UNIVERSITE DE LIMOGES

ECOLE DOCTORALE – n°613 Sciences de la Société, Territoires, Sciences Economiques et de Gestion

Faculté de Droit et des Sciences Economiques

Laboratoire d'Analyse et de Prospective Economiques (LAPE) EA 1088

Thèse

Pour obtenir le grade de

Docteur de l'Université de Limoges

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Présentée et soutenue publiquement par

Thu Ha TRAN

Le 12 Décembre 2018

Three essays on the composition of boards of directors and their contribution to effective corporate governance

Directeurs de thèse

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« The opinion expressed in this thesis are those of the PhD candidate and do not necessarily reflect the views of the University of Limoges"

"La faculté n'entend donner aucune approbation ou improbation aux opinions émises dans les thèses ; ces opinions doivent êtes considérées comme propres aux auteurs »

To my beloved family

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GENERAL INTRODUCTION

Various definitions of corporate governance have been advanced in literature coming from dissimilar perspectives. For instance, Shleifer and Vishny (1997) define corporate governance as mechanisms that assure investors to get a return on their investment. Gillan and Starks (2000) define corporate governance as the system of laws, rules, and factors that control activities in a company. Although definitions vary, researchers generally distinguish between two categories of corporate governance: internal and external governance. Internal governance is mostly concerned with ownership and control, characteristics and composition of the board of directors, and executive compensation; whereas external governance extends to the production and takeover markets, as well as the state regulatory system (Huson et al. 2001; Denis and McConnell 2003; Gillan, 2006).

The board of directors is considered as the lynchpin of internal governance mechanisms (Gillan, 2006). The board of directors has the main tasks to hire, fire and compensate top management, and to monitor and advise managers. Through its monitoring function, the main role of the board of directors is to reduce agency conflicts between shareholders and managers by aligning their interests. As an advisor, the board of directors uses its knowledge and experience to provide its opinions and directions to managers for establishing corporate strategies and policies. The board of directors is in fine responsible for ensuring firms create value for their shareholders. An important question is therefore what makes a board effective in carrying out its functions? Codes of Best Practice for Corporate Governance have been established in a majority of countries to make recommendations and requirements on the board of director's composition to ensure effectiveness in achieving its functions. The prevailing recommendations concern the independence of the board and its gender balance.

Policy-makers think that the presence of a minimum of independent directors on boards is an effective way to ensure that boards accomplish their functions. Codes of Best Practice for Corporate Governance in many countries require the presence of directors who are independent from managers and companies. However, policy-makers do not take into account that agency conflicts are different when firms have dispersed or concentrated ownership structure, and they do not make recommendations to adjust the composition of the board of directors to solve the prevailing problems in each case.

In firms with dispersed ownership structure, agency conflicts are between managers and shareholders. 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). The nomination of directors independent from managers, who have the power to hire, fix the remuneration and fire managers, seems in this case to be an effective solution to reduce agency conflicts in firms with dispersed ownership structure.

In firms with concentrated ownership, the conflict of interest shifts away from manager vs. shareholders to controlling shareholders vs. minority shareholders. Controlling shareholders might have the incentives and ability to monitor managers to ensure their decisions will increase overall shareholder value and thereby benefit all shareholders (Jensen and Meckling, 1976; Shleifer and Vishny, 1986). However, controlling shareholders may be tempted to expropriate minority shareholders for their own interests. Controlling shareholders might expropriate minority shareholders by paying excessive salaries, transferring assets to other companies under their control, selling assets, goods or services to other companies they are related to under preferential prices (Johnson et al., 2000). The solution recommended by Codes of Best Practice to have independent directors can be problematic in firms with concentrated ownership for two reasons. Firstly, these Codes recommend directors to be independent from managers while they should be independent from controlling shareholders to reduce the agency conflict between controlling and minority shareholders. Secondly, as controlling shareholders have the voting power to nominate and fire directors, independent directors might not be "strictly" independent if they avoid actions that could encourage controlling shareholders to replace them. Therefore, the presence of independent directors, as recommended in Corporate Governance Codes, might not be an effective solution to curtail the agency conflicts in firms with a concentrated ownership structure. The question of what makes a board of directors effective to carry out its functions is still an unanswered question for firms with a concentrated ownership structure. As most of the existing empirical research focuses on the role of independent directors in listed US firms, which are characterized by a dispersed ownership structure (e.g. MacAvoy et al., 1983; Agrawal and Knoeber, 1996; Adams and Mehran, 2012; Pathan and Faff, 2013), they do not contribute an answer to this question.

Another solution, more recently considered by policy-makers to enforce both the monitoring and advisory functions of the board of directors, is to improve the gender balance among directors. The existing literature argues that gender diversity might ameliorate the monitoring function of boards of directors as female directors should be more independent from management than male directors (Adams & Ferreira, 2009). The literature also indicates other numerous advantages of gender diversity, such as the improvement of the decision-making processes (Szydło, 2015), the benefit of the talent pool or attributes from both sexes (Gopalan

& Watson, 2015), to generate more ideas, improve creativity, innovation and adaptability (Kirsch, 2018). Policy-makers appeal to these arguments to justify the imposition of quotas, but ignore the side-effects associated with mandatory rules that might outweigh the expected positive effect of gender balance. Gender quotas might lead to more inefficient outcomes by forcing firms to appoint less-qualified female directors to comply with the quota (Pande and Ford, 2011; Holzer and Neumark, 2006). By forcing firms to modify the share of women on their boards, gender quotas might reduce firm profits if they are already at the optimal point of profits (Dale-Olsen, Schøne, & Verner, 2013). Gender quotas might also give less incentives for women to represent shareholders interest if they feel secure in their position (Coate and Loury 1993; Matsa and Miller 2013). By ignoring all these side-effects, policy-makers can create unrealistic expectations for women to boost the performance of firms. The existing literature that analyses the impact of gender quotas on firm performance is scarce and focuses on the case of Norway, which was the first country to impose a gender quota in 2003. Ahern and Dittmar (2012) and Matsa and Miller (2013) find a negative effect of gender quota on firm performance, while Eckbo et al. (2018) find a non-significant impact of gender quota on operating profitability after extending the sample period beyond the recent financial crisis. These mixed results raise the need to further analyse the impact of gender quotas on firm performance on other countries than Norway.

The two prevailing recommendations of Corporate Governance Codes therefore present some drawbacks, requiring additional refinement to be able to address the question of what makes a board effective in carrying out its monitoring and advisory functions. The objective of this thesis is to consider the issues raised above regarding the independence of board members and gender quotas in order to determine what patterns of board composition are effective in reducing agency conflicts among stakeholders and to improve firm outcomes.

In **Chapter 1,** we examine whether the recommendation, made by several jurisdictions in Europe with a prevalence of concentrated ownership structures to include a new type of board director who is nominated by minority shareholders, is a solution to improve board effectiveness. We focus our analysis on the particular case of banks as the failure 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). While the Basel Committee (2010, 2015) recommend that corporate governance of banks should be different from that of nonfinancial firms, Corporate Governance Codes worldwide tend to be

similar for nonfinancial and financial firms. Corporate governance of banks should have multi-faceted objectives for enhancing welfare, not only of shareholders as for non-financial firms, but also of depositors, debt holders and regulators. In this context, this chapter investigates empirically whether banks with concentrated ownership that allow minority shareholders to appoint board directors could achieve increased market valuation without further risk taking. The presence of these "minority directors" might be more effective in reducing the occurrence of value expropriation from minority shareholders as they are not appointed by controlling shareholders. However, the presence of directors related to minority shareholders might also intensify the agency conflict arising between shareholders and debt holders /regulators if the minority shareholders' risk appetite is greater than that of controlling shareholders, due possibly to more extensive diversification of their wider portfolio (Zhang, 1998; Paligorova, 2010; Faccio et al., 2011).

Using a manually-collected data set on the ultimate ownership structure and board composition of a sample of listed European banks with controlling shareholders, we find that the inclusion of minority directors does increase the effectiveness of bank boards, as it results in higher market valuations without increasing risk. To identify the relationship we use, as an instrumental variable for the presence of minority directors, the distance of minority shareholders from the bank's headquarters

Further investigation suggests an important role played by directors related to "active" institutional investors as a channel to explain the positive relationship between the presence of minority directors and market valuation and the decrease in risk. Our results also show that the beneficial impact of the presence of minority directors on market valuation and risk is further enhanced in countries with a stronger supervisory regime.

