

Reducing agency conflict between bank stakeholders: the role of minority directors

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This draft: 2 June, 2017

Abstract

We examine for a panel of European banks whether having a board structure that includes directors that are related to minority shareholders is effective in limiting expropriation by insiders, but also prevents excessive risk taking. We find that the inclusion of such minority directors increases bank board effectiveness for both controlled and widely held banks as it reduces the probability of default and results in higher market valuations. However, the inclusion of such directors is more likely to be successful if bank-level governance is accompanied by a strict supervisory regime.

JEL Classification: G21, G28, G32

Keywords: Ownership structure, agency conflicts, minority directors, European banking, regulation

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1. Introduction

Failure of a variety of internal governance mechanisms has been highlighted as a major contributing factor to the 2007–2008 financial crisis (Kirkpatrick, 2009; Basel Committee on Banking Supervision, 2010; Board of Governors of the Federal Reserve System, 2010). Corporate governance, and board oversight in particular, are essential in addressing agency problems and controlling risk within the firm; hence, several international reform initiatives regarding the corporate governance of banks are underway. The Basel Committee on Banking Supervision (2015) indicates in particular that “the primary objective of bank corporate governance should be safeguarding stakeholders’ interest in conformity with public interest on a sustainable basis. Among stakeholders, shareholders’ interest would be secondary to depositors’ interest”. This is in line with the OECD (2010) and European Union (2010) recommendations that corporate governance of banks should have multi-faceted objectives of enhancing welfare, not only of shareholders, but also of depositors and regulators, and society more widely. In this paper, we query what forms of corporate governance in banks could help attain the most efficient outcome for society in terms of both performance and financial stability. We examine in particular whether calls made by several European countries to create a new type of board of directors, one accountable to minority shareholders, are an effective way of achieving these objectives.

Financial firms, and banks in particular, are different from nonfinancial firms, due to their specific regulation, capital structure (i.e. deposit funding with high leverage), and their inherent complexity and opacity. Debtholders such as depositors cannot easily prevent bank shareholders from pursuing more risk, as issuing ‘complete’ debt contracts is generally impossible due to high information asymmetry (Dewatripont and Tirole, 1994). As a consequence, bank shareholders have strong incentives to favor ‘excessively’ risky investments, with potential losses largely shifted to the deposit insurer and/or taxpayers (Galai and Masulis, 1976; Jensen and Meckling, 1976; Merton, 1977). As the traditional corporate governance approach focuses only on the interests of shareholders, it largely abstracts from these features. This insufficiency can explain why the proposals drawn up by the Basel Committee (2010, 2015), OECD (2010) and the European Union (2010) refer to multiple objectives for bank corporate governance.

Strong corporate governance is supposed to encourage insiders to act in the best interest of all shareholders and other stake-holders (Shleifer & Vishny, 1997). However for banks, tight regulation combined with restrictions on bank entry and activities limits the effectiveness of many mechanisms intended to address corporate governance problems (Billett et al., 1998; Levine, 2004). Furthermore, external governance mechanisms such as takeovers hardly exist in banking,

unlike in other industries (Prowse, 1997; Levine, 2004). All combined, these elements strengthen the important role for more effective monitoring by boards of directors in the banking sector (Basel Committee on Banking Supervision, 2006).

How effective a board is in monitoring bank insiders, and limiting their opportunistic behavior, depends on its setup and also on the ownership structure of the bank. Apart from the agency conflict between shareholders and debtholders, the agency conflict arising between insiders and minority shareholders is different when banks have dispersed or concentrated ownership structure. In banks with a dispersed ownership structure, the agency conflict is between managers and dispersed (minority) shareholders, as managers have incentives to maximize their own benefits at the cost of shareholders, while dispersed shareholders do not have incentives to monitor managers (Shleifer and Vishny, 1997). In banks with concentrated ownership, the conflict of interest is between controlling and minority shareholders. Controlling shareholders might have the incentives and ability to monitor managers to make decisions that increase overall shareholder value and thereby benefit all shareholders (Jensen and Meckling, 1976; Shleifer and Vishny, 1986). On the other hand, controlling shareholders may also be tempted to reap private benefits of control through diversion of assets and profits outside of the firm (Johnson et al., 2000). Internal corporate governance mechanisms are less well suited to limiting such agency problems as controlling shareholders elect representatives to the board of directors that will represent their interests.

Some jurisdictions in Europe where concentrated ownership structure is prevalent, such as Italy and Spain, have created a new type of board director in their Corporate Governance Code which is nominated by, or at least linked to, minority shareholders. These directors, being related to minority shareholders, should be effective in reducing the occurrence of value being expropriated from minority shareholders in firms with concentrated ownership structures, as they are not appointed by controlling shareholders. While the presence of such minority directors might lead potentially to an increase in firm value more generally, if it is an effective way to curtail agency problems between controlling and minority shareholders, for banking firms it might also intensify the agency conflict arising between shareholders and debtholders/regulators. The presence of minority directors that are related to minority shareholders, who have fewer shares and might have a more short term focus, could lead to greater risk-taking in banks with concentrated ownership structure if their risk appetite is higher than that of controlling shareholders. Furthermore, in banks with dispersed ownership structure, the presence of directors that are independent from managers but related to shareholders could lead to greater risk-taking as their outlook will be more shareholder focused than that of generally more risk-averse managers.

The institutional and regulatory environment in place may further affect the ability and incentives of minority directors to effectively monitor insiders. Firstly, strict banking supervision might provide incentives to minority directors to soundly and effectively monitor insiders, as regulators may fine or dismiss bank directors without trial or hearing in such an environment. In addition, the effectiveness of minority directors' monitoring might depend crucially on the quality of the country-level governance, which includes the law protecting minority shareholders and the institutions that enforce the law.

The existing theoretical and empirical literature examines the impact of director independence on firm performance without allowing for the fact that some of those directors may in fact be related to minority shareholders. Mixed results are provided on whether there is in fact effective monitoring by independent directors. The majority of prior empirical papers, mostly focusing on listed US firms generally characterized by a dispersed ownership structure, point to the contribution of independent directors to firm performance being either insignificant (e.g. MacAvoy et al. 1983; Bhagat and Black, 1999, 2002 and, more specifically, Adams and Mehran, 2012; Aebi et al., 2012; Minton et al. 2014 for banks) or even negative (e.g. Agrawal and Knoeber, 1996 for nonfinancial firms and Pathan and Faff, 2013, and Andres and Vallelado 2008 for banks). An exception is Dahya et al. (2008) who find a positive relationship between the fraction of independent directors and Tobin's Q in the case of nonfinancial firms with a concentrated ownership structure, especially in countries with weak legal protection of minority shareholders. Several theoretical explanations could be advanced to underpin these conflicting findings. Fama and Jensen (1983) argued that independent directors have incentives to monitor insiders, as this may strengthen their reputation of effective and independent decision making. These independent directors can therefore monitor the insiders on behalf of minority shareholders and play an important role in limiting extraction of private benefits, potentially leading to an increase in firm value (Bhagat and Black, 2002; Hermalin and Weisbach, 2003; Dyck and Zingales, 2004; Adams and Ferreira, 2007, Adams et al. 2008). However, several factors may also limit the effectiveness of independent directors. Their independence might e.g. be compromised by the fact that they are appointed by insiders, or alternatively by "independent" nomination committees which may in turn depend on insiders. Independent directors may therefore avoid actions that could encourage insiders to replace them, although reputation and human capital arguments may limit this effect (Fama and Jensen, 1983). A further complication may arise through the fact that insiders may be reluctant to provide relevant inside information to independent directors, limiting their scope for exercising effective governance (Adams and Ferreira, 2007; Kumar and Sivaramakrishnan, 2008; Harris and Raviv, 2008). These different elements may make it difficult for insiders to credibly

commit to outsiders through the appointment of independent directors. The presence of directors nominated by or at least linked to minority shareholders might be seen as a way to resolve these different problems, but might also be accompanied by either lower or higher default risk in the case of banking firms, as outlined above. These different potential impacts of the presence of minority directors on performance and risk-taking behavior have not been examined on theoretical or empirical levels to date. Furthermore, most of the empirical research on the corporate governance of banks adopts the traditional corporate governance approach and hence ignores the interests of other stakeholders. However, as the main goal of shareholders is to increase share value, this might invariably be in conflict with the principal aim of debtholders and regulators to reduce excessive risk taking.

Our paper thus aims to complement the literature on corporate governance mechanisms in banks addressing agency problems between stakeholders, by examining in detail the potential role played by minority directors, which are considered as independent from insiders but are in fact related to minority shareholders. This will allow us to determine whether there are advantages for the different stakeholders in having a board structure of banks that includes such minority directors, in the sense that it can be effective in limiting expropriation of minority shareholders by insiders without increasing excessive risk taking by banks. A bank board could then be considered “strong” both from the perspective of minority shareholders as well as for debtholders and regulators if the inclusion of such minority directors can increase a bank’s market valuation without necessarily impacting its probability of default. We pay particular attention to the fact that the interplay of agency problems concerned varies significantly depending on whether banks are widely held or have controlling shareholders, and is generally also heavily influenced by the institutional and regulatory environment in place.

For our investigation of whether the presence of minority directors in bank board is effective for reducing agency conflicts between the different stakeholders, we use a novel data set on the ultimate ownership structure and board composition of a sample of 118 listed European banks. We find that the presence of minority directors in European banks’ boards is important, as they represent on average around 18% of board members in controlled banks and 13% in widely held banks. Most of these minority directors are related to shareholders through being employed by one of them. Our results show that the presence of minority directors within boards is effective to curtail the agency conflict either between insiders and outside shareholders, and between shareholders and debtholders, for both controlled and widely held banks. Deeper investigations show that for controlled banks that the inclusion of such minority directors is more likely to be successful in countries with strict supervisory regime. We also find that effective monitoring of

minority directors is less essential countries with higher levels of minority shareholder protection. For widely held banks, our results highlight that incentives of minority directors to effectively and soundly monitor insiders do not depend on the regulatory and institutional environment.

Our contributions to the literature are manifold: we firstly contribute to the corporate governance literature more generally by examining what constitutes a strong board for banks. In this, we highlight the potentially important role played by minority directors in addressing the complex interplay of agency problems faced by the many stakeholders relevant for banks, and also contribute to the wider discussion relating to the ownership structure of banks. We also contribute to the literature on bank regulation through our focus on how potential novel aspects of bank boards currently under discussion interact with the institutional and regulatory environment that banks operate in, and their consequent impact on financial stability in general.

The remainder of the paper is organized as follows. Section 2 presents the background and the hypotheses tested; Section 3 describes our sample, defines the ultimate ownership variables and the indices of directors relatedness, and provides some statistics. Section 4 presents the methodology we use to conduct our empirical investigation; Section 5 discusses our results; Section 6 contains robustness checks; and Section 7 concludes the paper and provides relevant policy implications.

2. Governance of banks and codes of corporate governance: key empirical issues

Self-regulatory codes designed to improve corporate governance and share best practices have been adopted by a number of countries.² These codes introduce standards for the role and composition of boards of directors, information disclosure, structure and functioning of internal committees, and remuneration of directors. The Corporate Governance Codes are usually implemented without either independent monitoring or enforcement mechanisms, and instead based on voluntary compliance.³ Companies choosing not to comply are required to give reasons for the non-compliance (“comply or explain” principle). Effective adoption hence relies on firms’ concern regarding reputation and investors being able to punish companies for potential non-

² The first code of good governance was issued by the U.S. in 1978, followed by Hong Kong in 1989, Ireland in 1991 and the United Kingdom in 1992 with the influential Cadbury report. Codes of good governance have since spread around the world, encouraged by the World Bank and the Organization for Economic Cooperation and Development (OECD) with its Principles of Corporate Governance published for the first time in 1999. See Aguilera and Cuervo-Cazurra (2009) for further details.

³ Corporate Governance Code can be implemented either through mandatory (laws) or voluntary regulation. However, mandatory is rarely used, with the exception of the 2002 Sarbanes-Oxley Act in the U.S..

compliance with provisions of the Code. This implies that firms within the same country can offer varying degrees of protection to their stakeholders.

Corporate Governance Codes worldwide tend to be similar for nonfinancial and financial firms; however, as argued above, governance of the two should ideally be differentiated as the interests of shareholders of financial firms and those of their debtholders and regulators often do not coincide. Despite this, it is only following the recent crisis that the Basel Committee on Banking Supervision (2010, 2015) and the OECD (2010) recommend that corporate governance of banks should be different from those of nonfinancial firms, with the two objectives of not only enhancing welfare of shareholders but also of depositors/regulators.

One of the prevailing recommendations of Corporate Governance Codes is that the presence of independent directors can be a signal of a “strong” board to curtail the agency conflict between insiders and dispersed/minority shareholders, as independent directors should be able to effectively control and monitor insiders.⁴ While independence should take different forms in firms with dispersed or concentrated ownership structure in order to obtain a “strong” board, relevant recommendations in Corporate Governance Codes are generally not conditional on ownership structure. In most countries, the code only recommends that the majority of the directors shall be independent of the company and its management board, without indicating that these directors should be independent of managers in widely-held firms, or of controlling shareholders in firms with concentrated ownership structure. Also, whereas criteria of independence from managers or controlling shareholders are often defined, apart from in some countries such as Germany, Corporate Governance Codes do not recommend that a sufficient number of board members are independent of managers or controlling shareholders. Following best practice codes, most companies report increasing proportions of independent directors (Linck et al. 2009), but without indicating what the independence is relative to.

