordination and communication costs.[25-27] These costs capture the difficulty in decision-making as the board size increases. Hence, smaller boards should be more effective because decision-making costs are lower in smaller groups.[20] For banks, the literature is not very abundant and the results are mixed. In fact, existing studies report either a positive relation,[5] a negative relation,[24,28] an inverted U-shaped relation[11,29] or no association between board size and performance.[30] Given the unique bank operating environment and complex organisational structure, a larger board should facilitate manager supervision and compliance with regulatory requirements (regulation distinguishes the banking industry from other industries), bring more human capital to advise managers and help enlarging the network of relationships, particularly with larger numbers of customers and depositors. Nevertheless, boards with too many members may lead to problems of coordination, control and flexibility in decision-making. Thus, the relationship could become negative when the board becomes too large, which may impair bank performance due to a lack of efficiency and increased agency conflicts. Performance improvement can thus reach a limit as the board grows; in other words, bank performance may increase as the number of supervisory directors increases to a point where the relation hits a maximum point from which performance will decrease. Accordingly, we expect a nonlinear relation between board size and bank performance. Thus, the second hypothesis (H_2) can be stated as follows: **H_2:** Board size had a concave or inverted U-shaped relationship with bank performance during the financial crisis.

2.3. CEO duality and performance

It has long been argued that when the CEO is also the Chairman[c] the motivation of the board to monitor and oversee management is compromised due to lack of independence and conflicts of interests.[26] Supporters of the separation between the CEO and Chairman roles argue that when the CEO is also the Chairman the agency costs are higher as the ability to supervise the CEO is reduced – *Entrenchment Theory.*[7,25,26] This reduction in board oversight facilitates the pursuance of the CEO's agenda,[31] which may diverge from shareholders' goals and thus negatively affect firm performance. On the other hand, advocates of the combination of the two roles defend that the choice of board leadership is based on the firm's economic and business environments. Thus, joining both functions in the same individual may be best suited to a firm's conditions – *Efficiency Theory*.[32,33]

In the context of the financial crisis and for non-financial companies, Francis *et al*[19] find a negative but not statistically significant relationship between "duality" and performance. Consequently, board duality does not have a significant impact on performance. Furthermore, in the financial crisis, but regarding US commercial banks, Grove *et al*[29] show that CEO duality is negatively associated with bank performance. The opacity of banks,[36-38,d] the very nature of banking business and the regulatory and valuation difficulties also weaken the potential role of the market for corporate control[39] and can therefore reduce the CEO

[c] We refer to the combination of the roles of the CEO and the Chairman of the board as CEO duality. So, CEO duality exists when a firm's CEO also serves as Chairman of the board of directors.

[d] Not only are bank balance sheets clearly opaque,[34] but also "*rapid developments in technology and increased financial sophistication have challenged the ability of traditional regulation and supervision to foster a safe and sound banking system.*"[35(p33)]

discipline further, which makes it more important to separate leadership roles at banks. Hence, the third hypothesis (H_3) is as follows: **H_3**: CEO duality had a negative impact on bank performance during the financial crisis.

2.4. Board experience and performance

The effectiveness of the internal control mechanisms in any financial or non-financial institution relies, to a great extent, on the monitoring and advising abilities of its board of directors. There is a recent and increasing agreement that the strict and effective performance of both the monitoring and advisory roles depends on directors' experience.[40-42] For Hau and Thum,[40] for example, effective monitoring of bank managers may involve industry-specific knowledge which depends on experience. Some recent literature has investigated the impact of directors' financial expertise on banks' performance during the recent financial crisis.[40,41] Fernandes and Fich[41] have shown that US banks with more financially experienced board members did better during the crisis. In particular, banks with more financial experts serving as outside directors exhibited better stock return performance during the crisis and received less bailout aid from the US government. Likewise, in examining the 29 largest German banks, Hau and Thum[40] conclude that financial expertise of the supervisory board correlates with crisis performance. The studies above suggest that a widespread lack of financial expertise in the boards of a large number of banks appear to have played a significant role in the recent crisis. Thus, we can reasonably expect that directors' banking experience influenced European banks' performance during the financial crisis. Our fourth hypothesis (H_4) is then stated as follows: **H_4** Supervisory directors' banking experience had a positive impact on banks' performance during the financial crisis.

2.5. Board education and performance

In addition to banking experience, directors' qualifications may influence bank performance, as educational level leads to better judgments on a particular investment strategy and thus, to better corporate decisions. This is particularly important in the case of banks because the complexity of their activity often requires a great amount of specific knowledge. OECD Corporate Governance Principles, more specifically "*the annotation to Principle VI.E.3 (board members should be able to commit themselves effectively to their responsibilities) touches on board training and refers that "this might include that board members acquire appropriate skills upon appointment (...)."*"[43p(23)] Widespread belief that director qualifications and experience matter is also reflected in the amendments to the US Securities and Exchange Commission's disclosure rules introduced in December 2009. The amendments are intended to improve disclosures regarding risk, corporate governance, director qualifications and compensation.[e] However, academic papers emphasise experience rather than qualifications. We conjecture that qualifications matter for the managing ability of executive directors as well as for the monitoring and advising abilities of supervisory directors. Unfortunately, when studying the biographies of board members, we were unable to obtain sufficient data on the level of directors' qualifications. Hence, we will use as proxy education of board the average number of directors' qualifications. Therefore, our fifth hypothesis (H_5) is the following: **H_5:** Supervisory directors' number of qualifications had a positive impact on bank performance during the financial crisis.

2.6. Board diversity and performance

The limitations related to some traditional, and more extensively studied, board characteristics in explaining firms' performance have spurred finance researchers to investigate whether other board features, such as diversity, can improve board effectiveness. The link between board diversity and shareholder value is relatively new, although since the 1990s at least research has supported expectations of improved performance and increased value for firms that implement diversity initiatives, thereby promoting action

[e] For more details see: http://www.sec.gov/rules/final/2009/33-9089-secg.htm

for managing diversity.[44,45] Firms which encourage diversity can create competitive advantages in several dimensions of business performance: cost, attraction of human resources, marketing success, creativity and innovation, problem-solving quality and organisational flexibility.[44] Moreover, greater diversity in board member characteristics has been advocated as a way of improving organisational performance by providing boards with new insights and perspectives.[46] Although board diversity has several dimensions, the literature reveals a predominance of gender diversity,[24,47-53] being much less frequent ethnic diversity[47,48,53] and political ideology.[54]

Following the increased attention that gender diversity has received, boards around the world are under increasing pressure to choose female directors. In fact, many proposals for governance reform explicitly emphasise the importance of gender diversity in the board. The most severe promotion of gender diversity took place in Norway where, since January 2008, all listed companies must have 40% female directors.[50,52] In the context of the financial crisis, Francis *et al*[19] present evidence that female board representation did not affect non-financial firms' performance. On the contrary, García-Meca *et al*[55] find that gender diversity improves bank performance, confirming the positive role of female directors on banks performance. Nevertheless, in regard to banks, or even financial firms, there is a clear lack of empirical studies examining the link between performance and gender diversity, although in the light of the financial crisis this issue has been raised and publicly discussed, particularly in the media. Kristof[56] has noticed the lack of women in banks around the world and implicitly suggested that male domination may have contributed to their recent poor performance. Similarly, Harriet Harman, United Kingdom (UK) Deputy Leader of the Labor Party, laid the blame for the financial meltdown on the male domination of the top jobs in banking and argued that the financial crisis would have been less extreme if Lehman Brothers had been Lehman Sisters.[57] More recently, European Union commissioner Michel Barnier suggested that having more women on bank boards would help prevent the kind of "group-think" that exacerbated the crisis.[58] In their research, Pathan and Faff[24] find that although gender diversity improved US bank performance in the pre-Sarbanes-Oxley Act (SOX) period, the positive effect of gender diminishes in both the post-SOX and crisis periods. In formulating our expectation related to gender diversity and European banks performance in the financial crisis we rely on the public belief of the value of gender diversity. Thus, our sixth hypothesis and the first related to board diversity ($H_{6.1}$) is stated as follows: **$H_{6.1}$**: The proportion of female supervisory directors' on board had a positive impact on bank performance during the financial crisis.