Chapter 2 complements Chapter 1 by determining the factors that significantly impact the presence of minority directors on bank boards. As we demonstrate in Chapter 1 that the presence of minority directors is an effective internal corporate governance mechanism for banks with concentrated ownership structure, the objective of Chapter 2 is to identify factors that could help policy-makers favor the presence of minority directors. We consider factors both at bank- and country-level. We first consider the voting power of controlling shareholders as a determinant of the presence of minority directors, however with no clear cut expected impact. On the one hand, controlling shareholders might use their voting power to limit the

presence of minority directors on bank boards to facilitate their expropriation behavior. On the other hand, controlling shareholders might signal their non-expropriation behavior by increasing the percentage of minority directors on the board. We furthermore consider the degree of bank opacity as a potential determinant of the presence of minority directors. In banks with a high degree of opacity, controlling shareholders might have more opportunities for expropriation by limiting the presence of minority directors on boards, or might alternatively use the presence of minority directors to signal that they will not expropriate minority shareholders. We then examine the institutional factors that could influence the presence of minority directors on bank boards, in particular the quality of recommendations on corporate governance, the degree of shareholder protection, and the strength of the supervisory regime. A strong institutional environment might facilitate legal procedures to nominate minority directors on bank boards. Alternatively, a strong institutional environment might contribute to reduce any expropriation behavior of controlling shareholders, and might therefore be considered as a substitute for the presence of minority directors on bank boards.

Using the same sample as in Chapter 1, our results show that ownership structure, bank characteristics, and institutional environment help to explain the presence of minority directors on bank boards. More specifically, we find that: (i) the voting rights of controlling shareholders increase the presence of minority directors on bank boards; (ii) the percentage of minority directors on bank boards decreases with the degree of opacity; (iii) the quality of recommendations for boards of directors in Corporate Governance Codes and higher shareholder protection are factors that promote the presence of minority directors, whereas stronger supervisory regimes reduce the presence of minority directors on bank boards. Our study therefore shows that policy-makers can increase the presence of minority directors on bank boards by reducing bank opacity and strengthening the quality of Corporate Governance Codes and the level of shareholder protection.

Finally, **Chapter 3** evaluates the impact of gender quotas on firm outcomes and strategic corporate decisions by taking Belgium, France and Italy, who implemented a gender quota in 2011, as a natural experiment. As we aim to examine the consequences of the imposition of a mandatory rule to achieve gender balance, we need to consider a representative sample of firms affected by the quota in each country. We therefore conduct our analysis on a sample of non-financial firms. We follow the existing literature and exclude banks from our sample as they are subject to specific regulation (Hermalin and Weisbach, 1988; Farrell and Hersch, 2005;

Matsa and Miller, 2013 or Bennouri et al*.,* 2018); we check, however, that the results observed for non-financial firms also hold for banks.

There is a large amount of literature that examines the relationship between female representation on boards and performance outside the context of gender quotas, however with mixed results (see Kirsch, 2018 and Adams, 2016 for a survey). The existing literature on the impacts of gender quotas is scarcer to date and focuses on the Norwegian case as it was the first country to introduce a gender quota, in 2003. There is no clear empirical evidence, with either gender quotas having negative consequences on performance (Ahern and Dittmar; 2012, and Matsa and Miller, 2013), or a neutral effect (Eckbo et al., 2018). This chapter aims to complement this literature by analysing a panel of three other European countries to see whether female directors can realistically be expected to bring benefits to corporations when their presence is imposed by mandatory quotas. As explained above, the potential benefit of an increased board diversity on firm outcomes could be outweighed by the cost to be paid when imposing mandatory rules.

We first conduct a statistical analysis to examine how boards' composition and board members' characteristics change after the implementation of a gender quota. Our analysis shows that there is a strong increase in female directors, however with a large number of firms below the required threshold at the date of compliance. Board members' characteristics change significantly after gender quotas, with higher education levels of all members, lower age, lower board experience and higher international exposure. We next use a difference-in-differences approach to examine the impacts of gender quota on corporate profits, risk-taking behavior and corporate decisions (labor cost, employment policy, etc.). We find that gender quotas do not have a significant impact on either firm outcomes or corporate strategies decisions. We also find that the changes in board characteristics such as directors' age, education, nationality or experience do not impact the way gender quotas affect performance and corporate decisions. Overall, our finding supports the argument that gender balance on corporate boards could be achieved by mandatory quotas without regulators expecting negative effects for firm performance.

CHAPTER 1

Better than independent:
the role of minority directors on
bank boards

1.1. 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, debt holders and regulators. In this paper, we query what forms of corporate governance in banks could help attain the most efficient outcome for stakeholders in terms of both performance and financial stability. We examine in particular whether board directors that are accountable to minority shareholders are more suitable than supposedly independent directors in achieving these objectives in banks with concentrated ownership structures.

Corporate Governance Codes worldwide tend to be similar for nonfinancial and financial firms. However, 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), their inherent complexity and opacity, and the fact that the interests of shareholders of financial firms and those of their debtholders and regulators often diverge. 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 corporate governance traditionally 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) recommend that corporate governance of banks should be different from that of nonfinancial firms, with the twin objectives of not only enhancing welfare of shareholders but also of depositors and regulators. Moreover for banks, tight regulation combined with restrictions on bank entry and

activities limit the effectiveness of many mechanisms intended to address corporate governance problems (Billett et al.1998; Levine, 2004), and external governance mechanisms such as takeovers hardly exist in banking, unlike in other industries (Levine, 2004; De Haan and Vlahu, 2016). All combined, these elements strengthen the important role for more effective monitoring by boards of directors in the banking sector.

In this context, this paper empirically investigates whether banks with concentrated ownership that allow minority shareholders to appoint board directors could achieve increased market value without further risk taking. In firms with concentrated ownership, controlling shareholders might have 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 expropriate minority shareholders by reaping private benefits through diversion of assets and profits outside the firm (Johnson et al., 2000). Common internal corporate governance mechanisms are not necessarily well suited to limiting such agency problems in firms with concentrated ownership, as controlling shareholders often participate in management and elect representatives to the board of directors that will represent their interests. In this context, it might be important to find other corporate governance mechanisms to protect minority shareholders (La Porta et al., 1999). One of the current recommendations of Corporate Governance Codes is to introduce a minimum number of independent directors on boards to curtail the agency conflict between insiders (managers or controlling shareholders) and minority shareholders, as independent directors should be able to effectively control and monitor insiders. Whereas independence might perceivably take different forms in firms with dispersed or concentrated ownership structure, relevant recommendations in Corporate Governance Codes are generally not conditional on ownership structure. In most countries, the code only recommends that the majority of directors shall be independent of the company and its management board, without indicating what proportion of these directors should be independent of controlling shareholders in controlled firms. A further problem with the recommendation of having independent directors in controlled firms is that they might not be "strictly" independent, in the sense that they are appointed by controlling shareholders, or alternatively by "independent" nomination committees which may in turn depend on controlling shareholders. Some of these directors, called "non-strictly independent directors" by Crespí-Cladera and Pascual-Fuster (2014), may avoid actions that could encourage controlling shareholders to replace them. These different factors might explain why the existing empirical literature that examines the impact of director independence on firm performance

does not support the high expectations placed by policymakers in the value of board independence.[1]

As an alternative approach to the introduction of "independent" directors, several jurisdictions in Europe with a prevalence of concentrated ownership structures (e.g. Italy and Spain) have introduced a new type of board director in their Corporate Governance Codes, one that is nominated by, or at least linked to, minority shareholders.[2] As these directors are related to minority shareholders, they might be more effective in reducing the occurrence of value expropriation from minority shareholders in firms with concentrated ownership structures, by virtue of not being appointed by controlling shareholders. Whereas the presence of such minority directors may thus lead to an increase in firm value if it effectively curtails agency problems between controlling and minority shareholders, for banking firms it might also intensify the agency conflict arising between shareholders and debtholders/regulators. With minority directors related to minority shareholders, greater risk-taking in banks with concentrated ownership could ensue if minority shareholders' risk appetite is greater than that of controlling shareholders, due to possibly more extensive diversification of their wider portfolio (Zhang, 1998; Paligorova, 2010; Faccio et al., 2011). John et al. (2008) also argue that even if large shareholders have incentives to increase a firm's profits by taking on risky projects, they may pursue more conservative projects than minority shareholders to secure the private benefits they can extract from the firm. It is furthermore possible that minority directors could be reluctant to take riskier decisions in order to maintain their reputation in the market for directorships and increase their chance to obtain seats in other boards (Fama and Jensen, 1983), unless their connection with shareholders is very strong (e.g. when being employed by one of them).