Existing empirical results are far from supporting the high expectations that policy-makers have placed in the value of board independence. As discussed in the introduction, independent directors might have neither the incentives nor the ability to control insiders; this is a particularly acute problem in firms with a concentrated ownership structure. As surveyed by De Haan and Vlahu (2016) for banks and Nguyen and Nielsen (2010) for non-financial firms, existing studies mostly focus on listed U.S. firms which are generally characterized by a dispersed ownership structure.

⁴ Most codes have some recommendations on the following seven governance practices: (1) a sufficient number of independent directors; (2) the need for board size limits; (3) a clear division of responsibilities between the chairman and the chief executive officer; (4) the need for timely and quality information provided to the board; (5) formal and transparent procedures for the appointment of new directors; (6) balanced and understandable financial reporting; and (7) maintenance of a sound system of internal control.

Most studies find that the presence of directors independent from managers has no significant impact on performance. To our knowledge, Dahya et al (2008) is the only previous study that investigates the relationship between corporate value and board independence in the case of concentrated ownership structure, for a large panel of nonfinancial firms from 22 countries; they find that a higher proportion of the board being independent from the largest controlling shareholder is associated with higher performance, especially in countries with weak legal protection of shareholders. Another strand of the literature uses data on board attributes provided by RiskMetrics through their Corporate Governance Quotient (CGQ) rating system,⁵ which capture aspects related not only to board independence, but also to composition of committees, size, transparency, and how business is conducted. While some of these studies only focus on U.S. firms (e.g. Brown and Caylor, 2006; Aggarwal and Williamson, 2006; Aggarwal et al. 2009 for nonfinancial firms), a few others use a worldwide sample including countries where concentrated ownership dominates (e.g. Chhaochharia and Laeven, 2009 and Bruno and Claessens, 2010 for nonfinancial firms; Beltratti and Stulz, 2012 for banks). They all find that a stronger CGQ index, i.e. the presence of a “stronger” board, has a significant and positive impact on the valuation of firms. Whereas the CGQ rating system seems adequate for widely-held firms, this is not the case for firms with concentrated ownership structure as it does not explicitly refer to director independence from controlling shareholders. For example, a director employed by the firm is considered as dependent from managers, while a director employed by another firm that the controlling shareholder owns would be inaccurately defined as independent.

The existing literature, mentioned above, that analyses the impact of board independence on bank performance mainly focuses on the agency conflict between insiders and minority/dispersed shareholders, ignoring the interest of depositors/regulators. Only recently, i.e. after the financial crisis of 2007-2008, some empirical studies have considered the interests of depositors/regulators by examining the relationship between the number of independent directors and bank risk-taking behavior. Their findings show either no significant relationship (Erkens et al. 2012; Minton et al., 2014), or that board independence is associated with lower risk (Pathan, 2009; Wang and Hsu, 2013; Brandão Marques and Opper, 2014). These results are in line with the hypothesis that independent directors have incentives to control insiders to forge their reputation, as suggested by Fama and Jensen (1983). However, all these studies only consider the independence of directors from managers, and do not define board independence conditionally on the presence (or not) of

⁵ ISS and RiskMetrics have offered the corporate-governance-rating system named Corporate Governance Quotient since 2002. Before it was acquired by RiskMetrics in 2007, its shareholder-advisory services operated independently as Institutional Shareholder Services (ISS).

controlling shareholders; this applies even to Erkens et al. (2012) and Brandão Marques and Opper (2014) who include countries other than the U.S. in their sample where concentrated ownership structures can dominate.

As some European jurisdictions, where firms with controlling shareholders predominate even for large publicly traded firms, recommend in their Corporate Governance Code to have some minority directors, it is important to differentiate between directors who are independent from insiders and those who are independent from insiders but related to minority shareholders. The inclusion of minority directors in the board could be a way for controlling shareholders to signal that they will refrain from expropriation. If minority shareholders perceive a lower risk of expropriation within a bank with minority directors, the market value discount attributed to the ability of controlling shareholders to divert corporate resources from minority shareholders to themselves should decrease. Similarly, including minority directors in the board of widely held banks could also curtail the agency conflicts between managers and shareholder by reducing the agency costs associated with a separation of ownership and control. On the other hand, the presence of minority directors could also create an additional agency conflict as non-controlling shareholders that nominate or are at least linked to such directors could benefit from certain degrees of decision power. However, this might not neutralize or even reverse the potential positive effect of the presence of minority directors on market valuation. This leads us to examine the following hypothesis:

H1: The presence of minority directors increases the market value of banks independently of their ownership structure.

According to the Basel Committee on Banking Supervision (2015), a “strong” board for banks should safeguard not only the interest of minority shareholders, but also those of depositors. In banks with a concentrated ownership structure, the presence of directors that are not appointed by controlling shareholders, but instead by minority shareholders, would lead to higher risk taking if the risk appetite of the latter is higher, given they have fewer shares and might have more of a short term focus. On the other hand, minority directors may have incentives to supervise and control risk taking if a director’s reputation is important in the market for directorships, as suggested by Fama and Jensen (1983); a good reputation might lead to being offered more board seats. However, minority directors should have no incentive to act against the interest of minority shareholders, especially if their connection is through being employed by one of them. Similarly, the presence of minority directors that are related to shareholders in banks with dispersed ownership structure could lead to greater risk-taking if they seek to maximize shareholder wealth.

These minority directors are after all independent from managers who may prefer less risk than that desired by shareholders due to their non-diversifiable human capital investment in the companies they manage (Faleye and Krishnan, 2010). We examine this issue through the following hypothesis:

H2: The presence of minority directors increases the default risk for banks independently of their ownership structure.

Our third hypothesis is related to the influence of the regulatory environment. In strict supervisory systems, supervisors can issue fines against, or even dismiss, bank directors without formal proceedings, and or mandate new board elections. As we are interested in determining whether stronger supervisory regimes could give minority directors incentives to soundly monitor insiders, we examine the following hypothesis:

H3: The presence of minority directors does not increase the default risk of banks located in countries with stronger supervisory regimes.

Finally, we examine whether country-level governance, more specifically the degree of minority shareholder protection, plays a major role in minority directors' actions to reduce agency conflicts between insiders and minority shareholders. The effectiveness of minority directors' monitoring might depend crucially on the quality of any anti-self-dealing regulation. Similarly, if minority shareholders want to nominate directors to board positions, they then need to rely on the existence of formal legal procedures to oversee and safeguard the process, making strong minority shareholder laws an additional complementary corporate governance mechanism. This leads to the following hypothesis

H4a: Strong minority shareholder laws and the presence of minority directors are complementary corporate mechanisms.

On the other hand, greater minority shareholder protection might constrain the opportunistic expropriation behavior of bank insiders. Effective monitoring by minority directors may therefore be less essential in controlling potential agency conflicts in countries with higher levels of minority shareholder protection. These observations lead us to consider the alternative hypothesis:

H4b: Strong minority shareholder laws and the presence of minority directors are substitute corporate mechanisms.

3. Data sources and ownership and board structures

3.1. Sampling procedure and data sources

We focus our analysis on European countries as some jurisdictions there recommend in their Corporate Governance Codes to have minority directors. Moreover, European banks show a substantial amount of variability between individual levels of ownership concentration given the lack of regulatory limitations on the percentage of bank capital owned by a single entity in Europe. We only consider European banks listed on the stock market as we were not able to collect data on the board structure of non-listed banks (even from their annual reports).

Our sample includes bank holding companies, commercial banks and investment banks, from 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). We identify all active listed banks as at the end of December 2013 provided by BvD Bankscope, resulting in 145 banks. As the main concern in our study is the relatedness of the board of directors to shareholders and managers, we only retain banks for which we have information on their board structure, leaving us with a sample of 124 banks. Additionally, we also exclude banks for which there is no information to compute the variables of interest. Consequently, we end up with a final sample of 118 banks in 17 countries (Table 1 gives a breakdown of these by country). On average, our sample covers more than 97% of banks' total assets of all listed banks provided by BvD Bankscope (see Table 1).

We assemble data on ownership structure and board of directors as of 2013 for our 118 banks. We use Bloomberg, BvD Bankscope, Amadeus, as well as websites of banks/firms for information on ownership structure. The data on board structure and the biographies of the board of directors are in part taken from Bloomberg, but mostly hand-collected from corporate governance reports or annual reports. We further collect financial statement data from BvD Bankscope, market data from Bloomberg, and macroeconomic data from the World Bank over the period 2011-2015.

[Insert Table 1 here]

3.2. Codes of Good Governance on board independence

The European Parliament called on the Commission of the European Communities to propose rules to strengthen shareholders' rights and protection for creditors, employees and the other parties companies deal with. The Commission of the European Communities published a list of recommendations in 2005 (Commission of the European Communities, 2005), with the objective to improve corporate governance standards in the EU with a certain degree of harmonization. A

report published in 2007 shows that most Member States follow almost fully or to a large extent the provisions of the Recommendation (Commission of the European Communities, 2007).

All Member States now recommend the presence of independent directors in boards through the principle of "comply or explain", but without indicating what the independence is relative to (see Table 2 for our sample).⁶ Differences in the definition of independence and in the proportion of independent board members recommended within the board make standards uneven. The recommendation to have boards independent from controlling shareholders in concentrated ownership has furthermore only been endorsed in a few Member States (in our sample: Austria, Finland, Netherlands, Norway, and Sweden), and with a very small number of a minimum of one or two independent directors.

Regarding the presence of minority directors, this is only recommended in two European countries, with no obligation for companies to either comply with or justify deviations from it. Spain has introduced a proportional voting system that allows for a minority of shareholders to appoint directors in proportion to their equity stake in the corporation, for both listed and non-listed corporations. An Italian reform of 2005, on the other hand, gives listed companies the right to reserve at least one seat on the board of directors to persons that are not appointed by controlling shareholders.

[Insert Table 2 here]

3.3. Identifying controlling shareholders

We need to build the control chain to determine if a bank is widely held or is controlled by one or several shareholders. In this we follow the existing literature (La Porta et al., 1999); Claessens et al., 2000; Facio and Lang, 2002) by using the control threshold of 20%.⁷ Besides control rights of controlling shareholders, we also compute their relative voting power by taking into account the probability of coalition between them.

Construction of control chains

Our first step is to build control chains for each bank to identify both direct and indirect owners, and their control rights in the control chain. Previous studies (La Porta et al., 1999; Shleifer, 1999; Barry et al., 2011) show that ownership structure is relatively stable over time. As one may argue that this is less true during a period of banking crisis, we construct the control chains for the year

⁶ We collect the last Corporate Governance Code available for the 17 European countries included in our sample from the European Corporate Governance Institute (<http://www.ecgi.org/>).

⁷ Alternatively, we apply a threshold of 10% in the robustness tests.

2013, after the subprime and the sovereign debt crises, and consider them to be unchanged for our study period.

At the first level in the control chain, we divide our sample into banks controlled by at least one controlling shareholder holding at least 20% of outstanding shares, and widely held banks (no controlling shareholders). We consider a controlling shareholder to be an ultimate owner when it is an individual/family, a government, or a widely held firm (industrial, mutual funds or financial firm). At this level, ultimate owners are direct shareholders of the banks. For banks with controlling shareholders for whom we can continue building the control chains, we collect information on ownership structure of controlling shareholders at each of the following levels in the chain. We continue the control chains until we find all indirect ultimate owners of a bank.⁸

We use the method of La Porta et al. (1999) to compute control rights of controlling shareholders. An ultimate owner can control a bank directly and/or indirectly. We define their direct control rights as the percentage of the bank's shares directly held, and their indirect control rights as the shares held by an entity at the first level that the ultimate shareholder controls through the intermediate entities in the chain of control. The aggregate control rights of a shareholder are the sum of their direct and indirect voting rights held in the bank (see Figure A1 in Appendix 1 for an example of a chain of control).⁹

Relative voting power of controlling shareholders

As the real voting power of a given controlling shareholder also depends on the possible coalitions between the other controlling shareholders, we use a measure of "relative voting power" alternatively to the control rights to estimate the potential influence of each controlling shareholder in the decision process. If the probability of coalition of multiple large shareholders is high, the voting power of the largest ultimate owner relatively decreases, i.e. they may not be the ones making decisions in this bank (see Figure A1 in Appendix 1 for an example of such a coalition).

We use the "Banzhaf Power Index" (*BPI*) to measure the relative voting power of each controlling shareholder. This index takes into account voting rights, and the possibility to unite with other shareholders to make decisions in a bank (see Appendix 2 for details). We compute the *BPI* index using the algorithms for voting power analysis (using the method of generating

⁸ In our sample, the maximum number of levels in a bank's control chain is eight.