National culture has an important impact on executive mindsets, as demonstrated by the fact that executives from differing cultural background are not equally open to change in organisational strategy and leadership profiles,[59] as well as in the interpretation and response to strategic issues.[60] Group members drawn from various nationalities tend to differ in ways that have substantial implications for group functioning, since national culture has a significant effect on the outlook, perceptions and behaviour of individuals.[61] Masulis *et al*[62] show that firms with foreign independent directors (FID) exhibit significantly poorer performance, especially as their business presence in the FID's home region becomes less important. Moreover, according to García-Meca *et al*[55] nationality diversity, measured as the percentage of foreign directors, has a negative impact on bank performance. However, the percentage of foreign directors may not be the best measure to represent nationality diversity. In fact, a high percentage can be obtained with a large number of foreign directors from a single country. In contrast, Nielsen and Nielsen[63] find that top management team nationality diversity is positively related to performance. Nationally diverse boards provide wide and complementary knowledge, as well as experiences in different institutional contexts, which enhance the quality of decisions through more innovative solutions, for example. However, the territorial scope of activities of banks may offset (at least some of) the advantages of nationality diversity. Despite these conflicting arguments, we advance for now with our sixth hypothesis and the second related to board diversity ($H_{6.2}$), stated as follow: **$H_{6.2}$**: More nationality diversity amongst the supervisory directors' on board had a positive impact on bank performance during the financial crisis.

An individual's age is expected to influence strategic decision-making perspectives and choices.[64] However, there are mixed views on how a director's average age impacts agency conflicts and, subsequently, firm performance.[29] On the one hand, older directors have more knowledge and experience, which might

facilitate effective monitoring and attenuate agency costs. On the other hand, flexibility decreases and both rigidity and resistance to change increase as people age.[64] Older directors might also lack the incentive and energy to actively monitor managers, thereby increasing agency problems.[29] Although no study that directly examines the effect of age diversity on performance was found, we believe that the relation between age diversity and bank performance can be positive, as such diversity may bring different points of view and perspectives to the board and, consequently, better decisions and performance. Therefore, our sixth hypothesis and the third related to board diversity ($H_{6.3}$) is formulated as follows: **$H_{6.3}$**: More supervisory directors' age diversity on board had a positive impact on bank performance during the financial crisis.

2.7. Board busyness and performance

The literature disagrees on the link between the number of directorships held by directors and firm performance. In fact, the evidence on the association between busyness of directors and firm value is mixed. The first strand of literature argues that busy directors will positively affect firm performance. Fama and Jensen[7] suggest that multiple directorship signal director's abilities/quality. Similarly, Gilson,[21] Kaplan and Reishus,[65] Ferris *et al*[66] and Fich and Shivdasani,[67] amongst others, provide additional evidence that multiple directorships certify the quality of a director. In this view, the number of directorships held by a director might proxy for reputational capital, as higher quality directors are more frequently asked to serve on additional boards – *Reputational Hypothesis*. The second strand of literature defends the proposition that busy outside directors may be less effective monitors. The *Busyness Hypothesis* postulates that serving on too many directorships reduces directors' time and attention and, consequently, their ability to monitor management, thereby decreasing firm value. While the number of directorships, according to some studies, appears to be closely linked to directors' reputational capital, other studies suggest that too many directorships may lower the effectiveness of outside directors as corporate monitors (e.g., Core *et al*,[68] Shivdasani and Yermack,[69] Loderer and Peyer,[70] Fich and Shivdasani[71] and Cashman *et al*[72]). Regarding the financial crisis period Francis *et al*[19] find that the number of directorships has no impact on non-financial firms' performance. However, Muller-Kahle and Lewellyn[73] report a positive relationship between outside director busyness and subprime lending in the period 1997-2005, supporting the view that serving on multiple boards may compromise a director's ability to effectively perform monitoring duties. Bearing in mind, the two conflicting arguments presented above and considering the specificities associated with banking activity and times of crisis, we expect that the costs of having busy directors outweigh the benefits related to the additional connections/network of contacts that such directors may bring. Hence, our seventh hypothesis (H_7) can be stated as: **H_7**: Having busier supervisory directors' on board, measured by the average number of directorships, had a negative impact on bank performance during the financial crisis.

2.8. Board activity and performance

In the agency framework, the intensity of board activity, measured by the frequency of board meetings, may indicate an active monitoring role for corporate boards and thus influence corporate performance. According to this view, board meetings are beneficial to shareholders. Conger *et al*[74] suggest that board meeting time is an important mechanism in improving board's effectiveness. The higher the frequency of meetings, the greater the supervision of the top management, indicating a more effective monitoring role which might mitigate agency costs and subsequently improve firm performance.[29] An opposing view is that board meetings are not necessarily useful because, given their limited time, they cannot be used for the meaningful exchange of ideas among directors or with management.[26] Moreover, routine tasks absorb much of the meetings limiting opportunities for outside directors to exercise meaningful control over management.[75] Concerning US banks', Grove *et al*[29] find weak evidence that board meeting frequency is positively associated with financial performance. The more frequent the meetings, the increased supervision of the top management, which might mitigate agency costs and subsequently improve bank performance. Consistent with this view, our final hypothesis (H_8) is thus formulated as follows: **H_8**: Board meeting frequency was positively associated with bank performance during the financial crisis.

3. Data and methodology

3.1. Sampling procedure and composition

Our sample consists of 72 publicly listed banks from seventeen European countries.[f] We use the following criteria to compile our sample. First, we limit our sample to European banks that were publicly listed at the end of December 2005; that is, they were listed at least one complete year before the beginning of the crisis, and not delisted during the crisis period. This provides a total of 191 banks. Second, we confine our sample to banks with common shares traded on a regulated market and also that are not a subsidiary of a bank already included in the sample to prevent duplication of data. These restrictions reduce our sample to 164 banks. Third, we restrict our sample to banks covered by *BoardEx*, our data source on board information, and *Datastream*. While *BoardEx* is the leading database on the board composition of publicly listed firms, only a limited number of European banks are covered in the database. So, our final sample consists of 72 publicly listed banks. Nevertheless, our sample is representative as it corresponds to 44.2% of total banks that meet our criteria.

3.2. Variables description

As with the studies of Beltratti and Stulz,[3] Erkens *et al*,[18] Francis *et al*,[19] Fahlenbrach and Stulz,[76] Aebi *et al*,[77] and Fahlenbrach *et al*,[78] we collect data on various variables for the year 2006, the last complete year before the beginning of the financial crisis. Appendix A provides a detailed definition of the variables used in this study, the measurement period and data sources.

3.2.1. Performance variable

Similar to the research of Beltratti and Stulz,[3] Erkens *et al*,[18] Fahlenbrach and Stulz,[76] and Fahlenbrach *et al*,[78] our measure of performance is buy-and-hold stock returns over the crisis period. We gathered data on bank's stock returns from *Datastream* database.

