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To cite this article: J. Augusto Felício, Ricardo Rodrigues, Hugh Grove & Adam Greiner (2018) The influence of corporate governance on bank risk during a financial crisis, Economic Research-Ekonomska Istraživanja, 31:1, 1078-1090, DOI: [10.1080/1331677X.2018.1436457](https://doi.org/10.1080/1331677X.2018.1436457)

To link to this article: <https://doi.org/10.1080/1331677X.2018.1436457>



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Published online: 01 May 2018.



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The influence of corporate governance on bank risk during a financial crisis

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ABSTRACT

Using agency theory, we explore the relationship between corporate governance mechanisms and bank risk. We employ panel data analysis to study the 97 largest European listed banks between 2006 and 2010, thereby covering the most recent international financial crisis. The results show that corporate governance mechanisms influence bank risk. During the financial crisis, different governance mechanisms can minimise or accentuate the agency conflict between shareholders and managers. In our model, bank size and G.D.P. per capita also exert a considerable influence.

ARTICLE HISTORY

Received 4 November 2017
Accepted 17 January 2018

KEYWORDS

Corporate governance; Bank risk; Financial crisis; Agency theory; Board of directors; Panel data

JEL CLASSIFICATIONS

G01; G21; G34

1. Introduction

Studying the banking sector is relevant given its prominent role in modern economies. The banking sector is particularly important in economies where banks play a central role in the financial system. Furthermore, during a financial crisis, turbulence can lead to a credit crunch, as noted by Marinković and Radović (2014). This can affect banks' activity and spread to other sectors. Prior corporate governance research has tended to exclude financial institutions from the analysis. Pathan (2009) reports an agency problem between bank shareholders and debt-holders (mostly depositors) because of shareholders' preference for 'excessive risk'. This motivates our study of corporate governance amongst banks and, specifically, the influence on bank risk. Adams and Mehran (2003, 2005) studied the specifics of the banking sector. Matić and Papac (2014) studied the quality of governance in banks. Iannotta, Nocera, and Sironi (2007) performed an integrated analysis considering governance, specifically ownership structure, risk and performance. Previous studies in this field (e.g., Pathan, 2009; Victorovich, Grove, Xu, & Bulepp, 2011) have focused on US financial institutions, where shareholder dispersion is the paradigm and banks play a less central role in the financial system than in, for example, continental European countries. As Maurović and Hasić (2013) note, agency problems in Anglo-Saxon and continental legal systems also differ. The scarcity of studies of the effect on bank risk also justifies this study's relevance.

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The conceptual model in this study is rooted in agency theory. We use data on the largest listed European banks for the period 2006 to 2010. This period spans the 2008–09 financial crisis, which had devastating effects on financial institutions (Beltratti & Stulz, 2012; Gorton & Metrick, 2012). For the empirical analysis, we employ panel data analysis (e.g., Zakaria, Purhanudin, & Palanimally, 2014). We focus on the corporate governance factors that are adopted by banks, measure bank risk, and study the influence of corporate governance on bank risk. To do so, we consider the effects of bank size, the location of the bank's headquarters, and G.D.P. per capita. We also consider the evolution of banks' governance from non-crisis to crisis years. The results show that bank risk is influenced by governance mechanisms. Furthermore, the agency problem is not unequivocal in a period of financial crisis. This finding also represents an important contribution to the literature.

Section 2 presents the literature review and hypotheses. Section 3 describes the research method. Section 4 presents the analysis and results. Section 5 presents the discussion and conclusions. Section 6 is devoted to recommendations and future research.

2. Literature review and hypotheses

The agency problem in the banking sector differs from the agency problem in other sectors. For most stakeholders (including depositors), the primary concern is minimising risk. In contrast, shareholders are probably willing to accept additional risk that they can diversify away. Another unique characteristic of the banking industry is that managers who are more aligned with shareholders take greater risks because of shareholders' preference for higher risk (Pathan, 2009).

This research uses agency theory perspectives (see, for example, Maurović & Hasić, 2013). Stewardship theory (Davis, Schoorman, & Donaldson, 1997) and the resource-based view (Miller, Washburn, & Glick, 2013) may question or complement the agency-theory-based assumptions that support most studies of corporate governance. Hypotheses regarding the relationship between governance mechanisms and performance or risk variables can thus be established. We develop our hypotheses based on the relationship between governance factors, including the board of directors, anti-takeover provisions, blockholdings, and leverage, as in Larcker, Richardson, and Tuna (2007), control variables, and bank risk.