⁹ We have some cases where we have several ultimate owners for a same controlling shareholder at the first level in the control chain. We then consider as the ultimate owner the one holding the largest number of shares.

functions) provided by Dennis Leech at the University of Warwick.¹⁰ This index ranges from 0 to 1; the higher the index, the more relative voting power has the shareholder. In widely held banks there are no controlling shareholders, so we set voting power of all shareholders of these banks equal to 0. For banks with concentrated ownership structure, we calculate the relative voting power for direct shareholders and for ultimate owners at the last level in the control chain. The relative voting power of ultimate owners is calculated as the product of control rights they have at each intermediate level and the relative voting power of the shareholder at the first level in the control chain. As for the ownership structure, we compute the *BPI* index for each controlling shareholder for the year 2013, and suppose that relative voting power is also unchanged for our study period.

3.4. Indices of relatedness of directors

Our next step is to identify board members that are related to either controlling shareholders or minority (non-controlling) shareholders. We collect for that information on the biographies of directors for the year 2013. As board terms range normally from 3 to 4 years, we suppose that the measures of relatedness we are computing remain the same over our period of analysis.¹¹ Instead of using directly the percentage of directors that are independent/dependent as in previous studies (e.g. Dahya et al., 2008; Adams and Mehran, 2012; Pathan and Faff, 2013), we build more refined measures by assigning weights to three factors that characterize the strength of the relatedness between a director and a shareholder/ultimate owner.

The first factor we consider is whether a director is related to either a direct shareholder (controlling or minority) or indirect controlling shareholders (ultimate owners). We consider a director to be related to a direct shareholder if: (1) they are an employee of the direct shareholder; (2) they are one of the direct shareholders of the bank; (3) they have the same family name as one of the direct shareholders of the bank; or (4) they are a politician or employee of a government agency when the bank is state owned. To determine if directors are related to the ultimate owners of the bank, we further need to consider if they are related to any firms in the control chain. A director is then identified as related to an ultimate owner in one of the following cases: (1) they are an employee either of the ultimate owner or in one of the firms controlled by the ultimate owner in the control chains of the bank; (2) they are one of the ultimate owners or one of the indirect minority shareholders in the control chain of the bank; (3) they have the same family name as the

¹⁰ See <http://homepages.warwick.ac.uk/~ecaee/ipgenf.html>.

¹¹ Bloomberg provided information on board structure of 62 banks among the 118 banks in our sample from 2011 to 2013. We notice that the board structure of these banks did not change for this period. Therefore, for the 42 remaining banks, we use 2013 annual reports for information on board structure, and also suppose that their board structure is stable during the period of study.

ultimate owner or as one of the indirect minority shareholders in the control chain of a bank; (4) they are shareholders in at least one of the firms controlled by the ultimate owner in the control chains of the bank; or (5) they are a politician or employee of a government agency when one of the ultimate owner is state owned. A director who is not considered to be related to a shareholder or an ultimate owner is considered to be independent from shareholders.¹²

The second factor we are taking into account to compute our indices of relatedness of directors is whether their relationship with shareholders is in the present or in the past. When directors are, for example, current employees of shareholders of the bank, they might have strong incentives to act in the interest of the person that can fire them. However, when the relatedness is already in the past, the related director is just related to, but not controlled by shareholders, thus their influence should be less significant than in the first case.

The third factor we considered is the position of directors in the board. We distinguish if directors are Chairman/Vice Chairman of the board, or other board members. The Chairman of the board has more rights in the directors meeting. In some countries (such as Italy and Portugal), when votes in the board are tied, the Chairman of the board can have the casting vote to make a decision. Besides the Chairman and the Vice Chairman can act in the Chairman's place such as presiding over board meetings, if the Chairman is not present. Therefore, when Chairman or Vice Chairman are related to shareholders, they might have greater opportunities to act in the interest of shareholders.

We use the three factors described above to compute several complementary indices to measure the strength of independence/dependence of the board of director for each bank (see Appendix 3 for details). These different indices are computed using either control rights or the Banzhaf Power Index to measure the decision power of the shareholders (based on the threshold of 20%). For controlled banks, we compute three indices measuring, respectively, the presence/influence of directors in their board that are (i) related to minority shareholders (*Minority*), (ii) related vis-a-vis controlling shareholders (*Controlling*), and (iii) independent from shareholders (*Independent*). These three indices range from 0 to 10. For widely held banks, we first construct an index measuring the presence/influence of directors in their board that are related to minority shareholders (*Minority*); this index also ranges from 0 (no directors are independent) to 10 (all directors are independent). We also measure the presence of directors that are dependent from

¹² In our sample, we also have 18 directors (1.51%) who are related to both controlling and non-controlling shareholders. We treat separately each of these 18 cases to make them related to only either controlling or non-controlling shareholders in function of the strength of their link with them. In robustness tests, we remove these 18 cases from the sample.

managers through the percentage of dependent directors, as provided in annual reports of each bank for the year 2013 ($Manager_i$).

[Insert Table 3 here]

3.5. *Some descriptive statistics*

We have in our sample 44 widely held banks (37%) and 74 banks controlled by at least one shareholder (63%). Among the latter, 32 banks (43%) have several controlling shareholders. Hence, these can enter coalitions with other shareholders to obtain the excess control rights over the largest ultimate owner to make decisions in banks. However, potential coalitions might be limited in a majority of banks as the average voting rights of the largest shareholder in our sample are around 56% (see Table 4). Besides, minority shareholders hold on average around 42% of the shares.

In our sample of controlled banks, we have on average 18.29% of directors that are related to minority shareholders and 13.44% that are related to controlling shareholders (direct or indirect), and 68.27% that are independent (see Table 5). The proportion of minority directors is therefore relatively high on average, especially in Spain (62.75%) where the Corporate Governance Law recommends to include such directors in the board, but also in other countries that do not have such recommendations (Austria 27.63%, France 20.29%, Sweden 26.92%, the UK 34.69%). In the sample of widely held banks, the relatedness of directors to managers is the greatest concern of shareholders. The average percentage of related directors to managers of widely held banks in our sample is 43.88%. Moreover, we also observe that the proportion of minority directors is high in widely-held banks, with an average value of 29.18%.¹³

Table 6 further provides statistics on the five different criteria used to determine if a director is related to a shareholder. We find that on average 82.82% and 76.76% of directors identified as related, in controlled and widely held banks, respectively, are related to shareholders through being employed by one of them. Directors that are shareholders of the bank represent more than 10% of the cases of related directors, while the three other criteria of relatedness account for only around 1% of the cases.

[Insert Tables 4, 5 and 6 here]

¹³ In this study, we cannot identify related directors to managers, we only take into account the percentage of related directors to managers which is reported in annual report of each bank. Therefore a director in widely held banks can be related to both shareholders and managers. The statistics on relatedness to managers and to shareholders in the Table 4 reports two separate aspects of relatedness of directors in widely held banks.

4. Methodology

4.1. Empirical specifications

We use two different specifications to test our four hypotheses developed above.

Specification to test hypotheses H1-H2

We first investigate whether the presence of minority directors within bank boards has an impact on their market valuation and risk-taking. For that, we estimate the following equation:

$$Y_{ijt} = \alpha + \beta Relatedness_{ij} + \sum_m \theta_m BankControl_{ijt} + \sum_n \gamma_n CountryControl_{jt} + \varepsilon_{ijt} \quad (1)$$

where subscript i denotes bank; j denotes country; t the time period ($t = 2011, 2012, 2013$), and ε is the idiosyncratic error term. Y_{ijt} is either Tobin's Q or the distance to default. We use Tobin's Q ratio ($Tobin_Q_{it}$) as a proxy of stock market valuation, following the existing literature (e.g. Andre and Vallelado., 2008; Dahya et al., 2008). This ratio is computed as the book value of assets minus the book value of equity plus the market value of equity, divided by the book value of assets. The average of Tobin's Q ratio in our sample is 1.07 (see Table 3). We compute the distance to default for each bank (DD_{it}) to proxy for bank risk using the methodology developed by Merton (1977) (see Appendix 4 for details). The average of the probability of default in our sample is 3.31 (see Table 3). $BankControl_{ijt}$ are bank control variables, and $CountryControl_{jt}$ are country control variables, as defined later in Section 4.2.

$Relatedness_{ij}$ is for controlled banks either the index measuring the presence/influence of directors that are related to minority shareholders (*Minority*), the index measuring the presence/influence of directors that are related to controlling-shareholders (*Controlling*), or the index measuring the presence/influence of independent directors from shareholders (*Independent*). We compute these three indices using either the Banzhaf Power Index or the control rights to differentiate between controlling or minority shareholders. These three indices cannot be included together as they are complementary. We first include them one by one, and we also include *Minority* and *Controlling* together. For widely held banks, $Relatedness_{ij}$ is either the index of relatedness to shareholders (*Minority*) or to managers (*Manager_i*). We first include *Minority* alone and then together with *Manager_j*.

When the dependent variable is the Tobin's Q ratio, we expect a significant and positive coefficient for the index *Minority* for both controlled and widely held banks to be consistent with the hypothesis **H1** that the presence of minority shareholders increases the market value of banks. When the dependent variable is the distance to default we expect, in line with the hypothesis **H2**,

the coefficient associated with *Minority* to be negative and significant if the presence of minority directors decreases the distance to default.

Regarding the other indices of relatedness we consider, we furthermore expect a stronger presence/influence of directors related to either controlling shareholders in controlled banks (*Controlling*) or to managers in widely held banks (*Manager_j*) to significantly decrease Tobin's Q ratio, as it might increase the risk of expropriation. On the contrary, the presence of directors that are independent from both controlling and minority shareholders in controlled banks (*Independent*) would increase the market value of banks if minority shareholders have confidence in the independence of these directors. We also expect, in widely held banks, that the presence of directors related to managers would increase the distance to default if managers are more risk-averse than shareholders. Similarly, a stronger presence/influence of directors related to controlling shareholders in controlled banks would decrease the risk of default if controlling shareholders have large shares and a long term focus compared to minority shareholders.

Specification to test hypotheses H2-H3

We further analyze whether a strong regulatory and institutional environment (*Env_j*), more specifically strong supervisory regimes and high levels of shareholder protection, could influence the role played by minority directors in addressing the complex agency conflicts faced by the different banks' stakeholders. For this, we augment Equation (1) with interaction terms between the different indices of relatedness and the variable *Env_j* as follows:

$$Y_{ijt} = \alpha + \beta Relatedness_{ij} + \delta Env_j \times Relatedness_{ij} + \rho Env_j + \sum_m \theta_m BankControl_{ijt} + \sum_n \gamma_n CountryControl_{jt} + \varepsilon_{ijt} \quad (2)$$

For the regulatory and institutional environment *Env_j*, we first consider an index for strength of supervisory regime (*SupPow_j*), drawn from the World Bank's 2013 Bank Regulation and Supervision database, in line with Laeven and Levine (2009) and Shehzad et al. (2010). It measures propensities of regulatory authorities to do on-site examinations in order to make an overall assessment of banks to determine their economic condition, and their ability to remove and replace managers and directors or to force a bank to change its internal organizational structure when problems are detected (see Table 3 for details). The index *SupPow_j* ranges in principle from 0 to 13, with a higher index indicating stronger supervisory strength. In our sample, the index has a median of 10 and ranges from 4 to 13 (see Table 3). If stronger supervisory regimes provide

incentives to minority directors to soundly monitor insiders, we expect the interaction term $SupPow_j \times Minority_{ij}$ to be significant and positive to be consistent with the Hypothesis **H3**.

We alternatively use an index measuring the level of minority shareholder protection. We follow Rossi and Volpi (2004), Hagendorff et al. (2010) and Dahya et al. (2008) and compute an index of shareholder protection that combines an index measuring the level of shareholder rights (revised anti-director index of Djankov et al. (2007)) and an index measuring the quality of law enforcement (the rule of law index from the Worldwide Governance Indicators (World Bank)). The anti-director index measures how strongly the legal system favors minority shareholders vis-a-vis managers or majority shareholders in the corporate decision making process, including the voting process; it ranges from 0 to 5. The rule of law index reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts; it ranges from -2.5 to 2.5. The index $Legal_j$ is defined as the revised anti-director rights index multiplied by the rule of law index, with a higher index indicating a higher level of shareholder protection. If the effectiveness of minority director monitoring actions depends on the level of shareholder protection in line with the Hypothesis **H4a**, we expect the interaction term $Legal_j \times Minority_{ij}$ to be significant and positive for both the Tobin's Q ratio and the distance to default. On the contrary, we expect the interaction term be significant and negative if monitoring of minority directors is less essential to reduce potential agency conflicts in countries with higher levels of minority shareholder protection (Hypothesis **H4b**).

In order to examine the impact of different regulatory regimes on how the institutional and regulatory environment may affect the way minority directors monitor insiders, we calculate the relevant marginal effects as $\partial Y_{ijt} / \partial Env_j = \beta + \delta Env_j$ for Eq. (2), with Env_j evaluated at quartile levels. To facilitate interpretation of regression coefficients in this context, we scale the two regulatory and institutional indices to have a minimum of zero.

4.2. Control variables

We determine a set of control variables specific to each of our two dependent variables (Tobin's Q and distance to default) following the existing literature. Table 2 presents definitions and general statistics for all these variables.