Our paper thus aims to complement the literature on corporate governance mechanisms in controlled banks to address agency problems between not only controlling and minority shareholders but also between shareholders and debtholders/regulators, by examining in detail the potential role played by the presence of minority directors in bank boards, i.e. directors related to minority shareholders. Dahya et al. (2008), who analyse the impact of the presence of "independent" directors on market valuation for a worldwide panel of nonfinancial firms with a concentrated ownership structure, classified directors as "independent" if they are not

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[1] See the survey of De Haan and Vlahu (2016) for banks, and Nguyen and Nielsen (2010) for non-financial firms.
[2] Spain has introduced a proportional voting system in 2000 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. In Italy, a reform of 2005 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. See Gutiérrez and Sáez (2013) for further details.

related to the biggest controlling shareholder. We refine this classification by excluding from the category of "independent" directors those that are in fact related to minority shareholders. We therefore classify directors as minority directors if they are related to at least one of the minority shareholders, and as "independent" if they are not related to either minority or controlling shareholders. As corporate governance in most countries is based on the "comply-or explain" principle, controlling shareholders have the ability to make decisions regarding the quality of the governance practices implemented. In this, they may be influenced by the perceived costs of implementing good corporate governance, i.e. their loss of private benefits. In this wider context, we examine whether banks with controlling shareholders could increase their market valuation by allowing minority shareholders to appoint board directors, who should be more inclined to defend their interests than directors declared as "independent" but that in fact might be "non-strictly independent". We further investigate whether this presence of minority directors might not, however, also be associated with increased bank risk taking. We overcome the potential endogeneity problem inherent in the analysis by using the distance of minority shareholders from the headquarters of the bank as an instrumental variable for the presence of minority directors. The intuition behind this instrument is that the further minority shareholders are from the headquarters of a bank, the more difficult it might be for them to directly lobby/influence managers and the board of directors; the presence of directors related to them might ensure that their interest will be protected even if they are at a geographical disadvantage in this respect.

We then explore two possible channels through which the presence of minority directors could affect market valuation and risk. The first one captures the risk of expropriation through related party lending (RPTs); we expect the presence of minority directors to reduce RPTs if it is effective in limiting the risk of expropriation. The second channel examines the relevance of minority directors which are related to "active" institutional investors (i.e. pension and mutual funds and investment companies)[3] for actively monitoring insiders and reducing the risk of expropriation. "Active" institutional investors would tend not to have potential business relationships with the companies in which they hold shares, as opposed to "dependent" or "pressure insensitive" institutional investors (banks and insurance companies), and might thus be less willing to challenge insiders' decisions in order to protect those relationships (Chen et al., 2007). Several studies have found that firms with "active" institutional investors as large

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[3] "Active" institutional investors are also called "pressure insensitive investors" (e.g. Chen et al., 2007) or independent investors (Ferreira and Matos, 2008; Ruiz-Mallorquí and Santana-Martín, 2011).

shareholders are associated with higher performance and higher value (e.g. Almazan et al., 2005; Cornett et al., 2007, Chen et al., 2007; Ruiz-Mallorquí and Santana-Martín, 2011), in line with the hypothesis that they monitor insiders more actively. We further aim to examine if "active" institutional investors, when they are not controlling shareholders but instead minority ones, could appoint directors who are related to them, e.g. by being one of their employees, in order to influence insiders and potentially limit any expropriation behavior. We could expect the presence of such directors to have a positive impact on market valuation in this case, with however less clear implications for associated risk-taking.

Our investigation will allow us to evaluate the potential benefits for the different stakeholders of having a board structure of banks that includes minority directors, in the sense that it may be effective in limiting expropriation of minority shareholders by controlling shareholders, and ideally without greater risk taking by banks. We could then consider that the inclusion of minority directors can create a "strong" bank board from the perspective of shareholders, as well as for debtholders and regulators, if it has the potential to increase a bank's market valuation, without affecting its probability of insolvency. An interesting aspect in this context will be to examine what degree of minority director representation is required to achieve these desired outcomes. We furthermore pay particular attention to the fact that the interplay of agency problems concerned could be greatly influenced by the institutional and regulatory environment in place. Strict banking supervision might provide incentives to directors more generally to effectively monitor insiders, particularly if regulators have the ability to fine or dismiss directors in such an environment. Furthermore, the effectiveness of minority directors' monitoring might depend crucially on the quality of country-level governance, including both the law protecting minority shareholders and the institutions that enforce it. Banking market competition could additionally present either a complementary or substitute mechanism to corporate governance in this context.

Our contributions to the literature are thus as follows: we firstly contribute to the corporate governance literature more generally by examining what constitutes a strong board for banks with controlling shareholders. 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. Our results furthermore emphasize the related role played by "active" institutional investors when they are minority shareholders in assuring improved monitoring of controlling shareholders. 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.

For our investigation, we use a hand collected data set on the ultimate ownership structure and board composition of a sample of listed European banks with controlling shareholders. We find that the presence of minority directors in these European banks' boards is substantial, as they represent on average around 24% of board members when present. Most of these minority directors are related to shareholders through actually being employed by one of them. Overall, our results demonstrate that the presence of minority directors on bank boards affects both market valuation and risk. Firstly, we find that the presence of minority directors on bank boards has a positive and significant impact on market valuation, with evidence that this increase in market value could come from a reduced risk of expropriation as the presence of minority directors decreases the level of related party transactions. Further investigation suggests an important role played by directors related to "active" institutional investors as a channel to explain the positive relationship between the presence of minority directors and market valuation. Secondly, our results show that the presence of minority directors is associated with lower risk. Further investigation reveals that it is in fact the presence of minority directors related to "active" institutional investors that drives this decrease in risk, whereas the presence of minority directors related to other minority shareholders actually results in increased bank risk. Thirdly, the presence of "independent" directors is found not to be associated with higher market valuation and has no impact on risk-taking. Hence, allowing minority shareholders to appoint minority directors, in particular with connections to "active" institutional investors, might represent a more effective way to ensure welfare enhancement of shareholders as well as depositors/debt holders/regulators than can be achieved by the inclusion of "independent" directors. Also important from an overall policymaker's perspective is the fact that this beneficial impact of the presence of minority directors on market valuation and risk is further enhanced the stronger the supervisory regime in place.

The remainder of the paper is organized as follows. Section 1.2 presents the background and the hypotheses tested; Section 1.3 describes our sample, defines the ultimate ownership variables and the indices of directors' relatedness, and provides some statistics; Section 1.4 presents the methodology we use to conduct our empirical investigation, and discusses our main results and possible channels of impact; Section 1.5 presents several policy-relevant refinements of our results; Section 1.6 contains robustness checks; and Section 1.7 concludes the paper.

1.2. 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.[4] 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 independent monitoring or enforcement mechanisms, and instead based on voluntary compliance.[5] Companies choosing not to comply are required to give reasons for the non-compliance. Effective adoption hence relies on firms being concerned about reputation, and investors being able to penalize companies for potential non-compliance with provisions of the Code. This implies that firms within the same country can offer varying degrees of protection to their stakeholders.

While Corporate Governance Codes around the world tend to be similar for nonfinancial and financial firms, governance of the two, as argued above, should ideally be differentiated as the interests of shareholders of financial firms and those of their debtholders and regulators often fail to coincide. Despite this, it is only following the recent financial crisis that the Basel Committee on Banking Supervision (2010, 2015) and the OECD (2010) have recommended the corporate governance of banks to be different from that for nonfinancial firms, pursuing the twin objectives of enhancing welfare not only 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, able to curtail the agency conflict between insiders and minority shareholders, as independent directors should be able to effectively control and monitor insiders.[6] While independence might perceivably 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. The majority of empirical papers regarding whether there

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[4] 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.

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

[6] Most codes have some recommendations regarding 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.

is in fact effective monitoring by independent directors focus on listed US firms, which are generally characterized by a dispersed ownership structure. These studies find the contribution of independent directors to firm performance to be either insignificant (e.g. MacAvoy et al., 1983; Bhagat and Black, 1999, 2002; and more specifically Adams and Mehran, 2012; Aebi et al., 2012 and Minton et al., 2014 for banks) or even negative (e.g. Agrawal and Knoeber, 1996 for nonfinancial firms; and Pathan and Faff, 2013 and De Andres and Vallelado, 2008 for banks).[7] An exception to this is the study by Dahya et al. (2008), who find a positive relationship between the fraction of independent directors and Tobin's Q for nonfinancial firms with a concentrated ownership structure, particularly 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 have incentives to 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., 2010). 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 controlling shareholders to credibly commit to outside investors through the appointment of directors that are classified as "independent".