3.2.2. Board characteristics variables

We focus our analysis on the following: board independence and board size (according to Denis and McConnell,[79] these are the two characteristics that have been more extensively studied in US), CEO duality, board experience, board education, board diversity, board busyness and board activity. The data was obtained from *BoardEx* and *Datastream* databases, as well as from annual reports, and refers to 2006 (i.e. prior to the onset of the crisis) as with the studies of Beltratti and Stulz,[3] Erkens *et al,*[18] Francis *et al*,[19] Fernandes and Fich[41] and Fahlenbrach and Stulz.[76] *BoardEx* provides detailed information on the board's composition of publicly listed firms. Recent studies also rely on *BoardEx* as a source of governance and board data (e.g., Erkens *et al*,[18] Fernandes and Fich,[41] Engelberg *et al*,[80] and van Essen *et al* [81]).

We define "Board independence" as the percentage of independent directors. *BoardEx* does not classify directors as independent in its own analysis; rather, when it classifies a director as an independent director it is because the company that they work for has disclosed them as such. In other words, *BoardEx* takes the company's classification for granted and accordingly provides this information. However, this fact does not constitute a serious problem because, to the best of our knowledge, the Codes of Best Practices of European countries tend to converge in the definition of board independence. "Board size" is defined as the total number of directors, while "CEO duality" is a binary variable equal to one if the CEO is also the Chairman and zero otherwise. "Board experience" is measured by the supervisory directors' average years of experience in the banking sector. "Board education" is calculated as the average number of qualifications held by supervisory directors. Although it was useful to use the average level of directors' qualifications, we are unable to use it because, by examining each director's biography, we obtain insufficient data on their level of qualifications. Board diversity is measured in three different but complementary ways: gender

[f] The countries are: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Italy, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

diversity ("Women"), calculated as the percentage of supervisory directors on board that are female; nationality diversity ("Nationality_mix"), computed as the proportion of supervisory directors from different countries; and age diversity ("Age diversity"), defined as the standard deviation of supervisory directors' age. "Board busyness" is calculated as the average number of board positions, this is the number of directorships held by supervisory directors; finally, "Board activity" is measured by the annual number of board meetings.

3.2.3. Control variables

Following previous studies such as Adams and Mehran,[5] Erkens *et al,*[18] Francis *et al*[19] and Pathan and Faff,[24] some control variables are included to account for several factors that might affect banks' stock performance. The first one is the performance in 2006, measured as the buy-and-hold stock returns from January 2006 to December 2006, to control for prior bank performance ("2006 performance"). The second is the bank's size, measured by the natural logarithm of market capitalisation ("Bank size"). The third is bank's capital, measured as the ratio of total equity to total assets ("Capital"). The fourth is the market-to-book ratio measured as the market value of equity to the book value of equity ("MBR"). Other variables include "Institutional ownership", to control for ownership structure, measured as the percentage of shares owned by institutional investors and "CG committee", a binary variable that equals one if the bank has a corporate governance committee and zero otherwise.

3.3. Timeline of the study

We conduct our empirical analysis using two different alternative definitions of the crisis period. First, as Beltratti and Stulz,[3] Fernandes and Fich,[41] Fahlenbrach and Stulz,[76] Aebi *et al*,[77] Fahlenbrach *et al*,[78] and van Essen *et al*[81] and we define our crisis period from July 2007 to December 2008. Admittedly, according to Beltratti and Stulz[3] and Fahlenbrach and Stulz,[76] the crisis did not end in December 2008 and bank stocks lost substantial ground in the first quarter of 2009. However, during that period the banking sector suffered losses not observed since the Great Depression. Moreover, subsequent losses were at least partly affected by uncertainty about the possibility of banks' nationalisation. Second, we investigate the robustness of our results using an alternative crisis period from January 2007 to September 2008 as Erkens *et al*.[18] In this case, the crisis period is defined as starting at the beginning of 2007, because the first wave of the crisis started in the early 2007,[82,g] and ending at the third quarter of 2008 for two main raisons: (1) at the end of the third quarter of 2008, regulators in various countries imposed short-selling prohibitions on the stocks of many financial institutions to contain sharp falls of their stock prices[18] and (2) in October 2008 the International Accounting Standards Board (IASB) issued amendments to grant companies the option of abandoning fair value recognition for selected financial assets. Such changes allowed companies to reclassify financial assets from market value based on historical cost based valuation.[18] Thus, some European banks use the reclassification option to forgo the recognition of fair value losses.[83] In order to avoid the confounding effects of government intervention, Erkens *et al*[18] choose the third quarter of 2008 as the end of the crisis period.

3.4. Empirical model and estimation method

3.4.1. Bank performance and board characteristics

We examine the relation between bank performance and board characteristics during the crisis by regressing buy-and-hold-stock return on our board characteristics and control variables using the Weighted Least Squares (WLS) model. The WLS model provides one method for dealing with heteroscedasticity. We expect that the source of heteroscedasticity is bank size, so we test for heteroscedasticity for two measures of bank´s size - bank's assets and bank's market capitalisation - and we conclude that the last is,

[g] Although in early 2007 the market first realised the severity of the subprime mortgages problems, the credit crunch did not really begin until July 2007.[82]

in the fact, the source of heteroscedasticity. Our sample includes several different countries, such as Cyprus and Germany, leading to major differences in the size of banks. Additionally, we test for model misspecification and we conclude that the model is correctly specified.

Our formal first regression model is as follows:

$$
\begin{aligned}
(Bank\ performance)_{i,t} \;=\; & \beta_0 + \beta_1(Board\ independence)_{i,t-1} + \beta_2(Board\ size)_{i,t-1} + \\
& + \beta_3(Board\ size)^2_{i,t-1} + \beta_4(CEO\ duality)_{i,t-1} + \\
& + \beta_5(Board\ experience)_{i,t-1} + \beta_6(Board\ education)_{i,t-1} + \\
& + \beta_7(Women)_{i,t-1} + \beta_8(Nationality\_mix)_{i,t-1} + \\
& + \beta_9(Age\ diversity)_{i,t-1} + \beta_{10}(Board\ busyness)_{i,t-1} + \\
& + \beta_{11}(Board\ activity)_{i,t-1} + \beta_{12}(2006\ performance)_{i,t-1} + \\
& + \beta_{13}(Bank\ size)_{i,t-1} + \beta_{14}(Capital)_{i,t-1} + \beta_{15}(MBR)_{i,t-1} + \\
& + \beta_{16}(Institutional\ ownership)_{i,t-1} + \beta_{17}(CG\ committee)_{i,t-1} \; + \\
& + \sum_{j=1}^{n} \beta_{(17+j)}(DCountry)_{ji,t-1} + \; \varepsilon_{i,t} \qquad (1)
\end{aligned}
$$

where, i is the index of the i^{th} bank, t is the crisis time period, $t-1$ is the pre-crisis time period (this is 2006), n is the number of country dummies and $\varepsilon_{i,t}$ is the error term. $Bank\ performance$ is the stacked vector of the dependent variable, the i^{th} bank buy-and-hold stock returns from July 2007 to December 2008, MBR is the market-to-book ratio and $DCountry$ are country dummies indicating bank's country.
For a detailed definition of the variables, see section 3.2 and Appendix A.