We consider the following bank-level control variables when the dependent variable is the Tobin's Q ratio: board size, bank size, growth of assets, capital structure, loan ratio, and level of risk. Board size ($BoardSize_{it}$) is given as the natural logarithm of the number of directors on the

board, and bank size ($Size_{it}$) is measured by the logarithm of total assets of banks. Growth of assets ($Growth_{it}$) is measured by the change of total assets between year $t-1$ and year t , divided by the total assets in year $t-1$. Capital structure ($Capital_{it}$) is measured as the ratio of equity to total assets of a bank, and the loan ratio ($Loan_{it}$) is the ratio of loans to total assets. Following Hail and Leuz (2009), we use return variability, i.e. the standard deviation of monthly stock returns over the last twelve months, to proxy for the risk of banks ($Risk_{it}$).

In the regressions using the distance to default as dependent variable, the bank-level control variables are board size, bank size, growth of assets, capital structure, loan ratio, the deposit, operating ratios and return on equity. The deposit ratio ($Deposit_{it}$) is computed as the ratio of deposits to total assets, the operating ratio ($Operating$) is the ratio of total operating expenses to total operating income, and the return on equity (ROE) is calculated as the ratio of net income to total equity. The other control variables $BoardSize_{it}$, $Size_{it}$, $Growth_{it}$, $Capital_{it}$, $Loan_{it}$ are computed as defined above.

We furthermore include in all regressions the growth rate of GDP (GDP_{jt}) and the index measuring the level of minority shareholder protection for each country ($Legal_j$).

We checked the correlation among our variables of interest and do not find any multicollinearity problem (see Table A1 in Appendix 1).

4.3. Endogeneity issues

One of the main concerns of studies on corporate governance in general, and regarding the board of directors in particular, is the endogeneity problem, which is raised in previous studies such as Mak and Li (2001), Hermalin and Weibach (1998, 2003). However, the “Code of Best Practices for Corporate Governance” is implemented in all countries in our sample, thus banks have to set their board of directors in compliance with the recommendations in the “Code of Best Practices”; if this is not the case, they have to explain this to regulators. From this point of view, the board of directors can arguably be considered as exogenously determined.

However, we still empirically test for the presence of endogeneity problems for the variables of relatedness of board of directors to shareholders in our study. We use the two-stage least squares (2SLS) method, finding instrument variables for each index of relatedness of board in each of the regressions on Tobin’s Q and distance to default. After each regression, we carry out tests to verify the validity of our model specification. We obtain the Sargan-Hansen statistic for test of over-identification, the Cargg-Donald Wald F statistic for test of weak identification, and the LM statistic for under-identification test. The results show that the instrument variables are valid in

each regression (see Tables A2-A4 in Appendix 1 for definition and result of the tests of validity of instrument variables in each regression).

Thereafter, we carry out the endogeneity tests¹⁴ to test the endogeneity problem for our variables of interest. The results show that we cannot reject the null hypothesis in the endogeneity tests (with p-value strictly greater than 10%); we can therefore conclude that the variables of relatedness of board of directors to shareholders in our sample are strictly exogenous.

Having discarded the need to correct for endogeneity, we estimate Eq. (1) and (2) using the generalized least square (GLS) random effects technique. The random effects model has the benefit of taking into account time-invariant explanatory variables that are eliminated by first-differencing when using the fixed effects model. Moreover, it also accounts for unobserved, individual-specific variation, which reduces potentially omitted variables bias. In order to test whether the individual-specific effect is not correlated with explanatory variables, we use the method described by Arellano (1993) and Wooldridge (2002), which is a robust Hausman test that is equivalent to the traditional Hausman test under conditional homoscedasticity. The robust Hausman test indicates that the random effect method is suitable in our panel. However, we cannot reject that the data does not have first order- autocorrelation. Consequently, we use the generalized least square (GLS) random effect technique, which is also robust to first-order autocorrelation disturbances.

5. Empirical results

5.1. Relatedness of directors to shareholders and agency conflicts

The estimation results for Eq. (1) are given in Tables 7 and 8 for controlled banks using, respectively, the Banzhaf Power Index and control rights to differentiate between controlling or minority shareholders. Results for widely held banks are provided in Table 9 for both the Banzhaf Power Index and control rights.

We find for both the sample of widely held and controlled banks that the presence and influence of minority directors in the board (*Minority*) has a significant and positive impact on Tobin's Q. Results are similar when we use either relative voting power or control rights to identify controlling shareholders (columns 1 and 3 of Tables 7 and 8, and columns 1-2 and 5-6 of Table 9). These results are consistent with the hypothesis **H1** that having directors that are related to minority shareholders is effective to convince outside shareholders that insiders will refrain from diverting

¹⁴ Null hypothesis is that there is no systematic difference between the estimator of the 2SLS technique and the one of the GLS random effects technique. Alternative hypothesis is that there is a systematic difference between the two estimators.

resources. The reduction of the market value discount results in an increase in stock market valuation. Our results further show that the presence and influence of minority directors in the board significantly decreases the probability of default for the sample of controlled banks, while there is no significant impact for widely held banks (columns 5 and 7 of Tables 7 and 8, and columns 3-4 and 7-8 of Table 9). This is not consistent with our hypothesis **H2**. The results indicate that minority directors are better placed to supervise and control risk taking if a director's reputation is important in the market for directorships. Having directors that are related to minority shareholders seems therefore effective to curtail the agency problem we have in banks between insiders and outsider shareholders, as well as between shareholders and debtholders.

As expected, our results show for the sample of controlled banks that the presence/influence of directors that are related to controlling shareholders (*Controlling*) contribute to amplify the agency conflicts between the different stakeholders, as we find that this is associated with a decrease in Tobin's Q and an increase in the probability of default (columns 2 and 6 Tables 7 and 8). Regarding the presence of directors that are independent from shareholders (*Independent*), we find that this is associated with a significant decrease in Tobin's Q and no significant impact on the distance to default (columns 4 and 8 Tables 7 and 8). This result is in contrast to those of Dahya et al. (2008) on non-financial firms who find a significant and positive relationship. This can be explained by the fact that we exclude from these independent directors those that are related to minority shareholders, for which we find a positive and significant impact on Tobin's Q. The negative relationship between independent directors and stock market valuation might be explained by the difficulty for controlling shareholders to credibly commit to not expropriating by including independent directors in the board, knowing that the latter are appointed by them, or alternatively by "independent" nomination committees which may also depend on them. For the sample of widely held banks, we find that the presence of directors that are independent from managers is associated with a significant increase in the distance to default, while having no significant impact on Tobin's Q (columns 2, 4, 6 and 8 of Table 9).

In summary, these different results seem to indicate that the presence/influence of minority directors is effective to curtail the agency conflict either between insiders and outside shareholders, and between shareholders and debtholders, for both controlled and widely held banks. On the contrary, the presence/influence of directors related to controlling shareholders in controlled banks is detrimental for agency conflicts and results in lower market valuation and higher default risk

[Insert Tables 7 to 9 here]

5.2. Role of institutional and regulatory environment

We now examine whether the institutional and regulatory environment may affect the way minority directors monitor insiders. The estimation results for Eq. (2) are given in Tables A3 and A4 in Appendix 1 where we only present the results obtained when we compute the indices of relatedness using the Banzhaf Power Index as we find similar results with control rights.¹⁵ To facilitate the interpretation, we comment the marginal effects evaluated at quartile levels for the index of strength of supervisory regime (Table 10) and the index of minority shareholder protection (Table 11).

On the one hand, we observe for the sample of controlled banks that the strength of the supervisory regimes impacts the way minority directors monitor insiders, in line with the hypothesis **H3**. We observe from Table 10 that the positive impact of the presence/influence of minority directors on Tobin's Q and on the distance to default is increasing with the strength of supervisory regimes. These results are in line with the argument that a complementary relationship exists between the strength of supervision and the incentives of minority directors to monitor insiders. The stronger is the mandate that regulators have been given to intervene and discipline, the greater is the "threat of action" (Booth et al., 2002) that regulators pose to minority directors. On the contrary, we find that the positive impact of the presence/influence of minority directors on Tobin's Q and the distance to default is decreasing for higher levels of minority shareholder protection, with no significant impact on Tobin's Q at all for the highest levels of protection (see Table 11). This is consistent with the hypothesis **H4b** that strong minority shareholder protection and the presence of minority directors are substitute corporate mechanisms, rather than complementary mechanisms. We further find that the market value discount imposed by minority shareholders when there is a strong presence of directors related to controlling shareholders is no longer imposed in countries with higher levels of shareholder protection (see Table 11). This result is consistent with the argument that the effectiveness of minority shareholders to limit any potential expropriation behavior of controlling shareholders depends on the quality of anti-self-dealing regulation. Similarly, we find that the negative impact of the presence of directors related to controlling shareholders on Tobin's Q is decreasing for stronger supervisory regimes.

On the other hand, we find for the sample of widely held banks that neither the strength of supervisory regime nor levels of minority shareholder protection have an impact on the way that minority directors monitor insiders. The presence/influence of minority directors has a positive impact on Tobin's Q while having no significant impact on the distance to default (Tables 10 and

¹⁵ These estimation results are available on request.

11), independently of the regulatory and institutional environment. Hypotheses **H3** and **H4a/H4b** do not therefore hold for the sample of widely held banks. Having minority directors is effective to reduce the agency conflicts between managers and shareholders, and between shareholders and debtholders, without regard to levels of supervisory regimes and minority shareholder protection. We find similarly that the impact of the presence of directors related to managers on both Tobin's Q and the distance to default does not depend on the regulatory and institutional environment.

[Insert Tables 10 to 11 here]

6. Robustness tests

We further check the robustness of our results as discussed in section 5 in several ways.¹⁶

First, we exclude from the initial sample banks cross-listed on a US exchange. Theoretical and empirical works on corporate governance show that cross-listing on a more transparent market, with higher requirements in terms of published information, is considered a mechanism to reduce risk of expropriation from insiders (e.g. Reese and Weisback, 2002; Doidge et al., 2004). As our study is on Western European countries, where stock markets are developed and quite transparent, we take the US exchange as a reference of an even more transparent market compared to the stock market of countries in our study. We exclude eight banks that are cross-listed on a US exchange from the initial sample in order to exclude the effect of cross-listing on Tobin's Q and distance to default. Our main results are unchanged.

Next, we exclude from the initial sample banks having dual class shares. The existence of dual class shares can bias voting rights in a bank (Faccio and Lang 2002), and thereby might weaken the relevance of minority directors in our study. Therefore, we exclude eight banks having dual class stock, with our conclusions from the section 5 still prevailing in reduced sample.

We then verify our results using alternative measures of our dependent variables. For the market valuation, we alternatively use shareholder market return (SMR), in line with Andres and Vallelado (2008). In order to compute the SMR, we calculate monthly returns from share prices of each bank, calculate the average monthly returns for each year, and then annualize them. We still find that for the sample of controlled banks that the presence of minority directors on the board ameliorates Tobin's Q and decrease the default risk, whereas the presence of independent directors or directors related to controlling shareholders have no significant impact. The presence of minority directors in the board of widely held banks still decrease the default risk, with however no significant impact on Tobin's Q.

¹⁶ While we do not include the estimation results discussed in this section, they are available on request.

We also consider an alternative measure of bank risk of insolvency, i.e. the widely used Z-score defined as $Z_{ROA} = \mu_{ROA} + EQ/\sigma_{ROA}$, with μ_{ROA} and σ_{ROA} respectively the mean and the standard deviation of ROA, and EQ the bank's capital-asset ratio (Lepetit and Strobel (2013, 2015)). We compute Z-scores using moving mean and standard deviation estimates for ROA, with window widths of three observations, and current values of EQ. A higher Z-score indicates that a bank is more stable, and thus has a lower risk of insolvency; as Z-scores tend to be skewed, we use their natural logarithm. We still find that the presence of minority directors on the board reduces insolvency risk of controlled banks, more specifically in countries with stronger supervisory regimes. Our results also confirmed that the presence of minority directors decreases the default risk of widely held banks, independently of the strength of supervisory regimes.

We then reestimate Eq. (1) and (2) using alternative measures of relatedness of board directors to shareholders. Firstly, we use the percentage of relatedness of board to shareholders; results are unchanged. Our results are thus robust to different measures of the representation of minority directors on the board.

We also alternatively use a threshold of control of 10% to identify controlling shareholders, following La Porta et al. (1999, 2002), Caprio et al. (2007) and Lepetit et al. (2015). We then have 96 controlled banks and 22 widely held banks, and we can only run regressions for Eq. (1). Our main results remain unchanged.

We had considered “having the same family name with shareholder” as one of the criteria to identify “related directors”. In our main results, we only considered related directors having the same family name with shareholders when it is not a common family name in each country. As a robustness test, in order to ensure that the presence or absence of related director in our sample according to “having the same family name” criterion does not drive our principal results, we exclude all the 8 related directors according to this criterion from the initial sample. Our main conclusions are unchanged;

Finally, we consider excluding from the initial sample directors relating to both controlling and minority shareholders. In our initial sample, there are 18 directors relating to both controlling and minority shareholders. In the main regressions, we treated each case of these 18 directors to classify them to one of the two categories: related to controlling or related to minority shareholders. In the robustness test, we exclude these 18 related directors from the initial sample. Results are similar to those obtained before.