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[7] Another strand of the literature uses data on board attributes (board independence, size, transparency, etc.) produced by Institutional Shareholder Services (ISS) or RiskMetrics through their Corporate Governance Quotient (CGQ) rating system (e.g. Brown and Caylor, 2006; Aggarwal and Williamson, 2006; Aggarwal et al., 2009; Chhaochharia and Laeven, 2009 and Bruno and Claessens, 2010 for nonfinancial firms, and Beltratti and Stulz, 2012 for banks). They all find that a stronger CGQ index has a significant and positive impact on the valuation of firms. Whereas the CGQ rating system seems adequate for widely-held firms, this cannot be said for firms with concentrated ownership structure as it does not explicitly refer to director independence from controlling shareholders. For example, a director employed by another firm that the controlling shareholder owns would be inaccurately classified as independent.

The existing literature, mentioned above, which analyses the impact of board independence on bank performance mainly focuses on the agency conflict between insiders and shareholders, ignoring the interests of depositors/regulators. It is only after the financial crisis of 2007-2008 that a range of empirical studies have turned to the interests of depositors/regulators, by examining the relationship between the presence of independent directors and bank risk-taking behavior. Their findings show either no significant relationship (Erkens et al., 2012; Minton et al., 2014; Battaglia and Gallo, 2017), or that the presence of independent directors is associated with lower risk (Pathan, 2009; Wang and Hsu, 2013; 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, none of these studies define board "independence" conditionally on the presence (or not) of controlling shareholders; this holds even for Erkens et al. (2012) and 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 Codes to also have minority directors, the aim of this paper is to more finely differentiate between directors who are related to minority shareholders and those unrelated to shareholders. In common with the existing literature, we refer to these unrelated directors as "independent", while realizing that they may in fact not be "strictly" independent in the sense that they could effectively be nominated or dismissed by the controlling shareholders. The inclusion of minority directors on the board could be a way for controlling shareholders to signal that they will refrain from expropriation. These minority directors, being related to minority shareholders, might be effective in reducing the ability of controlling shareholders to divert corporate assets to themselves. The presence of such minority directors could therefore potentially offset the value discount associated with the ability of controlling shareholders to expropriate minority shareholders, leading to an increase in firm value if it is indeed an effective way to curtail the agency problem between controlling and minority shareholders. We furthermore investigate whether the potential positive impact on market valuation of having minority directors is greater than the one associated with the presence of "independent" directors, which may in fact be insignificant in the context that outside investors might actually consider them not to be strictly independent. This will allow us to determine what criteria controlling shareholders should use to credibly commit that they will not expropriate minority shareholders, and leads us to examine the following hypothesis:

H1: The presence of minority directors increases the market value of banks, and has a greater impact than the presence of "independent" directors.

According to the Basel Committee on Banking Supervision (2015), a "strong" board for banks should safeguard not only the interests of minority shareholders, but also those of depositors/debt holders/regulators. From a theoretical perspective, the presence of directors in banks that are appointed by minority instead of by controlling shareholders might lead to higher risk taking if the risk appetite of the latter is higher; this might occur with possibly more extensive diversification of their overall portfolio (Zhang, 1998; Paligorova, 2010; Faccio et al., 2011). Also, the greater the private benefits controlling shareholders might extract, the greater the incentive to protect these benefits, making engagement in risky investments less attractive (John et al., 2008). It is also possible that minority directors could be less inclined to pursue risk in order to safeguard their reputation in the market for directorships (Fama and Jensen, 1983). These conflicting theoretical predictions regarding the impact of minority directors on bank risk taking lead us to examine the two following alternative hypotheses:

H2a: The presence of minority directors increases bank risk taking.

H2b: The presence of minority directors decreases bank risk taking.

1.3. Data sources and ownership & board structures

1.3.1. Sample construction and data sources

We focus our analysis on European countries as a majority of banks there are highly concentrated and thus exposed to conflicts between controlling and minority shareholders (Faccio and Lang, 2002). Some jurisdictions in Europe furthermore recommend having minority directors in their Corporate Governance Codes (see Footnote 3).[8] We collected the relevant information on ownership and board structure as at the end of December 2013, and conduct our consequent econometric analysis for the period 2011-2013.

Our sample includes bank holding companies, commercial banks and investment banks from 17 European countries[9] that are listed on the stock market and have at least one controlling shareholder. We only consider listed banks as we were unable to collect data on the board structure of non-listed banks (even examining annual reports). We initially identify all active

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[8] Similar provisions also exist only in Azerbaijan, Bahrain, Bosnia and Herzegovina, and Brazil.

[9] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

listed banks, resulting in 145 banks. Amongst these banks, we were able to assemble data on ownership structure for 118 banks using Bloomberg, BvD Bankscope, Amadeus, as well as annual reports and websites of banks/firms. Among these 118 banks, we keep the subsample of the 96 banks having at least one controlling shareholder. We follow the existing literature (La Porta et al., 1999, 2002; Caprio et al., 2007; Lepetit et al., 2015) by using the control threshold of 10%, and also check the robustness of our results by using a control threshold of 20%. As data on ownership are updated only every 18 months in BvD Bankscope and Amadeus, we initially compared the ownership structure of our sample of banks in 2013 and 2011. We found, as in the previous literature (La Porta et al., 1999; Barry et al., 2011), that ownership structure is relatively stable over time: the controlling shareholders remain the same even if the percentage of shares they hold may change slightly. We therefore assume that ownership structure of our sample of banks remains unchanged for the period examined.

We furthermore collect data on biographies of board directors for these 96 banks (1092 board members); this data is in part taken from Bloomberg, but mostly hand-collected from corporate governance reports or annual reports. With board terms ranging normally from 3 to 4 years, we assume that the board structure is stable over our period of analysis.[10]

We finally collect financial statement data from BvD Bankscope, market data from Bloomberg, and macroeconomic data from the World Bank over the larger period 2011-2015, as we additionally consider the two periods 2012-2014 and 2013-2015 for robustness checks. Financial data was winsorized at the 1% and 99% levels (our results are generally similar using non-winsorized data).

Table A1.1 gives a breakdown of banks by country; on average, our sample covers around 71% of banks' total assets of all listed banks provided by BvD Bankscope and Bloomberg.

1.3.2. Identifying controlling and minority shareholders using their relative voting power

Our first step is to build control chains for each bank to identify both direct and indirect owners, and their voting rights in the control chain. We follow the existing literature (e.g. La Porta et al., 1999, 2002; Caprio et al., 2007; Lepetit et al., 2015) in using the control threshold of 10%. At the first level in the control chain, we consider a shareholder holding more than 10% of shares to be an ultimate owner when they are an individual/family, a government, or a widely held firm that is not a bank's subsidiary. At this level, ultimate owners are direct

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[10] Bloomberg provides some information on board structure of 62 banks among the 96 banks in our sample from 2011 to 2013: board size, number of independent directors, and CEO duality. We observe that these board characteristics do not change significantly over this period.

shareholders of the bank (see e.g. B4 in Figure B1.1 in Appendix B). For banks with shareholders having a controlling stake for whom we can continue building the control chains, we collect information on ownership structure of shareholders holding more than 10% of shares at each of the following levels in the chain. We continue the control chains until we find all indirect ultimate owners of a bank (see e.g. D1 and D2 in Figure B1.1 in Appendix B); in our sample, the maximum number of levels in a bank's control chain is eight.[11] We follow La Porta et al. (1999) in defining the direct voting rights of ultimate owners as the percentage of the bank's shares held directly, and their indirect voting rights as the percentage of 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 voting rights of ultimate owners are then the sum of their direct and indirect voting rights held in the bank (see Figure B1.1 in Appendix B).

Our second step is to calculate the "relative voting power" of each shareholder, which reflects their potential influence in the decision process, in order to determine whether they have an effective controlling power or not. We use the "Banzhaf Power Index" (BPI) to measure the relative voting power of each shareholder. This index takes into account voting rights, and the possibility to unite with other shareholders to make decisions in a bank (see Section B1.2 in Appendix B for details). We compute the BPI index using the algorithms for voting power analysis (using the method of generating functions) developed by Dennis Leech at the University of Warwick.[12] This index ranges from 0 to 1; the higher the index, the greater the relative voting power of the shareholder. Using the same threshold as for building the control chain, shareholders with a BPI lower than 10% are classified as minority shareholders (B5 and B6 in the example given in Section B1.2 in Appendix B), while those with a BPI greater than 10% are classified as controlling shareholders (B4, D1 and D2 in the example). Analogously to our treatment of the ownership structure, we compute the BPI index for each shareholder for the year 2013, and assume that relative voting power is similarly unchanged for our study period.