The role of the board of directors in banking has been addressed by Andrés and Vallelado (2008) and Coles, Daniel, and Naveen (2008). Boone, Field, Karpoff, and Raheja (2007) and Bennedsen, Kongsted, and Nielson (2008) focused on board size. Core, Holthausen, and Larcker (1999) addressed C.E.O. compensation. Boards in the banking sector, however, are more important than boards in other sectors. Their heightened prominence owes to the importance of directors' fiduciary responsibilities not only to shareholders, but also to depositors and regulators (Pathan, 2009).

In the U.S., evidence suggests that smaller and less restrictive boards are positively related to risk taking by banks and are negatively related to C.E.O. power (Pathan, 2009). The argument for the negative relationship with C.E.O. power is based on a risk aversion by C.E.O.s. The assumption that larger companies tend to have bigger boards is a proxy for the 'too big to fail' issue, which leads to greater risk taking by banks. However, bigger boards may have resources and technical knowledge (e.g., in the form of a specific risk board) that allow

them to better assess the risk of bank activities. The risk-averse manager perspective also extends to compensation issues. As Pathan (2009) notes, a manager with fixed compensation would have no incentive to take risks. Finally, the C.E.O. may have an agenda that relates to prestige and reputation.

Besides the aforementioned mechanisms, others, particularly the monitoring role of the board, may affect bank risk. Supposedly, to perform monitoring tasks, the directors need the right skills, time and conditions. The argument (Ferris, Jagannathan, & Pritchard, 2003; Harris & Shimizu, 2004) is that busy directors may lack the time they need to review the company's activity, older directors may lack energy and motivation, and holding fewer meetings may limit their ability to monitor company activities. Torres and Augusto (2017) report that experiential learning theory (E.L.T.) could provide a different perspective focused on the experience of busy directors. Additionally, older individuals are less risk tolerant because of their greater knowledge and experience than younger individuals (Grable, McGill, & Britt, 2009; Sahn, 2007).

Anti-takeover provisions create conditions for management entrenchment and for managers to focus on their own interests (Gorton & Kahl, 2008; Grossman & Hart, 1998). As in prior research, we assume that managers are risk averse and that anti-takeover provisions are a proxy of poor governance (Larcker et al., 2007).

As noted by Maurović and Hasić (2014), shareholder concentration influences the type of agency problem within a company. Greater shareholder concentration contributes to a decrease in the collective action problem and a better alignment of interests between shareholders and managers (despite causing conflicts between majority and minority shareholders), thereby positively influencing bank risk. This topic has been studied by Demsetz and Villalonga (2001) and Seppo, Puttonen, and Ratilainen (2011). The theory suggests that creditors may act as external monitors (Matić & Papac, 2014) and, in this context, would contribute to minimising risk (Larcker et al., 2007). Based on the literature review and the governance factors presented by Larcker et al. (2007), we formulate the following hypothesis:

H1: Governance mechanisms that promote the alignment of interests between managers and shareholders lead to higher bank risk.

Larger banks are less susceptible to takeovers, which can be seen as disciplinary action by the market, and to internal disputes of interests amongst shareholders (Acharya, Philippon, Richardson, & Roubini, 2009). Larger banks have a greater capacity to absorb and assume greater risks because of their ability to establish common policies and networks of interest that protect and confer security (e.g., Demsetz & Strahan, 1997; Hakenes & Schnabel, 2011). Greater size also allows greater diversification of assets, implying a positive relationship between size and risk taking (Saunders, Strock, & Travlos, 1990).

Having their headquarters in the Eurozone allows banks to operate under specific conditions regarding the institutional environment and access to financial markets, thereby enabling more alternatives and capacities regarding bank risk. Economic development (proxied by G.D.P. per capita) and risk are positively related because development is broadly associated with market sophistication and a greater capacity to take risks (Dell'Ariccia & Marquez, 2006). We therefore formulate the following hypothesis:

H2: Bank size and external context influence bank risk.

3. Research method

3.1. Sample and data collection

The sample consisted of major European banks. Sample selection was based on the ranking of the 2,000 largest listed companies Global 2000. Forbes publishes this list annually. We considered the period 2006 to 2010 because it spanned the international financial crisis. Based on this sample and period, we analysed 97 banks. The data-set consisted of 404 observations, so the panel data was unbalanced.