7. Conclusion

We examine whether having a board structure of banks that includes minority directors which are related to minority shareholders is effective in limiting expropriation by insiders without increasing the default risk of banks. For this, we analyse the impact of the presence/influence of such minority directors on stock market valuation and the distance to default of both controlled and widely held banks. As a secondary focus, we also explore whether the institutional and regulatory environment may affect the way minority directors monitor insiders. For this purpose, we assemble a novel hand-collected data set on banks' ultimate control, ownership structure and board composition for a sample of 118 European listed banks from 17 countries.

We find for both controlled and widely held banks that the presence and influence of minority directors appears effective in convincing outside shareholders that insiders will refrain from diverting resources, as we observed a positive and significant impact on Tobin's Q. We furthermore find that the presence/influence of minority directors in the board decreases the default risk of both controlled and widely held banks, consistent with the argument that such directors are better placed to supervise and control risk taking. The introduction of minority directors seems therefore effective to curtail not only the agency problem between insiders and outside shareholders, but also the one between shareholders and debtholders. In comparison, we find for the sample of controlled banks that the presence of independent directors does not contribute to reducing either these two agency conflicts, while directors related to controlling shareholders strengthen them. For widely held banks, the presence of directors related to managers does not lead to lower market valuation and is associated with lower default risk.

We furthermore find for controlled banks that stronger supervisory regimes increase the incentives of minority directors to monitor insiders more effectively and soundly. This result suggests that the inclusion of such directors is more likely to be successful if bank-level governance is accompanied by a strict supervisory regime. Our results also show that effective monitoring of minority directors is less essential in controlling potential agency conflicts in countries with higher levels of minority shareholder protection. For widely held banks, our results show that incentives of minority directors to soundly monitor insiders do not depend on the regulatory and institutional environment.

Our findings contribute to the current policy debate on what forms of corporate governance in banks could lead to the most efficient outcome for society in terms of both market valuation and financial stability. It has been suggested by some regulators to introduce in Code of Corporate Governance the recommendation that at least one director should be nominated by banking regulators to reduce the agency conflict between shareholders and debtholders (De Haan and

Vlahu, 2016). However, such a recommendation might not be seen as a palatable for many banks' insiders and might then not be widely applied. Our work suggests instead that recommending the presence of a minimum of minority directors could increase bank board effectiveness for both controlled and widely held banks. Firstly, it could ensure that the risk-taking incentives of insiders are better aligned with the interests of other stakeholders such as depositors, debt holders, banking supervisors, and society in general. Secondly, it could also allow insiders to credibly commit that they will not divert corporate resources, reflected in higher market valuations. As a consequence, it seems advisable that Corporate Governance Law should recommend allowing minority directors to be present in bank boards. However, another important implication of our work is that regulation and governance cannot and should not be viewed in isolation. Attempts to raise directors' ability to soundly and effectively monitor controlling shareholders are more likely to be successful if bank-level governance is accompanied by a strict supervisory regime.

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Table 1: Number of banks in each country

Country	Number of listed banks	Number of banks in the sample	Total assets of the sample banks divided by total assets of all listed banks in Bankscope (%)
Austria	6	5	99.91
Belgium	4	3	98.98
Denmark	28	14	98.88
Finland	4	3	81.36
France	9	9	100
Germany	13	12	99.99
Greece	7	6	99.26
Ireland	2	2	100
Italy	19	16	99.13
Luxembourg	2	1	97.52
Netherlands	5	4	99.68
Norway	2	2	100
Portugal	4	3	93.78
Spain	7	7	100
Sweden	5	4	99.99
Switzerland	16	15	93.49
United Kingdom	12	12	100
Total	145	118	97.54

Table 2. Summary of Corporate Governance Codes on independent directors

Country	First code	Last update	Definition of criteria of independence			Presence of independent directors			Presence of minority directors	Disclosure on Controlling shareholders
			General ^a	Managers	Controlling shareholders	General ^a	Managers	Controlling shareholders		
Austria	2002	2012	N	N	Y	Majority / C	N	≥ 1 / C	N	N
Belgium	1995	2009	Y	Y	Y	≥ 3 / C	N	N	N	Y
Denmark	2000	2014	Y	Y	Y	Majority / C	N	N	N	N
Finland	2003	2015	Y	Y	Y	Majority / C	N	≥ 2 / C	N	N
France	1995	2016	Y	Y	Y	Majority for widely held, 33% for concentrated / C	N	N	N	N
Germany	1996	2015	N	N	N	Sufficient number / C	N	N	N	Y
Greece	1999	2013	Y	Y	Y	≥ 30% / C	N	N	N	N
Ireland	1991	2013	Y	Y	Y	Majority / C	N	N	N	N
Italy	1999	2015	Y	Y	Y	≥ 2 / C	N	N	Y / R	N
Luxembourg	2006	2013	Y	Y	Y	≥ 2 / C	N	N	N	N
Netherlands	1996	2016	Y	Y	Y	Majority / C	N	≥ 1 / C	N	N
Norway	2004	2014	Y	N	Y	Majority / C	N	≥ 2 / C	N	N
Portugal	1999	2012	Y	Y	Y	25% / C	N	N	N	N
Spain	1996	2015	Y	Y	Y	Majority / C	N	N	Y / R	Y
Sweden	1994	2015	Y	Y	Y	Majority / C	N	≥ 2 / C	N	N
Switzerland	2002	2014	N	N	Y	Majority / C	N	N	N	N
UK	1992	2014	Y	Y	Y	Majority / C	N	N	N	N

Source: Corporate Governance Code, European Corporate Governance Institute.

Note: N = No; Y = Yes; C = Comply or Explain; R = Recommendation.

^a Criteria of independence are defined, but without indicating what the independence is relative to.

Table 3: Variable definition, data sources and summary statistics

Variables	Definition	Source	Mean	Median	Standard Deviation	Min.	Max
<i>Dependent variables</i>							
Tobin_Q	Bank value: Book value of assets minus the book value of equity plus the market value of equity divided by the book value of assets	Bloomberg	1.07	0.99	0.38	0.56	6.74
DD	Distance to default computed using the Merton model (see Appendix 4 for details).	Bloomberg, Bankscope	3.31	2.84	3.08	-5.45	19.51
<i>Indices of relatedness of board of directors</i>							
Minority	Index on the relatedness of board of directors to minority shareholders having either						
	- less than 20% of relative power						
	- less than 20% of control rights						
		Bloomberg, annual reports	3.47	2	3.55	0	10
Controlling	Index on the relatedness of board of directors to controlling shareholders having either	(Details on the calculation of these indices are given in Appendix 3)					
	- more than 20% of relative voting power						
	- more than 20% of control rights						
			2.13	0	3.25	0	10
Independent	Index on the independence of board of directors to both controlling and minority shareholders						
	- at the threshold of 20% of relative voting power						
	- at the threshold of 20% of control rights						
			6.43	6.5	2.85	0	10
Manager	Percentage of directors that are related to managers.	Annual Reports	51.57	50.00	27.81	0	100

Bank-level variables

BoardSize	Natural logarithm of the number of directors on the board	Bloomberg	2.31	2.40	0.50	0.69	3.25
Size	Natural logarithm of Total Assets		16.94	16.95	2.83	8.60	21.75
Risk	The standard deviation of monthly stock returns over the last twelve months		2.79	0.33	29.24	0.20	522.7
GrowthAsset	The annual change in total asset from year t to year t-1 divided by total assets year t-1 (%)	Bankscope	0.09	0.02	0.70	-0.35	12.67
Loan	The ratio of gross loan to total assets (%)		0.49	0.54	0.25	0	0.91
Capital	Total equity divided by total assets (%)		0.14	0.07	0.18	-0.02	0.99
Deposit	Deposits divided by total assets (%)		0.58	0.57	0.20	0.01	0.94
Operating ratio	The ratio of total operating expenses over total operating income (%)		1.38	1.49	7.82	-3.75	23.56
ROE	Return on equity ratio (%)		0.15	0.05	2.55	-3.12	6.70

Country-level variables

GDP	GDP growth rate (%)	World Bank	0.36	0.58	1.61	-4.02	3.59
Legal	Product of Revised anti-director index (RADI) and index Rule of Law (RoL)	Djankov et al. (2008)					
	<ul style="list-style-type: none"> • RADI: Takes the value of 1 for each of these indicators: Vote by mail, Shares not deposited, Cumulative voting, Oppressed non-controlling, Pre-emptive rights and Capital to call a meeting • RoL: index measuring the quality of law enforcement 	Worldwide Governance Indicators (World Bank)	5.24	5.27	2.32	0.71	8.83
SupPow	Index measuring the strength of supervisory regime. The yes/no responses to the following questions are coded as 1/0: (1) Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? (2) Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? (3) Can supervisors take legal action against external auditors for negligence? (4) Can the supervisory authority force a bank to change its internal organizational structure? (5) Are off-balance sheet items disclosed to supervisors? (6) Can the supervisory agency order the bank's directors or management to constitute	Bank regulation and supervision database (The World Bank 2003)	10	11	2.33	4	13

provisions to cover actual or potential losses? (7) Can the supervisory agency suspend directors' decision to distribute: (a) Dividends? (b) Bonuses? (c) Management fees? (8) Can the supervisory agency legally declare - such that this declaration supersedes the rights of bank shareholders - that a bank is insolvent? (9) Does the Banking Law give authority to the supervisory agency to intervene that is, suspend some or all ownership rights in a problem bank? And (10) Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency do the following: (a) Supersede shareholder rights? (b) Remove and replace management? (c) Remove and replace directors? A higher value indicates wider and stronger authority for bank supervisors.

Instrument variables

indy	Independence : percentage of years since 1776 that a country has been independent		0.94	1	0.18	0.29	1
avelf	Ethnic fractionalization - probability that two randomly selected individuals in a country will not speak the same language		0.12	0.07	0.11	0.0025	0.36
lat_llsv	Latitude: absolute value of the latitude of a country		0.54	0.56	0.09	0.20	0.71
legor_uk	British legal origin (dummy variable)	Beck et al. (2003)	0.12	0	0.33	0	1
legor_fr	French legal origin (dummy variable)		0.40	0	0.49	0	1
legor_ge	German legal origin (dummy variable)		0.27	0	0.45	0	1
legor_sc	Scandinavian legal origin (dummy variable)		0.21	0	0.40	0	1
RoL	Rule of Law	Worldwide Governance Indicators (2016)	1.45	1.72	0.59	0.24	2.12
Avg_DepRel	Average of the percentage of directors related to controlling shareholders in a country	-	2.12	2.33	1.09	0	5.5

Table 4: Statistics on ownership structure (threshold of control at 20%)

	% of widely held banks	% of controlled banks	Controlled banks				
			Banks with only direct controlling shareholders (%)	Banks with pyramidal structure (%)	Average voting rights of the biggest shareholder (%)	Average voting rights of controlling shareholders (%)	Average voting rights of minority shareholders (%)
Austria	20	80	0	80	71.25	71.25	28.75
Belgium	0	100	33.33	66.67	41.34	41.34	58.66
Denmark	57.14	42.86	28.57	14.29	51.96	55.76	44.24
Finland	33.33	66.67	33.33	33.33	61.35	61.35	38.65
France	14.29	85.71	57.14	28.57	54.46	63.15	36.85
Germany	33.33	66.67	41.67	25	66.67	66.67	33.34
Greece	0	100	50	50	53.11	58.16	41.84
Ireland	50	50	50	0	99.42	99.42	0.58
Italy	25	75	50	25	48.65	55.51	44.49
Luxembourg	100	0	0	0	-	-	-
Netherlands	50	50	50	0	97.81	97.81	2.19
Norway	0	100	100	0	32.50	32.50	67.50
Portugal	66.67	33.33	33.33	0	46.22	46.22	53.78
Spain	42.86	57.14	28.57	28.57	48.42	48.42	51.58
Sweden	50	50	25	25	21.20	21.20	78.80
Switzerland	50	50	14.29	35.71	56.49	59.34	40.66
United Kingdom	58.33	41.67	33.33	8.33	49.74	55.11	44.89
AVERAGE	38	62	-	-	56.29	58.33	41.67

Table 5: Statistic on relatedness of board of directors to shareholders in widely held and controlled banks (threshold of control at 20%)