3.4.2. Corporate Governance Index

We construct a Corporate Governance Index, ("Governance Index"), based on the corporate governance codes and best practices recommendations regarding board characteristics. Here we examine whether bank performance in the financial crisis can be attributed to the fact that these institutions were (non)compliant with corporate governance codes and best practice recommendations concerning the ten board characteristics previously analysed. The arguments we described in the previous section to predict how these characteristics are related to bank performance are based on those that the literature most frequently reports. However, academics do not all agree on these predictions and sometimes the literature also "defies" some governance principles, as is the case with board independence. We use regulation or regulatory recommendation concerning each particular characteristic, regardless of the literature's predictions. The Corporate Governance Codes of all the countries in our sample promote board independence, even before the crisis. On the other hand, most of them do not make recommendations concerning board size, typically only referring to something such as, "*the board should be small enough for efficient decision-making. It should be large enough for its members to contribute experience and knowledge from different fields and for changes to the board's composition to be managed without undue disruption*"[84(p12)] or "*the board should not be so large as to be unwieldy. The board should be of sufficient size that the balance of skills and experience is appropriate for the requirements of the business and that changes to the board's composition can be managed without undue disruption.*"[85(p5)] The exceptions are Spain and Finland whose codes mention, respectively, that "*in the interests of maximum effectiveness and participation, the Board of Directors should ideally comprise no fewer than five and no more than fifteen members*."[86(p14)] However, "*in a relatively small company, a board consisting of three directors may be able to adequately discharge the duties pertaining to the board.*"[87(p7)] Following the crisis, the general recommendation is also that the board should have a size that enables it to discharge its duties in an efficient manner. The UK's Walker Review[88] states that board size will depend on particular circumstances and there can be no general prescription as to optimal board size. However, the behavioural studies of the optimal group size prepared for this Review report concluded the optimal size for a board is within the range of 8 to 12 people. The separation of CEO and Chairman roles is a general recommendation and the division of responsibilities between them should be clearly established. Moreover, the codes emphasise that board members must have

relevant experience, knowledge, qualifications and competence. The need for industry experience on banks and other financial institutions boards is greater than that of non-financial business.[88] Although improvements in diversity, especially gender diversity, were addressed by some codes even before the crisis, this issue gained significantly more relevance following the recent financial turmoil. Numerous countries have been implementing boardroom gender quotas.[89] For example, since January 1, 2008, Norway has enforced a gender quota requirement for corporate board membership at all public limited liability companies. They are obliged, by law[h], to ensure that at least 40% of their board directors are women. Concerning board busyness, in France, Germany and Denmark, for instance, there are limits on the number of directorships directors can hold[i]. Finally, regarding board activity, the board should meet with the necessary frequency to enable in-depth review and discussion of the matters and so effectively perform its functions.

The information from corporate governance codes was collected from the European Corporate Governance Institute code database.[j] Data related to best practices recommendations on the characteristics of boards was also collected (e.g., Deloitte[89]). We supplemented this data with data from commercial codes.

Table 1 summarises regulatory policy or recommendations (increase or decrease) in every board characteristic in order to improve governance quality. Using these predictions, we hence construct a governance index. For each characteristic (except for board size and for CEO duality), we define a dummy variable which is equal to one if the bank has better than the mean quality governance for that characteristic and zero otherwise. For board size, we assign a value of one if it ranges between 8 and 12 members and zero otherwise and for CEO duality, a value of one if the CEO is not the Chairman and zero otherwise. The governance index is the sum of all dummy variables. A higher value means better quality of governance.

[h] Public Limited Liability Companies Act § 6-11a.
[i] For example, article 100(2) of the German Stock Corporations Act prohibits supervisory board members from serving on more than ten supervisory boards of any incorporated companies that are legally required to have a supervisory board, although up to five additional directorships are allowable for group companies.
[j] Available at http://www.ecgi.org/codes/all_codes.php, accessed 5 February 2014.

Table 1 - Regulatory policy/recommendations concerning board characteristics

Board characteristic	Regulatory policy/recommendations	According to regulatory policy/recommendations, board characteristic must…	Governance index
Board independence	Corporate Governance Codes and Principles	Increase	1 if above sample mean, 0 otherwise
Board size	UK's Walker Review,[88] according to the specific analysis of the Tavistock Institute of Human Relations (TIRH)[k]	Increase within the range of 8 – 12 persons (the optimal size); otherwise decrease (the overall effectiveness of the board, outside a quite narrow range, tends to vary inversely with its size)	1 if between 8 and 12, 0 otherwise
CEO duality	Corporate Governance Codes and Principles	Decrease	1 if the CEO is not the Chairman, 0 otherwise
Board experience	Corporate Governance Codes and Principles; UK's Walker Review[88]	Increase	1 if above sample mean, 0 otherwise
Board education	Corporate Governance Codes and Principles	Increase	1 if above sample mean, 0 otherwise
Board diversity	Corporate Governance Codes and Principles; Norwegian Public Limited Liability Companies Act; Deloitte[89]	Increase	1 if above sample mean, 0 otherwise
Board busyness	France's New Economic Regulations Law (May 15, 2001) (http://uk.practicallaw.com/5-107-0184?q=&qp=&qo=&qe); German Stock Corporations Act, Article 100(2); Danish Corporate Governance Code, amongst others	Decrease	1 if below sample mean, 0 otherwise
Board activity	Corporate Governance Codes and Principles	Increase	1 if above sample mean, 0 otherwise

[k] In Annex 4 of the Walker report, the TIHR makes the link between understanding the behaviour of board chairs, group dynamics and improving board performance effectiveness.

Our regression model is as follows:

$$(Bank\ performance)_{i,t} = \beta_0 + \beta_1(Governance\ index)_{i,t-1} + \beta_2(2006\ performance)_{i,t-1} + \\ + \beta_3(Bank\ size)_{i,t-1} + \beta_4(Capital)_{i,t-1} + \beta_5(MBR)_{i,t-1} + \\ + \beta_6(Institutional\ ownership)_{i,t-1} + \beta_7(CG\ committee)_{i,t-1} + \\ + \sum_{j=1}^{n} \beta_{(7+j)}(DCountry)_{ji,t-1} + \varepsilon_{i,t} \quad (2)$$

where, i is the index of the i^{th} bank, t is the crisis time period, $t-1$ is the pre-crisis time period (this is, 2006), n is the number of country dummies and $\varepsilon_{i,t}$ is the error term. $Bank\ performance$ is the stacked vector of the dependent variable, the i^{th} bank buy-and-hold stock returns from July 2007 to December 2008, $Governance\ index$ is the index of the quality of governance, MBR is the market-to-book ratio and $DCountry$ are country dummies indicating bank's country.
For a detailed definition of the variables see section 3.2 and Appendix A.

3.5. Summary descriptive statistics

Table 2 provides summary statistics for the variables used in our analysis. Panel A presents summary descriptive statistics of bank performance (during the crisis). Panel B presents summary descriptive statistics of board's characteristics (before the crisis) and Panel C presents summary descriptive statistics of control variables (before the crisis).

Table 2 - Summary descriptive statistics

The table reports the descriptive statistics of each variable by showing mean, median, standard deviation (Std. dev.), maximum (Max.) and minimum (Min.).

Variables	# Obs.	Mean	Median	Std. dev.	Max.	Min.
Panel A: Bank performance variable						
Bank performance (%)	72	-64.50	-66.70	21.41	27.99	-98.87
Panel B: Board characteristics variables						
Board independence (%)	72	41.45	44.10	28.73	95.45	0.00
Board size (Nº)	72	16.39	15.00	5.70	31.00	6.00
CEO duality	72	0.07	0.00	0.26	1.00	0.00
Board experience (years)	72	12.75	10.78	6.51	35.06	3.00
Board education (Nº)	72	1.49	1.45	0.71	3.00	0.10
Women (%)	72	10.87	9.10	10.77	42.90	0.00
Nationality_mix	70	0.21	0.15	0.24	0.80	0.00
Age diversity (years)	72	7.48	7.21	2.85	16.60	1.20
Board busyness (Nº)	72	2.63	2.38	1.01	5.75	1.10
Board activity (Nº)	58	10.81	10.00	6.26	36.00	4.00
Panel C: Control variables						
2006 performance (%)	72	25.07	20.84	19.61	93.98	-29.25
Bank size (€ bil.)	72	22.73	11.41	29.59	160.44	0.22
Capital (%)	72	5.48	5.24	2.71	14.67	1.79
MBR (%)	72	238.59	209.70	108.61	692.48	47.08
Institutional ownership (%)	69	44.46	44.32	27.00	100.00	0.03
CG committee	68	0.18	0.00	0.38	1.00	0.00

Note: Observations vary because of missing data.