1.3.3. Indices of relatedness of directors

We categorize directors more finely than in previous literature, and then proceed to assign weights to three factors that characterize the strength of the relatedness between a director and a shareholder/ultimate owner. This approach allows us to compute measures that are more

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[11] We have 13 banks where several ultimate owners exist for a direct shareholder holding more than 10% of shares at the first level in the control chain. For these we consider as ultimate owner the one holding the largest number of shares.

[12] See http://homepages.warwick.ac.uk/~ecaae/ipgenf.html.

refined than the basic percentage of related/independent directors used in previous studies (e.g. Dahya et al., 2008; Adams and Mehran, 2012; Pathan and Faff, 2013; Cheung et al., 2013).

We first need to identify directors who are related to minority shareholders and those who are "independent". As we consider directors to be "independent" when they are not related to either a minority or a controlling shareholder, we also need to identify directors that are related to controlling shareholders. We use four criteria matching both biographical information and bank ownership structure to identify if a director is related to a shareholder (minority or controlling), depending on whether the bank has a pyramidal structure or not. We consider a director to be related to a direct shareholder (minority or controlling) if:[13] (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[14] as one of the direct shareholders of the bank; or (4) they are an employee of a government agency if the bank is state owned. To determine if directors are related to an indirect ultimate owner 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 indirect 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 chain of the bank; (2) they are one of the ultimate owners of the bank or they are shareholders in at least one of the firms controlled by the ultimate owner in the control chain of the bank; (3) they have the same family name as the ultimate owner or as one of the indirect shareholders in the control chain of a bank; and (4) they are an employee of a government agency if one of the ultimate owners is state owned.

We then assign weights to three factors that characterize the strength of the relatedness between a director and a shareholder, by giving a weight of one (as compared to zero) for each criterion (see Table B1.2 in Appendix B). The first factor considers if a director is related to a shareholder (controlling or minority). The second factor is the position of related 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 rights that are of greater significance 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. A Vice Chairman can act

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[13] We are, however, unable to ascertain who does in fact nominate particular directors.

[14] In our sample, 25 directors have the same family name as owners in the control chain. Taking into account only directors with the same family name as owners when the name is not common in each country, we are left with 8 related directors according to this criterion. As a robustness test, we remove all these cases from the sample.

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 interests of shareholders. The third factor we consider is whether their relationship with shareholders is in the present or in the past. When directors are, for example, current employees of shareholders/ultimate owners of the bank, they might have strong incentives to act in the interest of the persons that can fire them. However, when the relatedness is already in the past, the related director is less directly influenced by shareholders, thus their impact should be less significant than in the first case.

We use the three factors described above to compute several indices to measure the strength of relatedness of the board of directors for each bank (see Section B1.3 in Appendix B for details). We consider in our analysis the index *Minority* measuring the presence/influence of directors who are related to minority shareholders, and the index *Independent* measuring the presence of "independent" directors from shareholders. These indices both range from 0 to 10 in principle.

1.3.4. Some descriptive statistics

In our sample, 45 banks (47%) have a pyramidal structure with indirect ultimate owners, and 51 banks (53%) one with only direct controlling shareholders (see Table A1.3 for details by country). Controlling shareholders hold on average 44% of shares in banks with minority directors, versus 70% in banks without minority directors (Table 1.1), with the remainder held by minority shareholders.

We find that minority directors are present on the board of directors of around 49% of our sample of controlled banks (see Table 1.1). Minority directors, when present, account for more than 24% of board seats, against 14% of directors related to controlling shareholder; this gives around 62% of directors that we identified as "independent" in the sense that they are not related to shareholders. The proportion of minority directors is relatively high on average, especially in Spain (65%) where the Corporate Governance Codes cover inclusion of such directors on the board, but also in other countries that do not (France 38%, Switzerland 32%, and UK 47%).

We find that on average around 80% of minority directors are related through employment. Minority directors that are shareholders of the bank or in the control chain represent around 16% of the cases of related directors, while the two other criteria of relatedness account for around 4% of all cases.

To summarize, our statistics appear to indicate that a number of controlled banks in Europe have decided to allow minority shareholders to appoint board directors, even in countries where Corporate Governance Codes do not formally contain such a provision. As discussed above, this could be a way for controlling shareholders to credibly commit that they will not expropriate minority shareholders. To investigate this further, we will now empirically examine whether the presence of minority directors might be associated with higher market value, and whether or not it may lead to greater risk taking.

Table 1.1. Relatedness of board directors to shareholders

	Number of directors		Banks with minority directors					Banks without minority directors			
	Total	Average per bank	% of banks	% shares held by controlling shareholders	% of minority directors	% of independent directors	% of directors related to controlling shareholders	% of banks	% shares held by controlling shareholders	% of independent directors	% of directors related to controlling shareholders
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Austria	91	18.20	40	36.95	14.35	69.28	16.38	60	73.96	54.18	45.82
Belgium	44	14.67	33.33	51	17.65	35.29	47.06	66.67	71.31	66.67	33.33
Denmark	105	10.50	10	45.84	10.53	84.21	5.26	90	43.77	86.86	13.14
Finland	24	8	66.67	21.79	14.29	71.43	14.29	33.33	100	90	10
France	102	11.33	66.67	45.10	38.09	45.89	17.06	33.33	71.27	62.04	37.96
Germany	101	10.10	20	40.64	11.01	79.61	9.38	80	65.50	78.42	21.58
Greece	87	14.50	0	-	-	-	-	100	63.95	96.43	3.57
Ireland	11	11	0	-	-	-	-	100	99.42	100	0
Italy	130	10.83	50	58.20	20.29	60.44	19.28	50	67.04	79.44	20.56
Netherlands	16	8	50	98	11.11	88.89	0	50	97.61	85.71	14.29
Norway	13	6.50	50	34	25	75	0	50	31	100	0
Portugal	64	21.33	100	39.30	7.73	72.58	19.70	0	-	-	-
Spain	65	13	100	43.01	64.72	25.72	9.56	0	-	-	-
Sweden	49	12.25	100	19.22	24.20	70.59	5.21	0	-	-	-
Switzerland	87	7.25	41.67	46.57	32.29	45.05	22.67	58.33	59.73	66.41	33.59
United Kingdom	103	11.44	88.89	35.77	47.02	47.85	5.13	11.11	70.70	57.14	42.86
Sample average	**1092**	**11.81**	**48.96**	**43.96**	**24.16**	**62.27**	**13.64**	**51.04**	**70.40**	**78.72**	**21.28**

Notes. This table reports statistics on relatedness of board directors to shareholders for our sample of 96 European banks. The first two columns show the total and average number of directors per bank in each country. Columns (3) to (11) report statistics on the percentage of banks with and without minority directors, the percentage of shares held by controlling shareholders, the percentage of minority directors, the percentage of "independent" directors, and the percentage of directors related to controlling shareholders. The percentage of shares held by controlling shareholders is computed as the average of the percentage of shares held by controlling shareholders in banks with/without minority directors in each country. We calculate the percentage of minority directors, "independent" directors and directors related to controlling shareholders as the number of each category of directors divided by board size for each bank. We then calculate the average of these ratios for banks with/without minority directors in each country.

1.4. Director relatedness and corporate governance effectiveness

1.4.1. Empirical specification

The econometric specification we use to examine whether the presence of minority directors within bank boards has an impact on banks' market valuation and risk-taking is as follows:

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

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. De Andres and Vallelado, 2008; Dahya et al., 2008; Delis et al. 2016). 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 1.05 (see Table 1.2). We compute the distance to default (DD_{it}) to proxy for bank insolvency risk using the methodology developed by Merton (1977). A higher distance to default indicates lower default risk. The average distance to default in our sample is 3.52 (see Table 1.2). $BankControl_{ijt}$ are bank control variables, and $CountryControl_{jt}$ are country control variables.

$Relatedness_{ij}$ are indices representing the presence/influence of directors that are related to minority shareholders ($Minority_{ij}$) and directors that are "independent" from shareholders ($Independent_{ij}$). As these two indices are strongly correlated (see Table A1.6 in Appendix A), we introduce them one by one.

When the dependent variable is the Tobin's Q ratio, we expect a significant and positive coefficient for the index $Minority_{ij}$ to be in line with the hypothesis H1 that the presence of minority shareholders increases the market value of banks. We furthermore expect the presence of directors that are "independent" from both controlling and minority shareholders ($Independent_{ij}$) to increase the market value of banks if minority shareholders have confidence in the independence of these directors, but with a lesser impact than the presence of minority directors.