	Controlled banks				Widely held banks				
	Number of directors (average)	Relatedness to shareholders			Number of directors (average)	Relatedness to shareholders		Relatedness to managers	
		Related directors to Controlling SH (%)	Related directors to minority SH (%)	Independent directors from shareholders (%)		Related directors to minority SH (%)	Independent directors from minority SH (%)	Related directors to managers (%)	Independent directors from managers (%)
Austria	18.2	14.47	27.63	57.89	15	26.67	73.33	66.67	33.33
Belgium	15.33	23.91	10.87	65.22	-	-		-	-
Denmark	9.21	17.54	3.51	78.95	9	5.56	94.44	74.60	25.40
Finland	7.67	6.67	6.67	86.67	8	75	25	12.50	87.50
France	11.86	26.09	20.29	53.62	14	14.29	85.71	28.57	71.43
Germany	10.5	22.37	3.95	73.68	12.5	4	96	70	30
Greece	14.5	0	3.45	96.55	-	-		-	-
Ireland	12.5	0	9.09	90.91	14	14.29	85.71	42.86	57.14
Italy	13	14.49	10.87	74.64	17.5	24.29	75.71	34.41	65.59
Luxembourg	-	-	-	-	8	0	100	37.50	62.50
Netherlands	7.75	5.26	5.26	89.47	6	25	75	0	100
Norway	6.5	0	15.38	84.62	-	-	-	-	-
Portugal	22	13.04	15.22	71.74	20	5	95.00	65	35
Spain	13.57	13.73	62.75	23.53	14.67	72.73	27.27	36.01	63.99
Sweden	11	3.85	26.92	69.23	9	38.89	61.11	45.83	54.17
Switzerland	7.86	35	5	60	8.33	12	88	50.21	49.79
United Kingdom	12	6.12	34.69	59.18	13.57	60	40	41.51	58.49
AVERAGE	11.55	13.44	18.29	68.27	11.67	29.18	70.82	43.88	56.12

Note: SH=Shareholders

Table 6: Statistic on the relatedness of board of directors to shareholders according to different criteria (threshold of control at 20%)

	Controlled banks					Widely held banks				
	Employee of shareholder(s) (%)	Shareholder of the bank (%)	Same family name with shareholder(s) (%)	Shareholder of shareholders of the bank (%)	Politician / Employee of government agency (%)	Employee of shareholder(s) (%)	Shareholder of the bank (%)	Same family name with shareholder(s) (%)	Shareholder of shareholders of the bank (%)	Politician / Employee of government agency (%)
Austria	100	0	0	0	0	100	0	0	0	0
Belgium	87.50	0	0	0	12.50	-	-	-	-	-
Denmark	100	0	0	0	0	100	0	0	0	0
Finland	80.00	20.00	0	0	0	100	0	0	0	0
France	88.89	2.78	8.33	0.00	0	100	0	0	0	0
Germany	94.74	5.26	0	0	0	100	0	0	0	0
Greece	100.00	0.00	0	0	0	-	-	-	-	-
Ireland	100	0	0	0	0	50	0	0	0	50
Italy	64.71	35.29	0	0	0	100	0	0	0	0
Luxembourg	-	-	-	-	-	0	0	0	0	0
Netherlands	100	0	0	0	0	100	0	0	0	0
Norway	100	0	0	0	0	-	-	-	-	-
Portugal	85.71	7.14	7.14	0	0	100	0	0	0	0
Spain	16.67	83.33	0	0	0	11.76	85.29	2.94	0	0
Sweden	100	0	0	0	0	85.71	14.29	0	0	0
Switzerland	80.65	0	0	19.35	0	16.67	83.33	0	0	0
United Kingdom	26.32	68.42	5.26	0	0	33.33	64.91	1.75	0	0
AVERAGE	82.82	13.89	1.30	1.21	0.78	76.73	19.06	0.36	0	3.85

Table 7: Relatedness of directors to shareholders and agency conflicts in controlled banks (Eq. (1) using threshold of control at 20% of relative voting power, GLS random effects estimators)

	Tobin's Q				Distance to default			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	0.0695*** (7.58)		0.0624*** (4.82)		0.124*** (7.04)		0.124*** (6.73)	
Controlling		-0.0187*** (-2.96)	-0.0164* (-1.82)			-0.0516*** (-3.92)	-0.0485*** (-3.47)	
Independent				-0.0253** (-2.13)				-0.0243 (-1.00)
BoardSize	0.0189 (0.23)	0.179*** (3.72)	0.0216 (0.26)	-0.0275 (-0.29)	0.833*** (6.61)	1.004*** (8.08)	0.873*** (5.80)	0.882*** (5.09)
Size	-0.129*** (-7.82)	-0.158*** (-9.65)	-0.124*** (-6.96)	-0.133*** (-6.75)	-0.376*** (-13.64)	-0.313*** (-10.14)	-0.380*** (-12.53)	-0.307*** (-8.76)
Growth	-0.158** (-2.00)	-0.151* (-1.88)	-0.157** (-1.99)	-0.173** (-2.15)	1.440*** (9.55)	1.703*** (11.90)	1.297*** (8.75)	1.689*** (10.30)
Capital	-1.070*** (-5.81)	-0.890*** (-4.95)	-0.897*** (-5.06)	-0.860*** (-4.38)	5.120*** (10.00)	6.486*** (12.14)	4.976*** (9.78)	6.517*** (11.64)
Loan	-0.405*** (-3.26)	-0.425*** (-4.18)	-0.468*** (-3.20)	-0.425*** (-3.20)	0.820*** (3.82)	0.860*** (4.51)	0.649*** (2.83)	1.003*** (4.97)
Risk	0.00309*** (3.81)	0.00277*** (3.69)	0.00289*** (3.54)	0.00272*** (3.44)				
Deposit					-2.562*** (-10.20)	-2.495*** (-9.62)	-2.338*** (-9.56)	-2.689*** (-9.64)
Operating					0.00124 (1.13)	0.000865 (0.74)	0.000915 (0.86)	0.00146 (1.21)
ROE					0.00428 (0.31)	0.00382 (0.26)	-0.000163 (-0.01)	0.0109 (0.72)
Legal	-0.0624*** (-4.98)	-0.0446*** (-4.03)	-0.0620*** (-4.84)	-0.0450*** (-3.50)	0.0145 (0.64)	0.0563** (2.56)	-0.000279 (-0.01)	0.0515** (2.19)
GDP	-0.00388 (-0.47)	-0.00460 (-0.56)	-0.00188 (-0.23)	-0.00750 (-0.85)	-0.00348 (-0.21)	0.00720 (0.44)	0.0186 (1.01)	0.00417 (0.21)
_cons	3.671*** (18.38)	3.895*** (16.35)	3.649*** (16.73)	4.112*** (15.18)	5.651*** (9.02)	4.180*** (6.76)	5.852*** (10.06)	4.422*** (5.76)
N	216	216	216	216	220	220	220	220
Robust Hausman test								
Chi-square	5.577	3.841	5.177	4.717	8.072	8.656	8.085	8.429
p-value	0.6945	0.8712	0.7385	0.7874	0.5269	0.4696	0.5256	0.4915

See Table 3 for Definition of variables. z-statistics are in parentheses, with *, **, and *** denote significance at 10%, 5% and 1%

Table 8: Relatedness of directors to shareholders and agency conflicts in controlled banks (Eq. (1) using threshold of control at 20% of control rights, GLS random effects estimators)

	Tobin's Q				Distance to default			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	0.0600*** (6.41)		0.0534*** (5.72)		0.0954*** (5.54)		0.0867*** (4.38)	
Controlling		-0.0287*** (-3.05)	-0.0175** (-2.12)			-0.0532*** (-3.89)	-0.0271* (-1.70)	
Independent				-0.0242 (-1.59)				-0.0195 (-0.71)
BoardSize	-0.0682 (-0.67)		-0.0797 (-0.82)	-0.0127 (-0.13)	0.761*** (6.90)	1.000*** (9.12)	0.697*** (5.37)	0.897*** (5.16)
Size	-0.119*** (-6.46)	-0.131*** (-10.33)	-0.112*** (-6.09)	-0.138*** (-7.03)	-0.359*** (-12.53)	-0.308*** (-10.40)	-0.335*** (-11.47)	-0.302*** (-8.60)
Growth	-0.150* (-1.89)	-0.170** (-2.11)	-0.149* (-1.89)	-0.173** (-2.17)	1.483*** (9.20)	1.699*** (11.62)	1.475*** (9.22)	1.715*** (10.58)
Capital	-1.027*** (-5.44)	-0.968*** (-5.26)	-1.027*** (-5.60)	-0.938*** (-4.61)	5.224*** (9.68)	6.447*** (11.94)	5.411*** (9.99)	6.624*** (11.77)
Loan	-0.407*** (-3.29)	-0.586*** (-4.58)	-0.533*** (-3.91)	-0.513*** (-3.27)	0.888*** (3.86)	0.805*** (4.17)	0.797*** (2.97)	0.998*** (4.61)
Risk	0.00294*** (3.72)	0.00214*** (2.93)	0.00267*** (3.36)	0.00275*** (3.48)				
Deposit					-2.704*** (-10.95)	-2.528*** (-9.71)	-2.670*** (-10.83)	-2.661*** (-9.57)
Operating					0.00129 (1.12)	0.000831 (0.71)	0.00116 (1.02)	0.00143 (1.19)
ROE					0.00679 (0.47)	0.00424 (0.29)	0.00752 (0.53)	0.0107 (0.71)
Legal	-0.0599*** (-4.75)	-0.0331*** (-3.04)	-0.0592*** (-4.72)	-0.0436*** (-3.22)	0.0373* (1.79)	0.0569*** (2.72)	0.0168 (0.71)	0.0513** (2.15)
GDP	-0.00417 (-0.48)	-0.00303 (-0.34)	-0.00100 (-0.12)	-0.00652 (-0.74)	-0.00338 (-0.19)	0.00329 (0.21)	0.0124 (0.66)	0.00431 (0.22)
_cons	3.710*** (17.69)	3.944*** (16.47)	3.758*** (17.53)	4.203*** (15.21)	5.560*** (8.99)	4.139*** (6.79)	5.466*** (8.69)	4.243*** (5.49)
N	216	216	216	216	220	220	220	220
Robust Hausman test								
Chi-square	5.010	3.962	4.870	4.730	8.269	8.649	8.275	8.477
p-value	0.7565	0.8606	0.7714	0.7860	0.5073	0.4703	0.5067	0.4869

See Table 3 for Definition of variables. z-statistics are in parentheses, with *, **, and *** denote significance at 10%, 5% and 1%.

Table 9: Relatedness of directors to shareholders and agency conflicts in widely held banks (Eq. (1) using threshold of control at 20% of relative voting power or control rights, GLS random effects estimators)

	Relative voting power				Control rights			
	Tobin's Q		Distance to default		Tobin_Q		Distance to default	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	0.00470** (2.01)	0.00728** (2.50)	-0.0390 (-1.46)	-0.00483 (-0.19)	0.00408* (1.80)	0.00722** (2.38)	-0.0479* (-1.77)	-0.00562 (-0.21)
Manager		0.000547 (1.48)		0.0181*** (5.14)		0.000529 (1.39)		0.0182*** (5.08)
BoardSize	-0.0222 (-1.06)	-0.0256 (-1.10)	-0.115 (-0.47)	-0.286 (-1.31)	-0.0233 (-1.10)	-0.0287 (-1.19)	-0.0588 (-0.23)	-0.276 (-1.23)
Size	-0.00452 (-1.09)	-0.00568 (-1.16)	-0.0292 (-0.46)	0.00897 (0.12)	-0.00292 (-0.72)	-0.00400 (-0.84)	-0.0335 (-0.53)	0.0163 (0.23)
Growth	0.0852** (2.13)	0.0824** (1.98)	3.015*** (3.81)	2.855*** (4.00)	0.0821** (2.04)	0.0753* (1.80)	3.185*** (4.00)	2.882*** (4.04)
Capital	0.0187 (0.36)	-0.0351 (-0.54)	16.94*** (5.54)	18.18*** (5.80)	0.0413 (0.77)	-0.00650 (-0.09)	17.42*** (5.67)	18.59*** (5.93)
Loan	-0.0855*** (-3.26)	-0.110*** (-3.10)	-0.0866 (-0.15)	-0.811* (-1.79)	-0.0679** (-2.35)	-0.0869** (-2.19)	-0.112 (-0.19)	-0.867* (-1.85)
Risk	-0.0000381 (-0.60)	-0.0000914 (-0.80)			-0.0000314 (-0.38)	-0.0000787 (-0.67)		
Deposit			-2.878*** (-4.18)	-2.139*** (-3.26)			-2.948*** (-4.25)	-2.139*** (-3.25)
Operating			0.0171 (0.88)	0.0337* (1.95)			0.0161 (0.83)	0.0330* (1.90)
ROE			0.540 (1.10)	0.0727 (0.17)			0.584 (1.18)	0.0524 (0.12)
Legal	0.00818** (2.20)	0.00765* (1.65)	0.0787 (1.55)	0.0694 (1.29)	0.00723** (2.01)	0.00657 (1.42)	0.0852* (1.69)	0.0735 (1.34)
GDP	0.00621** (2.23)	0.00605** (1.97)	0.211*** (3.80)	0.215*** (4.21)	0.00618** (2.22)	0.00619** (2.03)	0.217*** (3.89)	0.211*** (4.08)
_cons	1.099*** (15.66)	1.112*** (13.22)	1.283 (0.90)	0.120 (0.07)	1.069*** (15.00)	1.080*** (12.58)	1.244 (0.87)	-0.0712 (-0.04)
N	129	120	120	111	129	120	120	111
Robust Hausman test								
Chi-square	4.317	9.370	12.466	13.487	4.257	9.331	12.018	13.113
p-value	0.7427	0.3121	0.1883	0.1977	0.7497	0.3151	0.2123	0.2174

See Table 3 for Definition of variables. z-statistics are in parentheses, with *, **, and *** denote significance at 10%, 5% and 1%.