For most governance variables, the data were collected manually from the companies' annual reports, which were obtained from the corresponding corporate websites. For certain governance variables, including remuneration, and for data to compute the risk variables, we used the Datastream database.

3.2. Method

3.2.1. Statistical instrument

Panel data analysis was used. This method provided the advantage of solving the 'omitted variables problem' (Wooldridge, 2002). Numerous scholars such as Pathan (2009) and Jannone Bellot, Martí Selva, and García Menéndez (2017) have also used panel data analysis to conduct their research. We used the following fixed effects model:

$$Y_{it} = \beta X_{it} + c_i + u_{it} \quad (1)$$

To analyse the significance of the regressions, we considered Wald's chi-squared statistic. Regarding the individual coefficients of the governance factors and control variables, we considered the p-value.

3.2.2. Conceptual model, factors and variables

The conceptual model captured the relationships between corporate governance factors and bank risk (Figure 1). The corporate governance factors were board size, C.E.O. duality, insider representation (including the appointment of insiders and insiders' power), compensation mix, affiliated committees, busy directors, director age, meeting frequency, anti-takeover, block ownership and debt. The bank risk variables were total risk, systematic risk and idiosyncratic risk. Bank size, location of headquarters (Eurozone) and G.D.P. per capita (as a proxy of economic development) were the control variables.

The governance factors, following Larcker et al. (2007), Grove, Patelli, Victoravich, and Xu (2011), and Felício, Ivashkovskaya, Rodrigues, and Stepanova (2014), resulted from standardisation of 36 governance variables. The factor scores were calculated as the average of these standardised variables. For the factors anti-takeover I, compensation mix and C.E.O. duality, there was a need to correct the procedure because some variables were substitutable.

The board size factor was based on the number of directors on the compensation committee, audit committee and board of directors. The C.E.O. duality factor considered the presence of a lead director on the board and whether the C.E.O. was also the chair of the board. Both dummy variables took the value 1 if true. Insider representation was proxied by two factors. The insider appointed factor variables were the percentage of affiliated directors and outsider directors appointed by insiders. The insider power factor comprised the percentage of shares held by executive directors and the C.E.O., the percentage of insiders

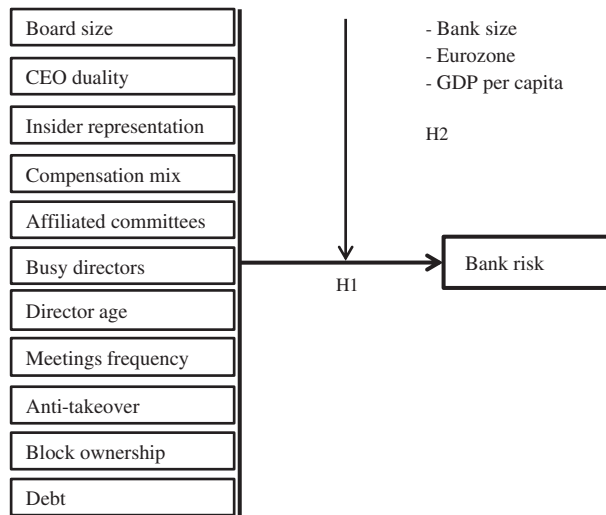


Figure 1. Conceptual model and hypotheses. Source: Own elaboration.

on the board of directors, and an unequal voting dummy variable. The compensation mix factor considered whether C.E.O. compensation was linked to total shareholder return and whether the executive directors' compensation consisted of fixed compensation, bonuses and stock option plans (both Datastream dummy variables). In this case, it was impossible to use exactly the same variables as those used by Larcker et al. (2007). These variables were replaced by alternatives available from Datastream. The affiliated committees factor considered the percentage of affiliated directors on the audit committee and the compensation committee and whether the chairs of those committees were themselves affiliated directors (dummy variable). The busy directors factor was the percentage of outsider, affiliated and insider directors that were considered busy. According to Larcker et al. (2007), a director on four or more boards was deemed busy. The director age factor was the percentage of outsider, affiliated and insider directors that were older than 70 years old. The meeting frequency factor was the number of meetings held by the audit committee, compensation committee and board of directors. The variables that related to anti-takeover provisions were grouped into two factors. The anti-takeover I factor consisted of the existence of a poison pill provision (dummy variable), the percentage of shares held by affiliated directors and the existence of a staggered board (also a dummy variable). The anti-takeover II factor consisted of dummy variables for the existence of a supermajority limitation for takeovers and country regulatory restrictions for takeovers. This variable was based on Clerc, Demarigny, Valiante, and Aremendia's (2012) data. The block ownership factor consisted of the percentage of shares held by blockholders (shareholdings above 5%), the number of blockholders and the percentage of shares held by the largest shareholder. Finally, the debt factor consisted of the book value of the debt to market value ratio and the book value of the preferred equity to market value ratio.