When the dependent variable is the distance to default, in order to examine hypotheses H2a/H2b, we expect the coefficient associated with $Minority_{ij}$ to be, respectively,

negative/positive and significant if the presence of minority directors decreases/increases the distance to default, i.e. increases/decreases the default risk of a bank. Regarding the expected impact of the presence of "independent" directors on bank risk, we expect the presence of "independent" directors to have either no significant impact or to decrease default risk based on the existing empirical literature discussed above.

We follow the previous literature (e.g. Dahya et al., 2008; De Andres and Vallelado, 2008; Adams and Mehran, 2012; Bhagat et al., 2015; Delis et al. 2017) to select our bank-level control variables. When the dependent variable is the Tobin's Q ratio, we include the following control variables: board size, board tier structure, bank size, growth of assets, capital structure, loan ratio, and risk. Board size ($BoardSize_{ijt}$) is given as the natural logarithm of the number of directors on the board. We expect a positive relationship between board size and bank performance if larger boards are beneficial in terms of diversified expertise and information (e.g. Dalton et al., 1999). However, we could also expect a negative relationship if large boards are less effective to monitor insiders because of free-riding problems and increased decision-making time (e.g. Jensen, 1993). We furthermore control for board tier structure, with the dummy variable $OneTierBoard_{ij}$ taking the value of one if a bank has a one-tier board, and zero if it is a two-tier board. We expect a positive sign if such a board system allows directors to have direct access to relevant information, as there is no separation between management and monitoring functions as in the two-tier board systems (Bezemer et al., 2014; Pellegrini et al., 2017). Bank size ($Size_{ijt}$) is measured by the logarithm of total assets of banks. We expect a positive sign if large firms benefit from scale economies that may improve firm performance (e.g. Hall and Weiss, 1967, Pathan and Faff, 2013), or a negative sign if small banks have some operational advantages of a specific activity to increase their performance (De Andres and Vallelado, 2008). Growth of assets ($Growth_{ijt}$) is measured by the change of total assets between year t-1 and year t, divided by the total assets in year t-1. We use the ratio of equity to total assets ($Capital_{ijt}$) as a proxy for bank capital structure. The ratio of loans to total assets ($Loan_{ijt}$) is expected to have a negative sign (De Andres and Vallelado, 2008). Following the previous literature (Hail and Leuz, 2009; Adams and Mehran, 2012; Pathan and Faff, 2013), 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 ($Risk_{ijt}$); a positive sign is expected if banks take more risk to increase their profitability.

In the regressions using the distance to default as dependent variable, we also follow the existing literature (e.g. Lepetit et al., 2008; Bhagat et al., 2015) and control at the bank-level

for board size, board tier structure, bank size, growth of assets, capital structure, loan ratio, deposit ratio, and operating ratio. Following Pathan (2009) and Minton et al. (2014), we expect a negative relationship between board size *(BoardSize$_{ijt}$)* or capital ratio (*Capital$_{ijt}$*) and the distance to default. Based on Lepetit et al. (2008), we predict a negative coefficient on the loan ratio (*Loan$_{ijt}$*) and the deposit ratio (*Deposit$_{ijt}$*). We also expect a negative sign for the operating ratio (*Operating$_{ijt}$*) defined as the ratio of total operating expenses to total operating income. We furthermore include in all regressions the following country-level variables: the growth rate of GDP, an index measuring the level of minority shareholder protection for each country, and an index measuring the strength of the supervisory regime. We alternatively include country dummies in Equation (1) for robustness checks without changing our main results (see Section 1.6).

All the control variables are defined in Table 1.2 with corresponding descriptive statistics. We examined the correlation between our variables of interest (see Table A1.6 in Appendix A) and detected some potential multicollinearity problems, which we resolved by orthogonalizing the variables in question (see Table 1.2).

Table 1.2. Definitions, data sources and summary statistics for variables

Variables	Definition	Data sources	Mean	Median	Std	Min.	Max.
Dependent variables							
Tobin_Q	Book value of assets minus the book value of equity plus the market value of equity, divided by the book value of assets	Bloomberg, Bankscope	1.05	0.99	0.26	0.69	2.67
DD	Distance to default computed using the Merton (1977) model.	ibid	3.52	3.17	2.61	-2.35	11.61
SMR	Shareholder market return is computed as annualized average monthly returns from share prices of each bank	Bloomberg	0.06	0.02	0.53	-0.99	2.75
Cost of Equity	Cost of equity is estimated using the single-factor capital asset pricing model (Barnes and Lopez, 2006; King, 2009). Our measure of cost of equity is adjusted for inflation by subtracting year-ahead inflation expectations from the nominal risk-adjusted cost of equity.	ibid	12.58	12.11	6.82	0.27	32.81
DD "naïve"	Distance to default is computed in a simpler way as in Bharath and Shumway (2008).	Bloomberg, Bankscope	1.04	0.49	1.83	-0.60	11.55
Z-score	Z-score is computed as the natural logarithm of the ratio of the sum of the mean of ROA and the bank's capital-asset ratio, over the standard deviation of ROA. We compute Z-scores using moving mean and standard deviation for ROA, with window widths of three observations, and current values of the capital asset ratio	Bankscope	3.43	3.60	1.35	-1.14	7.12
Indices of relatedness of board of directors							
Minority	Index of the relatedness of board directors to minority shareholders having less than 10% of relative voting power (see Section B1.3 in Appendix B for details)	Bloomberg, Bankscope, Amadeus, annual reports	3.08	1.5	3.52	0	10
Independent	Index of the independence of board directors from both controlling and minority shareholders using threshold of 10% of relative voting power (see Section B1.3 in Appendix B for details)		7.33	7.5	2.21	2	10

Bank level control variables

BoardSize	Natural logarithm of the number of directors on the board	Bloomberg	2.33	2.39	0.47	1.09	3.25
Size	Natural logarithm of Total Assets (orthogonalized on BoardSize)	Bankscope	16.79	16.67	2.61	9.88	21.65
Risk	Standard deviation of monthly stock returns over the previous twelve months	Bloomberg	3.07	0.33	31.79	0.20	522.7
Growth	Annual growth rate of total assets (%)	Bankscope	5.70	2.47	18.13	-25.01	64.04
Loan	Gross loans divided by total assets (%)	ibid	47.14	51.61	25.60	0.59	89.67
Capital	Total equity divided by total assets (%)	ibid	13.67	6.99	17.40	0.83	55.28
Deposit	Deposits divided by total assets (%)	ibid	55.46	58.20	22.70	1.72	91.72
Operating	Total operating expenses divided by total operating income (%)	ibid	1.80	1.43	1.49	-0.83	9.06
OneTierBoard	Dummy variable taking the value of one if the bank has a one-tier board	Annual reports	0.67	1	0.47	0	1

Country-level control 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 of Rule of Law (RoL). 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. Index varies from 0 to 5. RoL: Index measuring the quality of law enforcement. It captures 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, as well as the likelihood of crime and violence. This index is rescaled to make its range 0 to 5	Djankov et al. (2008) Worldwide Governance Indicators (World Bank)	13.11	13.75	4.63	5.71	21.33
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	Bank regulation and supervision	10	11	2.33	4	13

to the supervisory agency any presumed involvement of bank directors or senior database managers in illicit activities, fraud, or insider abuse? (3) Can supervisors take (World legal action against external auditors for negligence? (4) Can the supervisory Bank) 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 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.

HHI	Herfindahl Index is used to measure the level of competition in the banking sector in each country, calculated from bank market shares in terms of total assets.	Bankscope	0.11	0.09	0.06	0.05	0.30
Further variables							
LoanRPT	Loans to related parties divided by total assets (%)	Annual reports	1.35	0.12	3.67	0	23.73
DInstActive	Dummy variable taking the value of one if at least one of the minority directors is related to an "active" institutional investor (mutual funds, pension funds, and investment companies)	Bloomberg, Bankscope, Amadeus, annual reports	0.63	1	0.48	0	1