The negative average returns during the crisis period reported in Panel A are larger than in other studies, such as those of Beltratti and Stulz,[3] Fernandes and Fich[41] and Fahlenbrach *et al.*[78] Panel B shows that, on average, 41.45% of the directors on the board are independent - a much lower average percentage relative to other studies (e.g., Pathan and Faff[24] and Fernandes and Fich[41]). Boards have on average 16.39 directors, although there is a wide distribution of board size in the sample (a minimum of 6 and a maximum of 31

directors). The average number of directors on the board of banks, in our sample, is higher than the average number of directors on the board of non-financials firms (e.g., 10.4 in Coles *et al*,[6] 9.14 in Francis *et al*[19] and 12.25 in Yermack,[90]), confirming that, as evidenced by Adams and Mehran[9] and Adams,[20] banks have larger boards on average. Only 7% of the CEOs in our sample also serve as Chairman of the board. In relation to board experience and board education, we find that on average supervisory directors have 12.75 years of bank experience and hold 1.49 qualifications. The descriptive statistics of board diversity show that: (1) the percentage of female supervisory directors is, on average, 10.87%, with a minimum of 0% (no women as supervisory directors) and a maximum of 42.90%; (2) nationality_mix is, on average, 0.21, exhibiting a minimum of 0, which means that there is no foreign supervisory directors on board, and a maximum of 0.80 and (3) age diversity is, on average, 7.48 years, with a minimum of 1.20 years and a maximum of 16.60 years. With regard to board busyness, supervisory directors held on average 2.63 directorships, ranging from 1.10 to 5.75 board positions. The number of board meetings per year is, on average, 10.81, ranging from 4 to 36 times per year. Finally, Panel C shows that the stock returns in 2006 are, on average, 25.07%, with a minimum of -29.25% and a maximum of 93.98%. Bank size is, on average €22.73 billion, with a minimum of €0.22 billion and a maximum of €160.44 billion. The quite positively skewed distribution of the "Bank size" variable motivates the use of the natural logarithm, ln(Bank Size), in the regression analysis. The capital ratio is, on average, 5.48% and the ratio of the market value of equity to the book value of equity is, on average, 238.59%, exhibiting high variability. Institutional investors own on average 44.67% of banks shares and 18% of our sample banks have a corporate governance committee.

Table 3 presents the Pearson correlation coefficients among the explanatory variables. Due to the low levels of pairwise correlations, multicollinearity is not a sample problem.[1]

[1] All the pairwise correlations are well below the threshold of 0.8 beyond which multicollinearity is considered a problem (e.g. Berry and Feldman,[91] Retherford and Choe[92] and Gujarati[93]). Regarding multicollinearity "*(...) in practice the pairwise correlations usually tell most of the story.*" [92(p40)]

Table 3 - Correlation matrix

The table reports Pearson correlation coefficients.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Board independence	1.00															
2	Board size	-0.35***	1.00														
3	CEO duality	-0.06	-0.08	1.00													
4	Board experience	-0.25*	0.24*	-0.02	1.00												
5	Board education	0.31**	-0.24*	-0.14	-0.11	1.00											
6	Women	0.07	-0.09	-0.14	-0.43***	0.07	1.00										
7	Nationality_mix	0.25*	-0.09	-0.09	0.09	0.53***	-0.12	1.00									
8	Age diversity	-0.11	0.26*	0.05	0.41***	-0.21	-0.16	-0.15	1.00								
9	Board busyness	-0.24*	0.43***	0.04	0.39***	0.14	-0.24*	0.32**	0.12	1.00							
10	Board activity	0.30**	-0.19	-0.04	0.08	-0.06	0.15	-0.26*	0.10	-0.18	1.00						
11	2006 performance	-0.20	-0.04	-0.10	0.24*	-0.23*	-0.19	-0.20	-0.06	0.03	0.11	1.00					
12	Bank size	0.29**	0.27**	0.08	0.02	0.40***	-0.02	0.42***	-0.07	0.19	-0.11	-0.26*	1.00				
13	Capital	-0.07	-0.29**	0.05	0.10	-0.05	-0.31**	-0.20	0.09	-0.10	0.07	0.02	-0.40***	1.00			
14	MBR	0.18	-0.47***	0.02	-0.11	0.12	-0.04	0.00	-0.21	-0.21	-0.12	0.42**	-0.35***	0.21	1.00		
15	Institutional ownership	-0.27**	0.20	-0.28**	0.17	-0.14	0.12	-0.07	-0.02	0.09	-0.16	0.17	-0.07	-0.17	-0.17	1.00	
16	CG committee	0.14	-0.01	-0.12	0.10	0.20	-0.18	0.26*	-0.01	0.08	0.05	0.09	0.10	-0.18	0.09	-0.14	1.00

Asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

4. Empirical results

4.1. Results for bank performance and board characteristics

Table 4 presents the results of the WLS estimations. Columns (1) to (10) report the regression results including board characteristics one at a time. Column (11) reports the results of our full regression model.

Table 4 - Relationship between bank performance during the crisis and board characteristics

The table reports the WLS regression results of stock returns of banks during the crisis on board characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Board independence	-3.17***	---	---	---	---	---	---	---	---	---	-1.76**
	(0.00)										(0.05)
Board size	---	55.11**	---	---	---	---	---	---	---	---	-35.40
		(0.02)									(0.48)
Board size^2	---	-1.04*	---	---	---	---	---	---	---	---	1.11
		(0.10)									(0.38)
CEO duality	---	---	-63.17**	---	---	---	---	---	---	---	44.83
			(0.02)								(0.11)
Board experience	---	---	---	20.67***	---	---	---	---	---	---	13.84***
				(0.00)							(0.01)
Board education	---	---	---	---	-5.15	---	---	---	---	---	17.77
					(0.83)						(0.37)
Women	---	---	---	---	---	-12.08***	---	---	---	---	8.23***
						(0.00)					(0.02)
Nationality_mix	---	---	---	---	---	---	237.27***	---	---	---	67.64
							(0.00)				(0.27)
Age diversity	---	---	---	---	---	---	---	32.76***	---	---	14.41*
								(0.00)			(0.08)
Board busyness	---	---	---	---	---	---	---	---	-78.53*	---	-39.54*
									(0.09)		(0.09)
Board activity	---	---	---	---	---	---	---	---	---	-22.15***	-2.55
										(0.01)	(0.60)
2006 performance	-5.72***	-0.53	-3.04	-5.11***	-1.92	-7.78***	-3.78*	-5.17***	-1.76	-3.13	-2.95*
	(0.00)	(0.72)	(0.20)	(0.00)	(0.48)	(0.01)	(0.10)	(0.01)	(0.47)	(0.23)	(0.10)
Bank size	-18.08	32.21	16.86	74.25***	61.94	47.39	73.76	-66.70*	-1.30	1.55	7.80
	(0.57)	(0.28)	(0.74)	(0.00)	(0.24)	(0.29)	(0.11)	(0.10)	(0.98)	(0.98)	(0.78)
Capital	22.86**	27.58***	32.20**	21.99**	29.72*	38.37***	64.83***	31.17***	22.50	39.09**	16.69*
	(0.02)	(0.00)	(0.03)	(0.05)	(0.06)	(0.01)	(0.00)	(0.00)	(0.15)	(0.02)	(0.06)
MBR	0.58***	1.09***	0.94***	1.40***	0.75**	1.13***	1.54***	0.57**	0.37	0.86**	0.65***
	(0.01)	(0.00)	(0.01)	(0.00)	(0.05)	(0.00)	(0.00)	(0.03)	(0.37)	(0.03)	(0.01)
Institutional ownership	-4.36***	-2.79***	-2.09*	1.12	-2.00*	-3.01***	0.62	-1.46*	-3.92**	-0.61	-1.12*
	(0.00)	(0.00)	(0.06)	(0.24)	(0.10)	(0.01)	(0.62)	(0.07)	(0.02)	(0.64)	(0.06)
CG committee	90.49***	62.23***	60.87***	74.25***	79.35***	106.43***	116.07***	159.31***	43.09	79.75***	87.52***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.13)	(0.00)	(0.01)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66	66	66	66	66	66	64	66	66	55	54
Adj-R^2	0.95	0.95	0.88	0.93	0.86	0.89	0.89	0.94	0.87	0.88	0.99