Following Victoravich et al. (2011), we chose the following bank risk variables: total risk, measured as the standard deviation of the stock returns of the banks, and systematic risk, which was the coefficient β_1 of the following regression:

$$R_{it} = \alpha_i + \beta_{1i}R_{mt} + \beta_{2i}\text{Interest} + \varepsilon_{it} \quad (2)$$

where R_m is the M.S.C.I. stock index for the European Region, and Interest is the three month LIBOR. Higher values indicated higher risk. Whereas systematic risk accounts for the economic conditions in the banking sector, idiosyncratic risk (also considered as a bank risk variable) was the standard deviation of the residuals of the auxiliary regression (ε_{it}). It provided information on the specifics of each bank.

We also assessed the effect of the following control variables: bank size (calculated as the natural log of total assets), the location of the bank's headquarters (dummy variable equal to 1 when the bank's headquarters were located in a Eurozone country) and G.D.P. per capita in the country where the bank had its headquarters (calculated as the natural log of values obtained from Eurostat and, in the case of Liechtenstein, the World Bank). The G.D.P. per capita variable offered a proxy of each country's level of economic development, as suggested by Gordon, Greiner, Kohlbeck, Lin, and Skaife (2013) and Felício et al. (2014).

4. Analysis and results

4.1. Descriptive analysis

Between 2006 and 2010, a period that spanned the international financial crisis, banks introduced changes to their governance mechanisms. Detailed analysis of the variables that were used to construct the governance factors revealed some statistically significant changes from 2006 to 2010, as presented in Table 1.

In these years, the percentage of banks with a lead director increased, as did the percentage of banks with an insider chair. The percentage of banks with unequal voting decreased. The percentage of banks where compensation depended on total shareholder return increased, as did the inclusion of diverse compensation items (fixed compensation, bonuses and stock option plans). The percentage of banks with affiliated audit committee chairs increased, whereas the percentage of banks with affiliated compensation committee chairs decreased. The percentage of busy directors decreased between 2006 and 2010. The number of banks with poison pills, staggered boards and supermajority requirements increased. The number of banks with headquarters in countries where takeover costs were high also increased.

Table 1. Descriptive statistics for variables with statistically significant changes during the study period.

Variable	2006	2010
Percentage of banks with a lead director on the board	16.09	18.75
Percentage of banks where the C.E.O. is also the chair of the board	16.09	17.50
Percentage of banks with differences in voting rights	22.99	21.25
Percentage of banks where C.E.O. compensation depends on total shareholder return	19.54	22.50
Percentage of banks where C.E.O. compensation includes a range of items, including fixed compensation, bonuses and stock option plans	78.16	90.00
Percentage of banks where the audit committee chair is an affiliated director	3.45	5.00
Percentage of banks where the compensation committee chair is an affiliated director	5.75	3.75
Percentage of busy directors	Mean 43.23	34.54
	St. Dev. 26.04	25.24
Percentage of banks adopting a poison pill mechanism	19.54	22.50
Percentage of banks adopting a staggered board	74.71	78.75
Percentage of banks adopting supermajority requirements	86.21	95.00
Percentage of banks with headquarters in countries with regulations that restrict takeovers	54.02	93.75

Source: Authors calculation.

4.2. Multivariate analysis

For the three bank risk variables, analysis of the relationship between corporate governance variables and bank risk variables revealed significant regressions, allowing for an interpretation of the coefficients (Table 2). The total risk regression had the highest explained variance ($R^2 = 0.43$). The systematic risk ($R^2 = 0.28$) and idiosyncratic risk ($R^2 = 0.38$) regressions had lower explained variance. We used one-tailed significance tests of the regression coefficients.