PctMinorityInstActive	Percentage of minority directors related to "active" institutional investors (mutual funds, pension funds, and investment companies)	ibid	16.6	0	32.79	0	100
PctMinorityInstDep	Percentage of minority directors related to "pressure-sensitive" institutional investors (banks and insurance companies)	ibid	38.8	12.5	43.1	0	100
PctMinorityFamily	Percentage of minority directors related to individuals/families	ibid	29.7	0	40.1	0	100
PctMinorityIndust	Percentage of minority directors related to non-financial companies	ibid	12.5	0	27.6	0	100
PctMinorityFund	Percentage of minority directors related to foundation/research institute	ibid	2.24	0	13.9	0	100
MinorityInf1	Index of the relatedness of board directors to minority shareholders having less than 1% of relative voting power	ibid	2.33	0	3.29	0	10
Minority1to5	Index of the relatedness of board directors to minority shareholders having between 1% and 5% of relative voting power	ibid	0.96	0	2.51	0	10
Minority5to10	Index of the relatedness of board directors to minority shareholders having between 5% and 10% of relative voting power	ibid	0.53	0	1.87	0	10
Instrumental variables							
DistanceMinoritySH	Average index per bank of distance of minority shareholders from the bank's headquarters. We compute for each minority shareholder an index *D* depending on whether minority shareholders and banks are: (i) in the same city, *D* = 1; (ii) in different cities but same country, *D* = 2; (iii) in different countries but in Europe, *D* = 3; and (iv) in different continents, *D* = 4; *DistanceMinoritySH* is the average of D per bank	Bankscope, annual reports	2.17	2.34	0.81	1	3.63
DiffDistanceSH	Average index per bank of distance of controlling shareholders to the headquarters of the bank minus the average index per bank of distance of minority shareholders to the headquarters of the bank	ibid	0.05	-0.1	1.42	-2.34	3.42

Note: Std = standard deviation

1.4.2. Endogeneity and estimation issues

One of the main concerns of studies on corporate governance in general is the potential problem of endogeneity with firm performance; this has been raised regarding the board of directors in previous studies such as Mak and Li (2001) and Hermalin and Weibach (1998, 2003). Firm performance could be driven by the actions of previous directors, but at the same time be a potentially influential factor in the choice of subsequent directors. We therefore empirically test for the presence of endogeneity problems for the variables of relatedness of board directors to shareholders. We use for that a two-stage least squares method, finding instrumental variables for the two indices of relatedness of board directors in each of the regressions on Tobin's Q and distance to default. For this we identify instrumental variables (IVs) that satisfy the exclusion restrictions, i.e. they need to be correlated with our indices of relatedness of directors, but without affecting Tobin's Q and distance to default directly.

For the index of relatedness of minority directors *Minority$_{ij}$*, we use the instrumental variable *DistanceMinoritySH$_{ij}$* that measures the average distance of minority shareholders to the headquarters of the bank. The conceptual idea for the relevance of this variable is that the further a minority shareholder is from the headquarters of a bank, the more difficult it might be to directly lobby/influence managers and the board of directors. Presence of directors on the board that are related to them might be a solution for these minority shareholders to ensure that their interests will be protected even if they are at a geographical disadvantage in this respect. We thus expect that a bank with a higher number of minority shareholders located far away from its headquarters has a higher number of minority directors in its board. We compute for each minority shareholder the index *D* depending on whether minority shareholders and banks are: (i) in the same city, $D = 1$; (ii) in different cities but same country, $D = 2$; (iii) in different countries but in Europe, $D = 3$; and (iv) in different continents, $D = 4$. The variable *DistanceMinoritySH$_{ij}$* is then the average of the index *D* per bank.

For the index measuring the presence of "independent" directors, we consider the instrumental variable *DiffDistanceSH$_{ij}$* which is calculated as the average distance of controlling shareholders to the headquarters of the bank minus the average distance of minority shareholders to the headquarters of the bank; construction of the variable *DiffDistanceSH$_{ij}$* is analogous to the one for variable *DistanceMinoritySH$_{ij}$* outlined above. Shareholders in greater proximity to the headquarters of a bank have greater opportunities to directly lobby/influence managers and the board of directors, with obvious consequences for the conflict of interest

between controlling and minority shareholders. Hence, if controlling shareholders want to signal they do not want to expropriate minority shareholders, the lower the difference of average distances of controlling/minority shareholders to the headquarters of the bank, the higher might be the number of "independent" directors needed to help achieve this goal.

In order to determine whether fixed-effects or random-effects estimators are more appropriate, we test whether the individual-specific effect might not be correlated with explanatory variables; this uses the robust Hausman test, which is equivalent to the traditional Hausman test under conditional homoscedasticity (Arellano, 1993; Wooldridge, 2002). The robust Hausman test results reported in the lower part of Tables 1.3 and 1.4 indicate that it is appropriate to use the random effects method in our panel. For the IV regressions, we thus apply a generalized two-stage least squares (G2SLS) random-effects estimator, using the Balestra and Varadharajan-Krishnakumar (1987) implementation. As we cannot reject the hypothesis that the data does not have first-order autocorrelation, we use the Generalized Least Square (GLS) random effects technique in the alternative non-IV case.

Being purely distance based measures, our instrumental variables *DistanceMinoritySH$_{ij}$* and *DiffDistanceSH$_{ij}$* should not affect banks' performance and risk directly. However, they are likely to directly affect the indices of relatedness of directors; our instruments should therefore satisfy the exclusion restrictions. We verify the validity of our instruments by examining for each G2SLS regression the Cragg-Donald Wald F statistic for test of weak identification and the LM statistic for test of under-identification. The under-identification and weak identification tests are reported in the lower part of Tables 1.3 and 1.4, as well as the coefficients and Z-statistics of our instrumental variables for the first stage, where we include all explanatory variables used in the second stage. We can see from the first-stage results that the instrumental variables have a significant impact on the indices of relatedness at the 1% significance level, with the expected signs. For all regressions we can reject the under-identification restrictions tests and the weak instruments tests at the 1% level, confirming that our instruments are (empirically) relevant.

Then, we carry out endogeneity tests to test whether or not there is in fact an endogeneity problem regarding our variables of interest. For this, we compare the coefficients obtained from models using the G2SLS method with the equivalent ones obtained without instrumental variables, applying the Hausman test to examine the null hypothesis of no significant difference between estimated coefficients in the two models. The endogeneity tests reported in the lower

part of Tables 1.3 and 1.4 show throughout that we cannot reject the null hypothesis; therefore, we can conclude that the variables of relatedness of board directors to shareholders are strictly exogenous in our sample of European banks. We can see that the relationship between our indices of relatedness and both Tobin's Q and the distance to default are qualitatively similar between GLS and the second-stage G2SLS estimates. As instrumental variables estimators can be highly inefficient when the explanatory variables are in fact exogenous, we rely on the results from our GLS estimation throughout.

Table 1.3. Impact of relatedness of directors to shareholders on market valuation

Dependent variable: Tobin's Q				
	GLS	G2SLS 2nd Stage	GLS	G2SLS 2nd Stage
	(1)	(2)	(3)	(4)
Minority	0.0146***	0.114**		
	(6.27)	(2.37)		
Independent			-0.00531	-0.0515
			(-1.56)	(-0.63)
BoardSize	-0.0600***	-0.134***	-0.0596***	-0.120***
	(-7.50)	(-3.23)	(-7.24)	(-2.83)
Size	-0.104***	-0.123***	-0.110***	-0.134***
	(-12.14)	(-2.84)	(-11.65)	(-3.97)
Growth	0.000564***	-0.000340	0.000529***	-0.000500
	(3.30)	(-0.44)	(2.97)	(-0.64)
Capital	0.000547	-0.0599	0.00103**	-0.0215
	(1.33)	(-1.48)	(2.44)	(-0.64)
Loan	0.00000307	0.00753	-0.000175	-0.0221
	(0.01)	(0.19)	(-0.64)	(-0.65)
Risk	0.000181	0.0000177	0.000117	-0.00000143
	(1.57)	(0.05)	(1.04)	(-0.00)
Tier1	0.00461	-0.0643	0.0227	0.0293
	(0.31)	(-0.78)	(1.40)	(0.45)
SupPow	-0.0106***	0.0133	-0.0167***	-0.0143
	(-3.47)	(0.52)	(-4.07)	(-0.74)
Legal	-0.00604***	-0.0226*	-0.00612***	-0.00918
	(-4.04)	(-1.66)	(-3.15)	(-0.85)
GDP	0.00395**	-0.00453	0.00596***	-0.00383
	(2.05)	(-0.57)	(2.83)	(-0.44)
Constant	1.175***	0.940**	1.300***	1.669**
	(23.12)	(2.50)	(15.81)	(2.07)
Observations	282	282	282	282
FE vs RE test				
Chi-squared	10.942	5.25	11.437	2.09
p-value	[0.28]	[0.81]	[0.25]	[0.99]
IV First stage estimation		G2SLS 1st Stage		G2SLS 1st Stage
Instrument used		DistanceMinoritySH		DiffDistanceSH
		1.458***		-0.286***
		(5.16)		(-3.20)
Instrument validity tests				
Weak identification test (F-stat)		26.62		10.21
p-value		[0.00]		[0.00]
Underidentification test (LM-stat)		25.31		10.28
p-value		[0.00]		[0.00]
Endogeneity test (IV vs non-IV)				
Chi-squared		3.34		0.16
p-value		[0.99]		[1.00]

Notes. The regressions in this table investigate the impact of the presence/influence of related directors on Tobin's Q. The variables *"Minority" and "Independent"* are the indices measuring the presence/influence of minority directors and "independent" directors, respectively. All other variables are as defined in Table 1.2. Columns (1) and (3) report results using the GLS random-effects estimator. Columns (2) and (4) report 2nd stage of G2SLS random-effects estimations. The result of robust Hausman test (*fixed effects vs random effects*), first stage regression, tests of validity of instruments and endogeneity test are reported in the lower part of the table.