Table 10: Marginal effects for different levels of supervisory regimes (computed from Table A3 in Appendix 1)

Marginal effects at	Tobins' Q				Distance to default			
	SupPow (Q0)	SupPow (Q25)	SupPow (Q50)	SupPow (Q75)	SupPow (Q0)	SupPow (Q25)	SupPow (Q50)	SupPow (Q75)
<i>Controlled banks</i>								
Minority	-0.129*** (0.00)	0.037*** (0.00)	0.104*** (0.00)	0.170*** (0.00)	-0.052 (0.17)	0.109*** (0.00)	0.173*** (0.00)	0.238*** (0.00)
Controlling	-0.052** (0.04)	-0.033*** (0.00)	-0.026*** (0.00)	-0.018 (0.13)	0.0003 (0.99)	-0.023 (0.21)	-0.032** (0.02)	-0.041* (0.07)
Independent	0.078** (0.02)	-0.004 (0.73)	-0.037*** (0.00)	-0.069*** (0.001)	-0.130* (0.08)	-0.054** (0.02)	-0.023 (0.39)	0.008 (0.87)
<i>Widely held banks</i>								
Minority	0.004 (0.41)	0.005** (0.05)	0.005* (0.09)	0.005 (0.21)	0.041 (0.54)	0.002 (0.95)	-0.014 (0.64)	-0.030 (0.51)
Manager	0.003 (0.13)	0.001 (0.12)	0.0002 (0.49)	-0.0006 (0.37)	0.026** (0.02)	0.021*** (0.00)	0.019*** (0.00)	0.017** (0.02)

See Table 3 for Definition of variables. p-value are in parentheses, with *, **, and *** denote significance at 10%, 5% and 1%

Table 11: Marginal effects for different levels of minority shareholders protection (computed from Table A4 in Appendix 1)

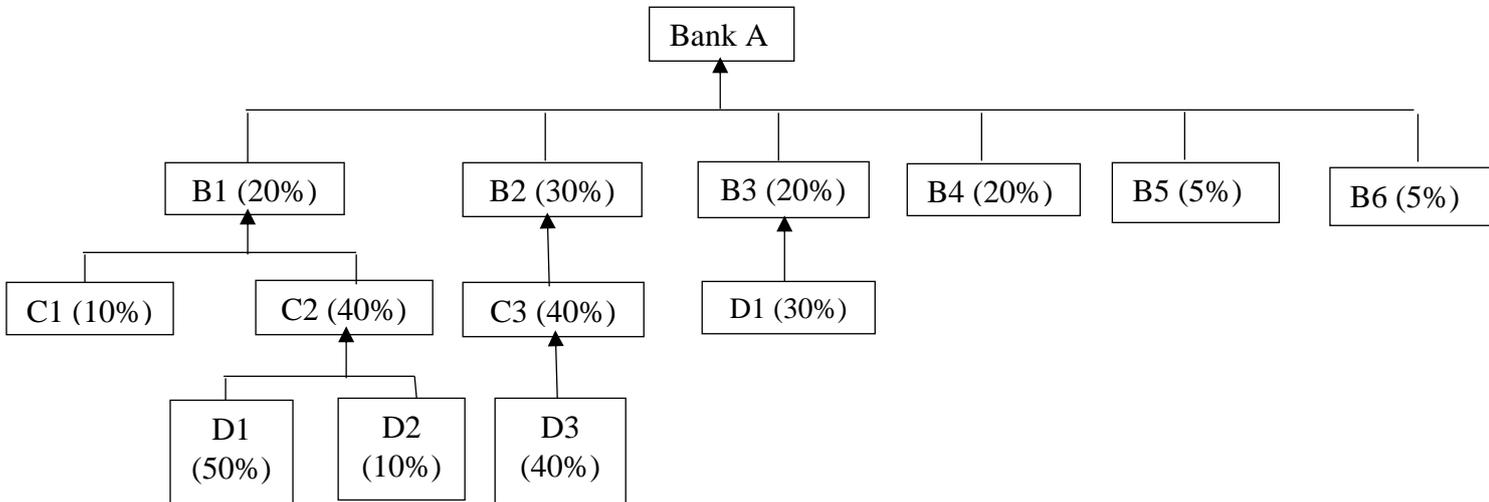
Marginal effects at	Tobin's Q				Distance to default			
	Legal (Q0)	Legal (Q25)	Legal (Q50)	Legal (Q75)	Legal (Q0)	Legal (Q25)	Legal (Q50)	Legal (Q75)
<i>Controlled banks</i>								
Minority	0.269*** (0.00)	0.108*** (0.00)	0.054*** (0.00)	-0.013 (0.31)	0.282*** (0.00)	0.178*** (0.00)	0.143*** (0.00)	0.099*** (0.00)
Controlling	-0.036** (0.02)	-0.011 (0.15)	-0.003 (0.69)	0.007 (0.47)	-0.083*** (0.00)	-0.048*** (0.00)	-0.036*** (0.01)	-0.021 (0.23)
Independent	-0.111*** (0.00)	-0.039*** (0.001)	-0.015 (0.20)	0.015 (0.32)	0.136** (0.01)	0.006 (0.82)	-0.038* (0.09)	-0.093*** (0.00)
<i>Widely held banks</i>								
Minority	0.007** (0.04)	0.007*** (0.01)	0.008*** (0.00)	0.008*** (0.00)	0.018 (0.78)	-0.005 (0.88)	-0.012 (0.64)	-0.021 (0.47)
Manager	0.0008 (0.569)	0.0007 (0.28)	0.0006 (0.15)	0.0006 (0.17)	0.071*** (0.00)	0.034*** (0.00)	0.022*** (0.00)	0.006 (0.17)

See Table 3 for Definition of variables. *p*-value are in parentheses, with *, **, and *** denote significance at 10%, 5% and 1%

Appendix 1

Figures and Tables

Figure A1. Example on the chain of control



We have two minority (non-controlling) shareholders: B5 and B6

We have three controlling shareholders:

- One direct controlling shareholder: B4, with 20% of control rights.
- Two indirect ultimate owners: D1 and D3, with respectively 40% (20% + 20%) and 30% of control rights.

Coalitions are possible between D1 and D3, and between B4 and D1 to obtain a total control rights of at least 51%.

Table A1. Matrix of correlation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Tobin_Q	1																		
2 DD	0.660***	1																	
3 Minority (BPI)	0.105*	0.134**	1																
4 Controlling (BPI)	-0.0728	-0.0309	-0.147**	1															
5 Independent (BPI)	-0.0286	-0.0996*	-0.825***	-0.297***	1														
6 Minority (CR)	0.0902	0.137**	0.916***	-0.0552	-0.805***	1													
7 Controlling (CR)	-0.0366	-0.0406	-0.0945	0.829***	-0.276***	-0.194***	1												
8 Independent (CR)	-0.0349	-0.0909	-0.815***	-0.257***	0.970***	-0.819***	-0.251***	1											
9 Manager	0.0454	0.182***	-0.0350	0.293***	-0.0448	-0.0221	0.295***	-0.0166	1										
10 BoardSize	-0.157**	-0.111*	0.148**	0.0412	-0.207***	0.203***	0.00149	-0.213***	0.0487	1									
11 Size	-0.374***	-0.393***	0.235***	-0.129*	-0.216***	0.184***	-0.0513	-0.222***	-0.276***	0.056	1								
12 GrowthAsset	0.114*	0.0663	0.0274	0.0936	-0.0688	0.0311	0.0779	-0.0634	0.0904	-0.102*	-0.0949	1							
13 Capital	0.391***	0.629***	0.0217	0.0808	-0.00917	0.0343	0.0587	0.0150	0.231***	-0.210***	-0.561***	-0.0112	1						
14 Loan	-0.197***	-0.398***	0.00674	-0.122*	0.0603	0.0123	-0.134**	0.0758	0.0254	0.183***	0.205***	-0.0792	-0.464***	1					
15 Risk	-0.0119	-0.0285	-0.0512	-0.0424	0.0634	-0.0548	-0.0330	0.0643	0.0777	0.00436	0.00833	-0.0128	-0.0185	0.0218	1				
16 Deposit	-0.181***	-0.268***	-0.123*	0.0157	0.0866	-0.114*	-0.0121	0.123*	0.0743	-0.200**	-0.181***	0.0553	-0.373***	0.438***	0.0264	1			
17 Operating	-0.00106	-0.0240	-0.0388	-0.0546	0.0598	-0.0407	-0.0522	0.0620	-0.0427	0.0146	0.0245	-0.00453	-0.0567	0.0708	0.00881	0.0272	1		
18 Legal	-0.0293	0.0727	0.193***	-0.109*	-0.116*	0.172***	-0.0828	-0.145**	-0.00331	-0.257***	0.0129	-0.0692	-0.0529	0.0158	0.0625	0.0617	-0.0905	1	
19 GDP	0.0621	0.107*	0.173***	0.0652	-0.184***	0.151**	0.0762	-0.179***	0.0952	-0.199***	-0.00675	-0.0523	0.0972	-0.190***	0.0432	-0.00989	-0.171***	0.579***	1

Note: BPI = the “Banzhaf Power Index” (BPI) is used to measure the relative voting power of each controlling shareholder; CR = control rights are used to differentiate between controlling or minority shareholders.

Table A2: Tests of endogeneityI/ Sample of controlled banks (Eq. (1) using threshold of control at 20% of relative voting power)

	Tobin's Q			Distance to default		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	0.0299 (0.79)			0.206 (1.41)		
Controlling		-0.0512 (-1.37)			-0.107 (-1.02)	
Independent			-0.0131 (-0.17)			-0.0347 (-0.20)
BoardSize	0.0165 (0.18)	0.0554 (0.51)	0.0124 (0.12)	0.660** (2.06)	0.858** (2.50)	0.692** (2.03)
Size	-0.0774*** (-3.92)	-0.0732*** (-3.24)	-0.0746*** (-3.66)	-0.306*** (-3.96)	-0.271*** (-3.74)	-0.272*** (-3.73)
Growth	-0.0802 (-0.88)	-0.0660 (-0.73)	-0.0774 (-0.84)	0.627 (1.27)	0.880* (1.83)	0.797* (1.66)
Capital	-0.318 (-1.12)	-0.247 (-0.81)	-0.250 (-0.87)	6.399*** (5.36)	7.152*** (6.73)	7.092*** (6.49)
Loan	-0.203 (-1.33)	-0.249 (-1.37)	-0.193 (-1.16)	0.253 (0.42)	0.332 (0.56)	0.558 (1.01)
Risk	-0.000200 (-0.13)	-0.000628 (-0.43)	-0.000317 (-0.21)			
Deposit				-1.716** (-2.39)	-1.858*** (-2.64)	-2.028*** (-3.01)
Operating				0.000221 (0.11)	0.0000388 (0.02)	0.000273 (0.14)
ROE				-0.00576 (-0.24)	-0.00546 (-0.22)	-0.00281 (-0.12)
Legal	-0.0193 (-0.98)	-0.0122 (-0.63)	-0.0128 (-0.65)	0.00655 (0.09)	0.0621 (1.08)	0.0710 (1.21)
GDP	-0.00491 (-0.50)	-0.0000413 (-0.00)	-0.00542 (-0.51)	-0.0620 (-1.24)	-0.0282 (-0.51)	-0.0583 (-1.08)
_cons	2.503*** (8.42)	2.549*** (7.21)	2.587*** (3.23)	4.442*** (3.02)	3.858*** (2.78)	4.137* (1.77)
N	217	217	217	222	222	222
Instrument variables	Aself legor_fr	avg_DelRel indy	Legor_sc	avelf legor_fr	avg_DelRel lat_llsv	lat_llsv avelf
F-test	12.33 [0.00]	13.51 [0.00]	11.10 [0.00]	11.46 [0.00]	10.66 [0.00]	13.31 [0.00]
LM statistics	23.20 [0.00]	25.17 [0.00]	11.049 [0.00]	21.92 [0.00]	20.53 [0.00]	13.23 [0.00]
Hasen statistic	1.641 [0.20]	0.002 [0.96]	- -	0.608 [0.44]	0.223 [0.64]	0.223 [0.64]
Endogeneity test	0.12 [0.99]	3.67 [0.88]	0.09 [1.00]	1.17 [0.98]	0.78 [0.99]	0.15 [0.99]

See Table 3 for Definition of variables. z-statistics are in parentheses of 2SLS regressions, p-values are in parentheses of tests of endogeneity, with *, **, and *** denote significance at 10%, 5% and 1%

II/ Sample of controlled banks (Eq. (1) using threshold of control at 20% of control rights)