By analysing total risk, systematic risk and idiosyncratic risk, we observed that the block ownership factor ($\beta = 0.002$; $\beta = 0.090$; $\beta = 0.002$) always had a significant positive coefficient, implying that more concentrated shareholdings contributed to aligning managers' and shareholders' interests. Debt factor ($\beta = 0.005$; $\beta = 0.093$; $\beta = 0.005$) also positively influenced risk, implying that greater debt meant greater risk. The results for the insider power factor ($\beta = 0.003$; $\beta = 0.144$; $\beta = 0.003$) suggested that higher internal power implied higher risk. Conversely, C.E.O. duality ($\beta = -0.002$; $\beta = -0.184$; $\beta = -0.002$) and directors' age ($\beta = -0.002$; $\beta = -0.127$; $\beta = -0.002$) negatively influenced risk.

Amongst the risk variables, systematic risk was influenced by a higher number of governance factors than any other form of risk. The results showed that, besides the aforementioned relationships, board size ($\beta = 0.139$) and frequency of meetings ($\beta = 0.156$) positively influenced systematic risk. Finally, the compensation mix factor ($\beta = 0.080$) positively influenced systematic risk and total risk ($\beta = 0.001$).

Table 2. Fixed-effects regressions.

Dependent variables\Indep. factors and expected sign	Total risk	Systematic risk	Idiosyncratic risk
Board size (-)	0.002 (0.001)	0.139** (0.050)	0.001 (0.001)
C.E.O. duality (-)	-0.002* (0.001)	-0.184* (0.100)	-0.002* (0.001)
Insider appointed (-)	0.000 (0.001)	0.048 (0.046)	0.000 (0.001)
Insider power (-)	0.003* (0.002)	0.144* (0.077)	0.003* (0.001)
Compensation mix (+)	0.001* (0.001)	0.080** (0.035)	0.000 (0.001)
Affiliated committees (-)	0.001 (0.001)	0.022 (0.056)	0.000 (0.001)
Busy directors (-)	0.000 (0.001)	0.034 (0.050)	-0.000 (0.001)
Director age (-)	-0.002* (0.001)	-0.127** (0.055)	-0.002* (0.001)
Meeting frequency (+)	0.002 (0.001)	0.156** (0.056)	0.001 (0.001)
Anti-takeover I (-)	0.000 (0.001)	0.034 (0.060)	0.000 (0.001)
Anti-takeover II (-)	0.002 (0.001)	0.047 (0.046)	0.001 (0.001)
Block ownership (+)	0.002* (0.001)	0.090* (0.046)	0.002* (0.001)
Debt (-)	0.005*** (0.001)	0.093*** (0.027)	0.005*** (0.001)
Constant	0.015*** (0.001)	0.873*** (0.044)	0.013*** (0.001)
Number of observations	404	404	404

Note: (*), (**) and (***) indicate significance at 0.05, 0.01 and 0.001 levels (one-tailed).

The robust standard errors are presented in parentheses below the regression coefficients. Year fixed effects were estimated but are excluded for brevity.

Source: Authors calculation.

Introducing the control variables of bank size, location of headquarters and country G.D.P. per capita to the model altered the relationships between corporate governance factors and bank risk (Table 3). The explained variance of all bank risk variables was greater than 0.40 for total risk ($R^2 = 0.48$), systematic risk ($R^2 = 0.47$) and idiosyncratic risk ($R^2 = 0.40$).

Size ($\beta = 0.002$; $\beta = 0.165$) positively influenced total risk and systematic risk, whereas G.D.P. per capita ($\beta = -0.005$; $\beta = -0.267$; $\beta = -0.003$) negatively influenced total risk, systematic risk and idiosyncratic risk. The results failed to provide evidence that the location of headquarters in a Eurozone country exerted an influence. Consequently, including the control variables showed that the factor anti-takeover II ($\beta = 0.002$) increased total risk, and compensation mix was non-significant. The results implied that large European banks and low G.D.P. per capita in those European countries were associated with changes in the role of the governance mechanisms that influenced total risk. Including the control variables showed that systematic risk positively influenced the factor insider appointed ($\beta = 0.066$), and the factor compensation mix seemed to have a non-significant influence. Including the control variables also showed that G.D.P. per capita had a negative effect on idiosyncratic

Table 3. Fixed-effects regressions with control variables.