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

Columns (1) and (11) show that the estimated coefficient on the "Board independence" variable is negative and statistically significant, confirming hypothesis H_1 that board independence reduced bank performance during the financial crisis. The negative impact for independence is consistent with previous studies (e.g., Erkens *et al*[18] and Pathan and Faff[24]). As we found in the US context, board independence also influences negatively banks performance in a pan-European context. With regard to the "Board size*"* variable, both the coefficients on the linear and non-linear factors are statistically significant (Column (2)) and thus, similarly to Andres and Vallelado[11] and Grove *et al,*[29] we find a concave association between the size of the board and bank performance. However, when we combine all the variables into a single regression both the linear and non-linear board size factors are insignificant. Thus, hypothesis H_2 is not confirmed. In regard to the "CEO duality" variable, Column (3) reports as predicted, a negative and statistically significant coefficient, but the joint regression of all the variables shows that the coefficient is positive but insignificant. Thus CEO duality has no impact on bank performance, which does not confirm hypothesis H_3. With regard to the supervisory directors' banking experience, as expected, banks with more experienced boards performed better during the financial crisis, which confirms hypothesis H_4. The estimated coefficient on the "Board experience" variable is not only statistically significant but also economically significant. The working experience of supervisory directors, which is associated with a deep understanding of regulatory issues and banking activity specificities and complexity, had a positive and economically important effect on the bank´s stock return performance during the recent crisis. This finding confirms the recently frequent heard claim for having more financial/banking experts on the boards. On the one hand, a better understanding of banking activity helps supervisory directors oversee the management. On the other hand, supervisory directors with banking experience provide valuable advice to management. In relation to the supervisory directors' education, the coefficient on the "Board education" variable is not statistically significant; hence, we do not find support for hypothesis H_5 that more qualified board improves banks performance. With regard to gender diversity, the estimated coefficient on the "Women" variable is positive and statistically significant. Thus, we find support for hypothesis $H_{6.1}$ that female supervisory directors improve bank performance during the financial crisis, which is in accordance with the Kristof,[56] Morris[57] and Treanor[58] findings that the lack of women in banks boards contributed to their poor performance. In relation to diversity in nationality, the estimated coefficient on the "Nationality_mix*"* variable is positive but not statistically significant. Thus, concerning hypothesis $H_{6.2}$, we did not find evidence that board nationality diversity increases bank performance. Hence, the predominant national focus of the activity of many banks in our sample makes local knowledge fundamental, offsetting the advantages relating to nationality diversity. Furthermore, in regard to diversity, the estimated coefficient on the "Age diversity" variable is positive and statistically significant which is consistent with hypothesis $H_{6.3}$. Thus, the age diversity of supervisory directors improved bank performance during the financial crisis. Concerning the busy supervisory directors' hypothesis (H_7), the negative and statistically significant coefficient on the "Board busyness" variable indicates, as expected, that supervisory directors holding multiple directorships decrease the performance of banks. Thus, our finding provides support for the *Busyness Hypothesis*. Contrary to our expectations, the coefficient on the "Board activity" variable is negative, but statistically insignificant. Therefore, the number of annual meetings exhibits no significant impact on bank performance.

The estimated coefficients on the control variables offer some further interesting insights. As Beltratti and Stulz[3] also demonstrate, banks that perform better in 2006 have worse returns during the crisis; in other words, the better-performing banks during the crisis had lower returns immediately before the crisis. This finding is consistent with the idea that the banks that suffered the most in the crisis seemed to have policies that the market favoured before the crisis and/or that these were engaging in riskier activities. When a financial crisis occurs, we would expect banks with more capital to perform better. We find that this is the case. The statistically significant positive coefficient on the "Capital" variable indicates that highly capitalised banks perform better during the crisis as in previous studies (e.g., Pathan and Faff[24]). Therefore, the better-performing banks had less leverage before the crisis. One explanation for this finding is that a bank with more capital has a cushion to absorb adverse shocks and is hence better protected against financial distress. In addition, the banks most valued by the market relative to their book value exhibited better performance. The market valuation of the banks and therefore the market's growth expectations are

positively associated with the performance during the crisis. Our result is consistent with Fahlenbrach and Stulz,[76] which report a negative relation between the book-to-market ratio and the crisis returns. Consistent with Erkens *et al*[18] our analysis finds that institutional ownership is associated with worse stock returns during the crisis. Finally, the statistically significant positive coefficient on the "CG committee" variable demonstrates that banks with a corporate governance committee perform better during the crisis. A potential explanation for this finding is that such banks are able to better periodically review and reassess the adequacy of their governance to environmental circumstances and, more timely, recommend any changes. Hence, those banks are better able to introduce changes in their governance, having greater flexibility and responsiveness. Finally, we note that we find similar results when we use the natural logarithm of assets as a proxy for bank size.

4.2. Results for bank performance and governance index

Table 5 reports the results when we use an aggregate governance index instead of individual board characteristics.

Table 5 - Relationship between bank performance during the crisis and governance index

The table reports the WLS regression results of stock returns of banks during the crisis on governance index, which measures governance quality.

	(1)
Governance index	36.56***
	(0.00)
2006 performance	-4.09*
	(0.07)
Bank size	-13.50
	(0.77)
Capital	42.10***
	(0.00)
MBR	0.96***
	(0.01)
Institutional ownership	-0.71
	(0.50)
CG committee	99.99***
	(0.00)
Country dummies	Yes
Observations	54
Adjusted-R-Squared	0.91

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

Overall, the results show strongly that governance quality, according to corporate governance codes and best practices recommendations, measured by the governance index, impacted positively and very significantly on bank performance during the crisis.

4.3. Bank performance and country-level governance

In this paper we have primarily focused on the role of corporate boards' features on banks performance. Additionally, the international corporate governance literature suggests that another important dimension of corporate governance is the external governance mechanism in a country;[79] this is mainly the legal institutions that protect shareholders' rights, both in terms of the quality of a country's legal institutions and laws protecting shareholders' rights and creditor rights.[94] Since our primary analysis includes country dummies to control for country-specific factors, it does not address how country-level governance influenced the performance of banks during the crisis. Hence, in this section we explore the influence of country-level governance on bank performance. As proxy for the quality of legal institutions we use the

governance indicators compiled by Kaufmann *et al*[95] for six dimensions of governance: (1) voice and accountability, (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of law and (6) control of corruption and, following Beltratti and Stulz[3] and Erkens *et al*,[18] we consider the simple average of the six governance indicators for each country. We name this index "Institutions" where a higher value of the index indicates a better institutional environment. We measure the laws protecting shareholders' rights using the updated antidirector rights index (ADRI) compiled by Spamann.[96,m] A higher value means better shareholders rights. Finally, to assess the impact of the creditor rights protection in each country, we use Djankov *et al*'s[97] creditor rights index, named "Creditor rights", which follows that constructed by La Porta *et al*[94] although with minor differences. The index varies between 0 (poor creditor rights) and 4 (strong creditor rights).