	Tobin's Q			Distance to default		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	0.0724*			0.190		
	(1.67)			(1.43)		
Controlling		-0.0503			-0.118	
		(-1.29)			(-1.10)	
Independent			0.0449			-0.0386
			(0.71)			(-0.24)
BoardSize	-0.0686	0.00500	0.0409	0.405	0.692**	0.691**
	(-0.62)	(0.05)	(0.39)	(1.03)	(2.16)	(2.07)
Size	-0.0687***	-0.0646***	-0.0715***	-0.264***	-0.250***	-0.272***
	(-3.25)	(-2.78)	(-3.35)	(-3.53)	(-3.33)	(-3.76)
Growth	-0.0885	-0.0772	-0.0721	0.609	0.824*	0.803*
	(-0.95)	(-0.84)	(-0.77)	(1.24)	(1.72)	(1.69)
Capital	-0.434	-0.269	-0.190	6.403***	6.980***	7.109***
	(-1.41)	(-0.89)	(-0.65)	(5.29)	(6.43)	(6.66)
Loan	-0.227	-0.283	-0.234	0.195	0.250	0.561
	(-1.37)	(-1.50)	(-1.35)	(0.31)	(0.40)	(1.01)
Risk	-0.000192	-0.000616	-0.000537			
	(-0.13)	(-0.42)	(-0.35)			
Deposit				-1.822**	-2.005***	-2.011***
				(-2.56)	(-2.91)	(-2.97)
Operating				0.000147	-0.000202	0.000279
				(0.07)	(-0.01)	(0.14)
ROE				-0.00368	-0.00429	-0.00279
				(-0.15)	(-0.18)	(-0.12)
Legal	-0.0302	-0.0120	-0.00575	0.0124	0.0608	0.0706
	(-1.43)	(-0.63)	(-0.29)	(0.17)	(1.05)	(1.22)
GDP	-0.00471	-0.000885	-0.00280	-0.0631	-0.0325	-0.0580
	(-0.47)	(-0.09)	(-0.27)	(-1.25)	(-0.61)	(-1.11)
_cons	2.528***	2.515***	2.015***	4.420***	4.029***	4.157*
	(7.91)	(7.30)	(2.87)	(2.95)	(2.84)	(1.93)
N	217	217	217	222	222	222
Instrument variables	Legor_ge Legor_sc	avg_DepRel MINOR_20	avelf indy	Avelf Legor_fr	avg_DepRel lat_llsv	lat_llsv avelf
F-test	10.66 [0.00]	13.64 [0.00]	10.63 [0.00]	10.06 [0.00]	11.52 [0.00]	13.08 [0.00]
LM statistics	20.36 [0.00]	25.38 [0.00]	20.30 [0.00]	19.47 [0.00]	22.02 [0.00]	24.66 [0.00]
Hasen statistic	1.423 [0.23]	0.185 [0.67]	0.124 [0.72]	0.316 [0.57]	0.024 [0.88]	0.203 [0.65]
Endogeneity test	1.18 [0.98]	1.49 [0.96]	0.07 [1.00]	1.94 [0.93]	0.99 [0.98]	0.49 [0.99]

See Table 3 for Definition of variables. z-statistics are in parentheses of 2SLS regressions, p-values are in parentheses of tests of endogeneity, with *, **, and *** denote significance at 10%, 5% and 1%

III/ Sample of widely held banks (Eq. (1) using threshold of control at 20% of relative voting power or control rights)

	Relative voting power		Control rights	
	Tobin's Q	Distance to default	Tobin's Q	Distance to default
Minority	0.0107 (0.55)	0.358 (1.60)	0.0243 (1.42)	0.613** (2.05)
BoardSize	-0.0908* (-1.70)	-0.897 (-1.38)	-0.124** (-2.15)	-1.292* (-1.87)
Size	0.00210 (0.13)	-0.187 (-0.87)	-0.000763 (-0.05)	-0.246 (-1.04)
Growth	0.192*** (2.86)	0.612 (0.99)	0.187*** (2.77)	0.579 (0.94)
Capital	0.235 (1.14)	20.35*** (5.63)	0.213 (1.04)	18.95*** (5.19)
Loan	-0.0635 (-0.72)	-2.154* (-1.67)	-0.0417 (-0.44)	-1.645 (-1.15)
Risk	-0.0000138 (-0.09)		0.00000264 (0.02)	
Deposit		-0.338 (-0.33)		-0.231 (-0.22)
Operating		0.00902 (0.65)		0.0104 (0.75)
ROE		-0.140 (-0.29)		-0.142 (-0.29)
Legal	0.00881 (0.71)	0.0779 (0.46)	0.00256 (0.20)	-0.00443 (-0.02)
GDP	0.00378 (0.69)	0.0962** (2.07)	0.00387 (0.70)	0.0874* (1.90)
_cons	1.099*** (3.51)	4.496 (1.13)	1.200*** (4.29)	5.653 (1.31)
N	129	121	129	121
Instrument variables	legor_uk legor_fr	legor_ge legor_sc	legor_ge legor_sc	RoL avelf
F-test	14.68 [0.00]	14.70 [0.00]	17.25 [0.00]	12.64 [0.00]
LM statistics	25.70 [0.00]	25.73 [0.00]	29.30 [0.00]	22.96 [0.00]
Hasen statistic	1.292 [0.26]	0.135 [0.71]	1.035 [0.31]	0.554 [0.46]
Endogeneity test	2.15 [0.98]	2.17 [0.98]	0.22 [1.00]	7.49 [0.76]

See Table 3 for Definition of variables. z-statistics are in parentheses of 2SLS regressions, p-values are in parentheses of tests of endogeneity, with *, **, and *** denote significance at 10%, 5% and 1%

Table A3: Role of institutional and regulatory environment (Eq. (2) using threshold of control at 20% of relative voting power, GLS random effects estimators)

	Env = Supervisory Regime				Env = Shareholder protection			
	Tobin's Q		Distance to default		Tobin's Q		Distance to default	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	-0.129*** (-7.18)		-0.0519 (-1.36)		0.269*** (13.11)		0.282*** (6.97)	
Minority * Env	0.0333*** (10.88)		0.0322*** (4.43)		-0.0461*** (-11.45)		-0.0299*** (-4.42)	
Controlling	-0.0515** (-1.98)		0.000301 (0.01)		-0.0358** (-2.34)		-0.0832*** (-3.20)	
Controlling * Env	0.00368 (0.93)		-0.00458 (-0.61)		0.00703** (2.17)		0.0101* (1.74)	
Independent		0.0782** (2.25)		-0.130* (-1.70)		-0.111*** (-4.32)		0.136** (2.46)
Independent * Env		-0.0164*** (-2.88)		0.0153 (1.20)		0.0206*** (3.82)		-0.0374*** (-3.20)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	216	216	220	220	216	216	220	220
Robust Hausman test								
Chi 2 - stat	3.486	4.508	7.993	8.495	5.947	4.584	8.779	9.371
p-value	0.8367	0.7198	0.4341	0.3867	0.8197	0.8690	0.6423	0.4973

See Table 3 for Definition of variables. In the main tests, z-statistics are in parentheses. In the marginal effects tests, p-value is given in parentheses. *, **, and *** denote significance at 10%, 5% and 1%.

Table A4: Role of institutional and regulatory environment (Eq. (2) using threshold of control at 20% of relative voting power, GLS random effects estimators)

	Env = Supervisory regime		Env = Shareholder protection	
	Tobin_Q (1)	Distance to default (2)	Tobin's Q (3)	Distance to default (4)
Minority	0.00420 (0.82)	0.0410 (0.61)	0.00668** (2.29)	0.0178 (0.27)
Minority * Env	0.000132 (0.15)	-0.00787 (-0.71)	0.000180 (0.19)	-0.00639 (-0.52)
Manager	0.00318 (1.51)	0.0261** (2.22)	0.000793 (0.57)	0.0714*** (4.16)
Manager * Env	-0.000421 (-1.42)	-0.00104 (-0.34)	-0.0000349 (-0.14)	-0.0107*** (-3.44)
Control variables	Yes	Yes	Yes	Yes
N	120	111	120	111
Robust Hausman test				
Chi 2 – stat	8.679	14.925	11.212	15.099
p-value	0.2766	0.1030	0.2614	0.2361

See Table 3 for Definition of variables. In the main tests, z-statistics are in parentheses. *, **, and *** denote significance at 10%, 5% and 1%.

Appendix 2

The Banzhaf Power Index (BPI)¹⁷

1. Notation

A coalition is any group of players that join forces to vote together.

- The total number of votes controlled by a coalition is called the *weight of the coalition*.
- A *winning coalition* is one with enough votes to win.
- A *losing coalition* is one without enough votes to win.
- A player whose desertion of a winning coalition turns it into a losing one is called a critical player.
- A player's power is proportional to the number of times the player is critical.
- The quota is the minimum number votes needed to pass a decision.

2. Computing the BPI for Player P

STEP 1: Determine all WINNING coalitions.

STEP 2: Determine the critical players in each winning coalition.

STEP 3: Find the number of times all players are critical.

STEP 4: Find the number of times Player P is critical.

STEP 5: $BPI(P)$ is the number of times Player P is critical (from STEP 4) divided by the number of times all players are critical (from STEP 3).

3. Example

We determine relative voting power BPI for ultimate owners of bank A in the control chain in the Appendix 1.

Voting rights of B4, D3, D1 are 20%, 30%, 40% respectively. The quota is 51%.

STEP 1: Determine all WINNING coalitions.

Winning Coalitions	Explanation
{D1, D3}	Shareholder D1 and D3 together have enough control rights to win.
{B4, D1}	Shareholder B4 and D1 together have enough control rights to win.
	There are 2 winning coalitions having two players.
{B3, D1, D3}	The coalition containing all 3 ultimate owners wins.

STEP 2: Determine the critical players in each winning coalition.

¹⁷ Extract from the website of the University of Alabama

To determine whether or not a Player is a critical Player in a winning coalition, count the number of votes the coalition has without that particular Player. If the coalition no longer has enough votes to win, then that Player is critical.

The critical Players are underlined below.

In {B4, D1}, both are critical since the coalition loses if either shareholder leaves.

In {D1, D3}, both are critical since the coalition loses if either shareholder leaves.

In {B4, D1, D3}, only D1 is critical since the coalition still wins if B4 leaves or if D3 leaves (but not if D1 leaves).

STEP 3: Find the number of times all players are critical.

5 (underlined above).

STEP 4: Find the number of times Player P is critical.

(See the underlined Players in STEP 2 above.)

D1 is critical 3 times, D3 is critical 1 time, B4 is critical 1 time.

STEP 5: $BPI(P)$ is the number of times Player P is critical (from STEP 4) divided by the number of times all players are critical (from STEP 3).

$$BPI(D1) = 3/5 = 0.6 \quad BPI(D3) = 1/5 = 0.2 \quad BPI(B4) = 1/5 = 0.2$$

Appendix 3

Construction of the indices of relatedness of directors

We assign weights to the four factors we consider in characterizing the relatedness of a director, by giving a weight of one (as compared to zero) for each of the following criteria: (1) the director is considered to be related to a shareholder; (2) the director is related to a controlling shareholder; (3) the relatedness between the director and the shareholder is current; or (4) the director is Chairman or Vice Chairman of the board.

For each director, we sum up the number of ones for all the connections they have with shareholders to obtain what we call the “score of relatedness” of a director. A “score of relatedness” is then computed at the bank level by taking the average of the “score of relatedness” of all directors. We then use these scores to compute our indices.

If the “score of relatedness” of a bank is zero, it indicates that its board of directors is totally independent from shareholders, and we set the index of relatedness at 0. For banks with a positive “score of relatedness”, we rank them into deciles to obtain an index of relatedness that ranges from 1 to 10. Finally, our index of relatedness of directors to shareholders varies from 0 to 10. The higher the index, the more the board of directors is related to shareholders.

We compute for both controlled and widely held banks the index $Minority_i$ that measures the presence/influence of minority directors in their board. For controlled banks, we additionally compute the index $Controlling_i$ that measures the presence/influence of directors that are related to controlling shareholders. An index measuring the presence/influence of independent directors in controlled banks is also computed by subtracting the average of the two indices of relatedness of board to controlling and to minority shareholders from the highest value of the index (i.e. from 10):

$$Independent_i = 10 - \frac{(Minority_i + Controlling_i)}{2}$$

The higher the index of independence, the more independent from shareholders is the bank.

Appendix 4

Merton (1977) approach to compute distance to default

According to this approach, firstly, we need solve the following nonlinear system of equations to find the value of assets (Va) and the volatility of assets (σ_a):

$$\begin{cases} Va * N(d1) - D * e^{-r*T} * N(d2) - Ve = 0 \\ \frac{Va}{Ve} * N(d1) * \sigma_a - \sigma_e = 0 \end{cases}$$

where $d_1 = \frac{\ln(\frac{Va}{D}) + rT}{\sigma_a} + \frac{\sigma_a}{2}$ and $d_2 = \frac{\ln(\frac{Va}{D}) + rT}{\sigma_a} - \frac{\sigma_a}{2}$

and Ve is the value of equity, σ_e is the volatility of equity, D is debt value, r is risk free rate, and T is time of debt's maturity.

Secondly, we can compute the distance to default as following:

$$DD(it) = \frac{\ln(\frac{Va}{D}) + (r - \frac{1}{2}\sigma_a^2)(T-t)}{\sigma_a\sqrt{T-t}}$$