Dependent variables\Indep. factors and expected sign	Total risk	Systematic risk	Idiosyncratic risk
Board size (-)	0.001 (0.002)	0.085 (0.054)	0.001 (0.002)
C.E.O. duality (-)	-0.002* (0.001)	-0.138* (0.065)	-0.002* (0.001)
Insider appointed (-)	0.001 (0.001)	0.066* (0.038)	0.001 (0.001)
Insider power (-)	0.003* (0.002)	0.124* (0.057)	0.002* (0.001)
Compensation mix (+)	0.001 (0.001)	0.060 (0.039)	0.001 (0.001)
Affiliated committees (-)	0.000 (0.001)	0.018 (0.058)	0.000 (0.001)
Busy directors (-)	-0.000 (0.001)	-0.000 (0.044)	-0.000 (0.001)
Director age (-)	-0.002* (0.001)	-0.114*** (0.037)	-0.001 (0.001)
Meetings frequency (+)	0.001 (0.001)	0.101* (0.053)	0.001 (0.001)
Anti-takeover I (-)	-0.000 (0.001)	-0.009 (0.056)	-0.000 (0.001)
Anti-takeover II (-)	0.002* (0.001)	0.068 (0.051)	0.002 (0.001)
Block ownership (+)	0.002* (0.001)	0.079* (0.043)	0.001 (0.001)
Debt (-)	0.005*** (0.001)	0.087*** (0.026)	0.005*** (0.001)
Size	0.001** (0.001)	0.164*** (0.026)	0.001 (0.001)
Eurozone	-0.002 (0.002)	-0.106 (0.082)	-0.002 (0.002)
G.D.P. per capita	-0.005** (0.002)	0.267*** (0.062)	-0.003* (0.002)
Constant	0.028 (0.022)	0.669 (0.770)	0.039* (0.022)
Number of observations	404	404	404

Note: (*), (**) and (***) indicate significance at 0.05, 0.01 and 0.001 levels (one-tailed).

The robust standard errors are presented in parentheses below the regression coefficients. Year fixed effects were estimated but are excluded for brevity.

Source: Authors calculation.

risk through changes in the effect of governance mechanisms. The block ownership and directors' age factors were non-significant.

5. Discussion and conclusions

According to agency theory, a larger board can increase difficulties in aligning shareholders' and managers' interests. Accordingly, a larger board means lower risk. Our results, however, suggest the opposite, leading us to question Pathan's (2009) assumptions regarding this relationship during a crisis. Contrary to expectations, our results show a significant positive relationship between board size and bank risk, in terms of systematic risk. One possible explanation relates to the 'too big to fail' paradigm. Additional analysis shows a positive relationship between size and risk. Prior research has already shown that larger companies tend to have larger boards. Like Kiel and Nicholson (2003), we advocate seeking a balance between agency theory and other approaches to understand the impact of corporate governance variables.

C.E.O. duality is usually considered a symptom of bad governance because of the concentration of power (and information). In the context of risk analysis, we expected lower risk to be associated with this governance factor. The results show the negative influence of C.E.O. duality on risk, thereby supporting hypothesis 1. Similarly, we expected insider representation to negatively influence bank risk. However, we obtained no evidence to support this prediction. Insider power had a positive relationship with risk. This result is contrary to expectations because of the relationship's positive nature. Approximately 30% of the board consisted of insiders (Grove et al., 2011, report 16%). More than 16% of banks had an insider chair.

Compensation mix positively influenced bank risk. The results for the relationship with total risk and systematic risk support hypothesis 1. Traditionally, compensation mix is presented as a good mechanism to align the interests of managers with those of shareholders. An optimised compensation mix would lead managers to share the same objectives as those of shareholders. Because shareholders are expected to be more willing to accept risk than managers are, the appropriate compensation mix would lead to higher risk, which is statistically supported by the results of the total and systematic risk regressions.

Assuming that affiliated committees include directors with specific relationships with the company, their presence should have a similar effect on the relationship between managers and shareholders. However, our results fail to support hypothesis 1.

One of the directors' roles would be to monitor managers on behalf of shareholders. If the directors were too busy to perform this role properly, managers would pursue a strategy that involved lower risk. Between 2006 and 2010, however, the percentage of busy directors decreased and the results fail to support hypothesis 1.

The higher age of the directors was expected to limit their ability and motivation to monitor managers' actions. The results confirm hypothesis 1 because the presence of older directors led to the avoidance of risk.

Meeting more often was expected to guarantee that the directors would be more aware of the company's activities. This greater awareness would supposedly contribute to a better alignment between shareholders' and managers' interests, thereby leading to greater risk. This prediction is confirmed by the results regarding systematic risk, thereby supporting hypothesis 1.