Our regression model is as follows:

$$\begin{aligned}(Bank\ Performance)_{i,t} \;=\; & \beta_0 + \beta_1(Institutions)_{i,t-1} + \beta_2 ADRI_{i,t-1} + \beta_3(Creditor\ rights)_{i,t-1} + \\ & + \beta_4(2006\ performance)_{i,t-1} \;+\; \beta_5(Bank\ size)_{i,t-1} + \beta_6(Capital)_{i,t-1} + \\ & + \beta_7(MBR)_{i,t-1} + \beta_8(Institutional\ ownership)_{i,t-1} + \\ & + \beta_9(CG\ committee)_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where, i is the index of the i^{th} bank, t is the crisis time period, $t-1$ is the pre-crisis time period (this is 2006, except if another year is indicated) and $\varepsilon_{i,t}$ is the error term. $Bank\ performance$ is the stacked vector of the dependent variable, the i^{th} bank buy-and-hold stock returns from July 2007 to December 2008. *Institutions* is the simple average of six governance indicators: (1) voice and accountability, (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of law and (6) control of corruption, based on the 2006 index value in Kaufmann *et al*,[95] *ADRI* is the corrected antidirector index of La Porta *et al*,[94] based on the 2005 index value in Spamann[96] and *Creditor rights* is the creditor rights index of Djankov *et al*,[97] following that constructed by La Porta *et al*.[94] *MBR* is the market-to-book ratio.
For a detailed definition of the variables see section 3.2 and Appendix A.

Table 6 reports the analysis on country-level governance variables. Panel A shows the values of the country-level governance variables. Panel B provides summary descriptive statistics for these variables, while Panel C presents the results from the regression analysis.

[m] As Erkens *et al*[18] we use the legal institutions variable of Kaufmann *et al*[95] and the antidirector index of Spamann[96] because we want to utilise an index measured closest to the beginning of the financial crisis.

Table 6 - Analysis on country-level governance variables

Panel A: Country-level governance variables

Country	Institutions	Antidirector rights	Creditor rights
Austria	1.58	4	3
Belgium	1.35	2	2
Cyprus	0.97	---	---
Denmark	1.82	4	3
Finland	1.92	4	1
France	1.21	5	0
Germany	1.52	4	3
Greece	0.66	3	1
Ireland	1.55	4	1
Italy	0.57	4	2
Netherlands	1.62	4	2
Norway	1.70	4	2
Portugal	1.02	4	1
Spain	0.92	6	3
Sweden	1.71	4	2
Switzerland	1.78	3	1
UK	1.55	5	4

Panel B: Summary descriptive statistics of country-governance variables

Variables	# Obs.	Mean	Median	Std. dev.	Max.	Min.
Institutions	72	1.26	1.43	0.44	1.92	0.57
ADRI	70	4.14	4	0.95	6	2
Creditor rights	70	1.90	2	1.02	4	0

Note: observations vary because of missing data.

Panel C: Regression of bank performance during the crisis on country-governance variables

	(1)	(2)	(3)	(4)
Institutions	-55.75***	---	---	-29.17
	(0.01)			(0.19)
ADRI	---	27.12***	---	23.85***
		(0.00)		(0.01)
Creditor rights	---	---	-7.72	-6.85
			(0.22)	(0.26)
2006 performance	-3.61***	-5.66***	-2.91***	-5.55***
	(0.00)	(0.00)	(0.00)	(0.00)
Bank size	23.11	-32.92	9.42	-7.97
	(0.30)	(0.15)	(0.69)	(0.76)
Capital	12.83**	1.05	25.40***	5.22
	(0.03)	(0.89)	(0.00)	(0.55)
MBR	0.20	-0.04	0.20	0.17
	(0.18)	(0.77)	(0.23)	(0.27)
Institutional ownership	-3.16***	-4.03***	-2.92***	-3.31***
	(0.00)	(0.00)	(0.00)	(0.00)
CG committee	69.88***	48.84***	67.22***	53.17***
	(0.00)	(0.00)	(0.00)	(0.00)
Country dummies	No	No	No	No
Observations	66	64	64	64
Adj-R^2	0.84	0.85	0.82	0.85

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

Columns (1) to (3) report the results one at a time with the control variables, including the country-level governance variables. Column (4) presents the full specification and shows that the coefficient on the "Institutions" variable is statistically insignificant, meaning that the quality of legal institutions does not affect the performance of banks during the financial crisis, as found by Erkens *et al*[18] in a dataset of financial firms. On the contrary, the coefficient on the "ADRI" variable is positive and statistically significant. Hence, laws protecting shareholders' rights improved banks' performance during the financial crisis. Differently, Erkens *et al*[18] and van Essen *et al*[81] do not conclude that antidirector rights have a beneficial impact, respectively, on financial firms and non-financial firms' performance during the recent crisis. Finally, creditor rights protection has no impact on banks performance, unlike non-financial firms.[81]

5. Robustness tests

5.1. Alternative definition of the crisis period

We have investigated the robustness of our results using an alternative crisis period from January 2007 to September 2008 as Erkens *et al*.[18] We re-estimate the regression model from Table 4 and Table 5 using this alternative crisis period. Table 7 and Table 8 report the results of this analysis.

Table 7 - Relationship between bank performance during the crisis and board characteristics using an alternative definition of the crisis period

The table reports the WLS regression results of stock returns of banks during the crisis - January 2007 to September 2008 - on board characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Board independence	-1.32***										-1.40**
	(0.00)										(0.02)
Board size		29.89**									-22.97
		(0.04)									(0.48)
Board size^2		-0.64*									0.64
		(0.10)									(0.44)
CEO duality			-23.44*								60.97***
			(0.07)								(0.00)
Board experience				9.70***							7.17**
				(0.00)							(0.03)
Board education					10.91						28.74**
					(0.34)						(0.04)
Women						-4.99***					4.82**
						(0.00)					(0.03)
Nationality_mix							110.59***				30.02
							(0.00)				(0.46)
Age diversity								15.19***			9.30*
								(0.00)			(0.08)
Board busyness									-21.05		-19.95
									(0.34)		(0.19)
Board activity										-7.42*	0.40
										(0.08)	(0.90)
2006 performance	-1.46*	-0.53	-0.30	-1.36	-0.46	-2.30*	-0.73	-1.37	0.13	-0.31	-1.13
	(0.10)	(0.57)	(0.79)	(0.12)	(0.72)	(0.09)	(0.50)	(0.11)	(0.91)	(0.81)	(0.24)
Bank size	6.57	28.86	22.91	82.57***	32.71	33.74	45.41**	-19.74	22.40	19.14	16.53
	(0.72)	(0.12)	(0.35)	(0.00)	(0.19)	(0.13)	(0.04)	(0.31)	(0.44)	(0.50)	(0.37)
Capital	25.09***	27.62***	28.84***	24.32***	27.20***	31.50***	44.31***	28.61***	25.95***	31.03***	16.09***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
MBR	0.27**	0.50***	0.41**	0.65***	0.36**	0.50***	0.71***	0.26**	0.24	0.38**	0.09
	(0.03)	(0.00)	(0.02)	(0.00)	(0.04)	(0.00)	(0.00)	(0.04)	(0.23)	(0.05)	(0.56)
Institutional ownership	-2.14***	-1.32***	-1.19**	0.30	-0.98*	-1.57***	0.06	-0.91**	-1.66**	-0.69	-0.64*
	(0.00)	(0.01)	(0.03)	(0.50)	(0.09)	(0.00)	(0.92)	(0.02)	(0.04)	(0.29)	(0.10)
CG committee	72.49***	62.28***	60.93***	65.57***	63.25***	79.05***	85.08***	105.03***	57.88***	67.90***	82.26***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66	66	66	66	66	66	64	66	66	55	54
Adj-R^2	0.97	0.97	0.94	0.97	0.94	0.95	0.95	0.97	0.94	0.94	0.99

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

In respect to Table 7 then, we find that board independence, board experience, female supervisory directors (gender diversity), age diversity, bank's capital, institutional ownership and corporate governance committee maintain their impact on bank performance.[n] Hence, our conclusions on the relation between bank performance during the crisis and board characteristics are qualitatively similar to those reported in Table 4.