According to agency theory, anti-takeover provisions protect managers from external pressures, allowing them to pursue their low-risk strategies without the pressure of a potential takeover. We therefore expected a negative influence on bank risk, but neither factor had a significant relationship with the risk variables in this study. The relationship with anti-takeover provisions, which was expected to negatively influence bank risk, fails to support hypothesis 1. However, the anti-takeover defence poison pill was adopted by more than 20% of banks, and the supermajority requirements were adopted by approximately 95% of banks. Both increased over the period. In different countries, progressive adoption of the EU regulation on takeovers, as noted by Clerc et al. (2012), led to greater takeover costs.

The block ownership factor represents an interesting approach in the agency theory context. The larger concentration of shareholdings was expected to be beneficial for aligning shareholders' and managers' interests, despite a potential problem of expropriation of minority shareholders or stakeholders. The results support hypothesis 1.

Debt works as a governance mechanism to the extent that debt holders also monitor company activities. According to the theory, debt holders are somewhat risk averse. We therefore expected lower risk when debt was higher. The evidence from our analysis refutes this prediction. The debt ratio did influence risk, although the results fail to support hypothesis 1 because the relationship was negative.

We also considered bank size, the importance of locating the company headquarters in a Eurozone country and the level of wealth, measured by G.D.P. per capita. The location of the headquarters was non-significant. However, the influence of G.D.P. per capita and bank size was significant, thus supporting hypothesis 2. Considering the control variables, the influence on systematic risk was enhanced by the positive contribution of internally appointed directors and the lack of importance attached to performance-based manager compensation, unlike in the previous evaluation of the model. Another important observation suggested by our analysis is that large banks and low G.D.P. per capita contribute to higher total risk, which culminates in the imposition of legal restrictions on acquiring banks (anti-takeover II) and the absence of evidence of manager compensation. Our analysis also shows that high G.D.P. per capita decreases idiosyncratic risk, which is no longer influenced by shareholder concentration and director age, when compared with the results for the initial model.

This study shows that corporate governance mechanisms influence bank risk in a way that is not always consistent with predictions according to agency theory. Overall, during the period, banks made some adjustments in terms of governance. Furthermore, blockholders, higher debt, board size, insider power, frequency of meetings and the compensation mix, positively influenced bank risk, resulting in a better alignment between managers and shareholders, whereas C.E.O. duality and director age had a negative influence on bank risk. Amongst the risk variables, systematic risk was influenced by the highest number of corporate governance factors.

The results also provide some support for specific regulations regarding banks' debt ratios. Governance factors mitigate or exacerbate agency concerns during a financial crisis. These findings also indicate that accepted agency-theory-based assumptions are supported during crisis periods. However, other possible theoretical contributions allow us to better understand these relationships. Therefore, there is an opportunity for future research to introduce new theories that offer complementary contributions to explain the relationships between corporate governance and bank risk.

Bank size and the level of wealth, measured by G.D.P. per capita, exerted a considerable influence. Internally appointed directors influenced the systematic risk. Large banks and low G.D.P. per capita influenced the contribution of governance mechanisms to explaining total risk.

The imposition of legal restrictions on acquiring banks and the absence of evidence of compensation paid to managers also differentiate the results obtained with the control variables from those obtained without the control variables. The inclusion of G.D.P. per capita led to a change in the influence of governance mechanisms on idiosyncratic risk. Shareholder concentration and director age were less important than they were in the initial model.

These findings will motivate boards to address their monitoring effectiveness, particularly in times of high market uncertainty. The observation that corporate governance mechanisms influence total risk, systematic risk, and idiosyncratic risk to a varying degree is a major contribution. Another important contribution relates to the influence that bank size and country G.D.P. per capita have regarding rules that restrict takeovers and the activities of internally appointing directors. However, the inclusion of control variables implies that director compensation and age become less important in the analysis.

6. Recommendations and future research

Future developments in this field would include addressing some of this study's limitations. More risk variables (e.g., asset return risk and insolvency risk) should be added to the model. Also, the composition of the governance factors should be reviewed because we assumed that Larcker et al.'s (2007) approach was suitable for different contexts and for this specific sector. Additionally, there is evidence of some non-linearity in the relationships. This non-linearity should be tested. Finally, we would like to study the role of family holdings (e.g., Klein, Shapiro, & Young, 2005) in the corporate governance model in different contexts.

Disclosure statement

No potential conflict of interest was reported by the authors.

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