Table 8 - Relationship between bank performance during the crisis and governance index using an alternative definition of the crisis period

The table reports the WLS regression results of stock returns of banks during the crisis - January 2007 to September 2008 - on governance index, which measures governance quality.

	(1)
Governance index	18.72***
	(0.00)
2006 performance	-0.98
	(0.32)
Bank size	1.28
	(0.95)
Capital	34.29***
	(0.00)
MBR	0.45***
	(0.00)
Institutional ownership	-0.51
	(0.28)
CG committee	78.64***
	(0.00)
Country dummies	Yes
Observations	54
Adj-R^2	0.97

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

Regarding Table 8, we also conclude that the quality of governance, measured by an index of governance, impacts positively on bank performance. Therefore, our conclusion is not sensitive to an alternative definition of the crisis period.

5.2. Additional econometric issues

Endogeneity is a common issue in governance studies that makes interpretation of the results difficult. As Hermalin and Weisbach[14] point out, board characteristics and firm performance are endogenously and not exogenously determined. While this issue is less likely to be problematic in our analysis because the financial crisis is mostly an exogenous macroeconomic shock,[17] we mitigate the endogeneity issue in some ways. First, we measure all board variables at the end of 2006 just before the beginning of the crisis, while measuring bank performance during the crisis. Therefore, our empirical framework mitigates the endogeneity issue due to reverse causality as bank crisis performance is regressed on (lagged) pre-crisis variables. Second, we examine board characteristics changes from 2005 to 2006. If the banks' boards could anticipate the crisis, it is expected that at least some board characteristics exhibit a drastic change; for example, banks' boards could hire directors with more banking experience. Similarly, the boards could have increased their meeting frequency in order to deal with the looming crisis. In Table 9 it is compared the board characteristics in 2005 and 2006. The results show that there are no significant differences between 2005 and 2006 regarding board characteristics. In fact, none of them is significantly different

[n] We also note that board busyness now has no impact on the performance of banks, contrary to CEO duality and board education which have a positive impact.

between the two years, indicating that the financial crisis was an unexpected event in the view of the bank´s board of directors.

Table 9 - Univariate comparison of board characteristics between 2005 and 2006
The table compares the characteristics of the board of banks in 2005 and 2006.

Variables	Mean 2005	Mean 2006	Test for Equality of Means (p-values)
Board independence	42.808	41.449	0.78
Board size	16.442	16.389	0.96
CEO Duality	0.086	0.069	0.72
Board experience	11.672	12.751	0.30
Board education	1.435	1.486	0.67
Women	11.359	10.872	0.80
Nationality_mix	0.208	0.209	0.98
Age diversity	7.525	7.485	0.93
Board busyness	2.735	2.631	0.54
Board activity	10.556	10.810	0.82

The p-values of coefficient significance are in brackets and asterisks indicate significance at 1% (***), 5% (**) and 10% (*) levels, using a two-tailed test. Please refer to Appendix A for the definition of each variable.

6. Conclusion

This research was conducted to investigate how supervisory board characteristics have affected bank performance during the 2007-2008 financial crisis. Establishing an understanding of the supervisory board roles is of significant importance for policymakers, supervisory authorities and other public entities. Using buy-and-hold stock returns as a measure of bank performance we find that the better-performing banks during the crisis had in 2006, less independent boards, boards with more banking experience and diversity (gender and age) and less busy supervisory directors. Moreover, such banks enjoyed lower returns in 2006, alongside higher capital and market-to-book ratios and lower institutional ownership, while possessing a corporate governance committee. Our results are robust to an alternative definition of the crisis period as well as to the endogeneity issue. The findings in our study support the notion that board characteristics are an important determinant of bank performance and provide a clear understanding into why some banks were more affected by the crisis than others.

Appendix A – Variables definitions

Variables	Definitions	Measurement period	Data sources
Bank performance	Buy-and-hold stock returns. Specifically, for each bank, the annual stock return is calculated as the natural logarithmic of the ratio of the stock price (adjusted), that is, $ln\ (P_{it}/P_{it-1})$.	July 2007 to December 2008; alternatively, January 2007 to September 2008	Datastream
Board independence	Percentage of independent directors, that is, the number of independent board directors on the board divided by board size.	December 2006	BoardEx
Board size	Total number of directors serving on the board of the bank.	December 2006	BoardEx
CEO duality	A dummy variable equal to 1 if the CEO is also the Chairman, 0 otherwise.	December 2006	BoardEx; Annual Reports
Board experience	Supervisory directors' average years of experience in the banking sector. To track banking experience we examine each supervisory director's biography as provided in the BoardEx database. First, we compute the number of years each supervisory director has worked in the banking sector and sum all these years. Second, we divide this total by the number of supervisory directors on the board of the bank.	December 2006	BoardEx
Board education	Average number of qualifications, that is, sum of the number of qualifications held by the supervisory directors divided by the total number of supervisory directors. All qualifications have a count of one.	December 2006	BoardEx
Women	Percentage of female supervisory directors on the board, that is, the number of woman supervisory directors divided by the total supervisory directors. Measures gender diversity.	December 2006	BoardEx
Nationality_mix	Proportion of supervisory directors from different countries. Measures nationality diversity.	December 2006	BoardEx
Age diversity	Standard deviation of supervisory directors' age. Measures age diversity.	December 2006	BoardEx
Board busyness	Average number of board positions (number of directorships) held by supervisory directors.	December 2006	BoardEx
Board activity	Annual number of board meetings.	December 2006	Datastream
2006 performance	Buy-and-hold stock returns.	January 2006 to December 2006	Datastream
Bank size	Natural logarithm of the bank's market capitalization.	December 2006	Datastream
Capital	Bank capital, computed as the ratio of total equity to total assets.	December 2006	Datastream

Variables	Definitions	Measurement period	Data sources
MBR	Market-to-book ratio, that is, the ratio of the market value of equity to the book value of equity.	December 2006	Datastream
Institutional ownership	Percentage of shares owned by institutional investors.	December 2006	Thomson Financial
CG committee	A dummy variable equal to 1 if the bank has a corporate governance committee, 0 otherwise.	December 2006	BoardEx; Annual Reports
Governance index	Index of the quality of governance. For each characteristic (except for board size and for CEO duality), a dummy variable is defined, which is equal to 1 if the bank has better than the mean quality governance for that characteristic and 0 otherwise. For board size a value of 1 is assigned if it ranges between 8 and 12 members and 0 otherwise. For CEO duality a value of 1 is assigned if the CEO is not the Chairman and 0 otherwise. Governance index is the sum of all dummy variables. A higher value means better quality of governance.	December 2006	BoardEx; Annual Reports; Datastream
Institutions	The simple average of six governance indicators: (1) voice and accountability, (2) political stability, (3) government effectiveness, (4) regulatory quality, (5) rule of law and (6) control of corruption.	2006	Kaufmann *et al*[95]
ADRI	Antidirector rights. The corrected antidirector index of La Porta *et al*,[94] by Spamann.[96]	2005	Spamann[96]
Creditor rights	The index aggregating creditor rights by Djankov *et al*,[97] following that constructed by La Porta *et al*.[94]	2004	Djankov *et al*[97]

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