Table 1.4. Impact of relatedness of directors to shareholders on the distance to default

Dependent variable: Distance to default				
	GLS	G2SLS 2nd Stage	GLS	G2SLS 2nd Stage
	(1)	(2)	(3)	(4)
Minority	0.0600***	0.442**		
	(5.42)	(2.02)		
Independent			-0.0197	0.126
			(-0.95)	(0.45)
BoardSize	-0.116***	-0.593***	-0.0730	-0.280*
	(-2.83)	(-3.18)	(-1.36)	(-1.70)
Size	-0.562***	-1.085***	-0.509***	-1.035***
	(-10.67)	(-6.93)	(-9.10)	(-9.65)
Growth	0.0166***	0.00343	0.0174***	0.0100**
	(11.73)	(0.74)	(11.01)	(2.10)
Capital	0.0687***	0.753***	0.0749***	1.020***
	(15.51)	(3.89)	(17.10)	(7.01)
Loan	0.00878***	0.130	0.00939***	0.0820
	(5.05)	(0.88)	(4.33)	(0.76)
Deposit	-0.0195***	-0.00819	-0.0179***	-0.0140**
	(-8.86)	(-1.12)	(-7.49)	(-2.33)
Operating	0.00611	-0.00489	0.00485	-0.00404
	(0.55)	(-0.26)	(0.42)	(-0.22)
Tier1	0.0308	-0.531	0.0256	0.102
	(0.39)	(-1.26)	(0.26)	(0.44)
SupPow	-0.0618***	0.0146	-0.0865***	-0.0318
	(-2.77)	(0.17)	(-2.98)	(-0.51)
Legal	-0.00429	-0.0558	-0.00988	0.0309
	(-0.41)	(-0.98)	(-0.69)	(0.92)
GDP	0.0427***	-0.0513	0.0581***	0.0145
	(2.80)	(-1.09)	(2.97)	(0.27)
Constant	1.504***	1.415	1.932***	0.943
	(3.77)	(1.10)	(3.43)	(0.37)
Observations	271	271	271	271
FE vs RE test				
Chi-squared	11.202	5.10	10.912	2.37
p-value	[0.19]	[0.83]	[0.21]	[0.98]
IV First stage estimation		G2SLS 1st Stage		G2SLS 1st Stage
Instrument used		DistanceMinoritySH		DiffDistanceSH
		1.084***		-0.252***
		(3.75)		(-2.83)
Instrument validity tests				
Weak identification test (F-stat)		14.04		7.99
p-value		[0.00]		[0.00]
Underidentification test (LM-stat)		13.99		8.14
p-value		[0.00]		[0.00]
Endogeneity test (IV vs non-IV)				
Chi-squared		7.90		0.37
p-value		[0.72]		[1.00]

Notes. The regressions in this table investigate the impact of the presence/influence of related directors on the distance to default. The variables "*Minority" and "Independent"* are the indices measuring the presence/influence of minority directors and "independent" directors, respectively. All other variables are as defined in Table 1.2. Columns (1) and (3) report results using the GLS random-effects estimator. Columns (2) and (4) report 2nd stage of G2SLS random-effects estimations. The result of robust Hausman test (*fixed effects vs random effects*), first stage regression, tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

1.4.3. Impact on market valuation and default risk

The estimation results for Equation (1) with the Tobin's Q ratio as dependent variable are given in Table 1.3, whereas Table 1.4 presents the respective results for the distance to default. In each case, we report the GLS random-effects estimates in columns 1 and 3, and the second stage of the G2SLS random-effects estimations in columns 2 and 4.

Our results show that the presence and influence of minority directors within the board (*Minority*) has a significant and positive impact on Tobin's Q (columns 1 and 2 of Table 1.3). These results are consistent with the hypothesis H1, suggesting that having directors that are related to minority shareholders might be an effective means to convince outside investors that controlling shareholders may refrain from diverting resources. Our results further show that the presence of directors that are "independent" from shareholders (*Independent*) is not associated with a significant impact on Tobin's Q (columns 3 and 4 of Table 1.3). Our results are in contrast to those of Dahya et al. (2008) who find a significant and positive relationship between the presence of "independent" directors and Tobin's Q. A plausible explanation for this is the fact that we exclude from "independent" directors those that are in fact related to minority shareholders, for which we find a positive and significant impact on Tobin's Q. The non-significant relationship between "independent" directors and stock market valuation could be due to the difficulty faced by controlling shareholders to commit credibly to non-expropriation through the inclusion of "independent" directors; this is due to the fact that the latter are often appointed by controlling shareholders, or otherwise by "independent" nomination committees which may nevertheless also depend on them. As a consequence, our results indicate that banks with controlling shareholders might be able to offset the market value discount, at least partly, by allowing minority shareholders to appoint related directors rather than including directors that are "independent" from shareholders.

As concerns the control variables included, almost all are seen to be significant with the expected signs. In particular, we find a negative relationship between board size and Tobin's Q, in line with Pathan and Faff (2013).

Our results further show that the presence and influence of minority directors on the board significantly increases the distance to default (i.e. decreases default risk), in line with our hypothesis H2b (columns 1 and 2 of Table 1.4). The results seem to indicate that minority directors might in fact be reluctant to take riskier decisions supporting the hypothesis that they aim to maintain their reputation in the market for directorships (Fama and Jensen, 1983). Inclusion of directors that are related to minority shareholders appears therefore to be an

effective approach to curtail the agency problems observed in banks between minority and controlling shareholders, as well as between shareholders and depositors/debt holders/regulators. We furthermore find that the presence of "independent" directors is not associated with a significant impact on default risk (columns 3 and 4 of Table 1.4), in line with Minton et al. (2014) and Battaglia and Gallo (2017).

As for the control variables included, almost all are seen to be significant.

1.4.4. Channels of impact

Related party transactions

We have hypothesized that the positive impact of the presence/influence of minority directors on Tobin's Q could be driven by a reduction in the risk of expropriation by controlling shareholders, as minority directors could curb diversion of corporate resources by effectively monitoring insiders. We follow Cheung et al. (2006) and Dahya et al. (2008) and use related party transactions (RPTs) as a proxy of the degree of potential resource diversion. There are many types of transactions that can be conducted between related parties, such as sales, asset transfers, leases, lending arrangements, guarantees; however, for banks the dominant RPT is loans to related parties.

We collect data on RPTs from banks' annual reports for the years 2011-2013. Since the implementation of the IAS 24 Related Party Disclosures norm in 2011, European listed companies are required to disclose in their annual reports all transactions with related parties such as executives, associates and their family members. We collect the amount of loans granted by insiders to related parties and compute for each bank the ratio of related loans to total assets; we find that these related loans represent around 1.35% of total assets in our sample of European banks.

The existing literature shows that controlling shareholders have the opportunity to transfer wealth from the firm to their own benefit (tunneling resources), in particular through RPTs (e.g. Johnson et al., 2000; Bae et al. 2002; Bertrand et al., 2002). We therefore might expect that banks with minority directors on their boards have lower levels of RPTs, with increased monitoring reducing possible resource diversion. We further analyze whether the presence of "independent" directors could also reduce related loans, by alternatively including *Independent$_{ij}$* instead of *Minority$_{ij}$*. We include a range of bank and country control variables (board size, board tier structure, bank size, growth of assets, capital structure, loan ratio, operating ratio and risk, as well as the growth rate of GDP and the level of minority shareholder protection).

Results in Table 1.5 show that the coefficient of $Minority_{ij}$ is negative and statistically significant, implying that the presence/influence of minority directors reduces the amount of related loans granted by insiders. We also find that the presence of "independent" directors significantly reduces related loans. With RPTs being a key mechanism for controlling shareholders to expropriate minority shareholders, including either minority directors or "independent" directors seems to limit such behavior. However, as our previous results indicated, only the presence of minority directors is associated with a positive impact on banks' market valuation and appears therefore to be a credible way for controlling shareholders to signal they will not expropriate minority shareholders.

Table 1.5. Channels of impact (1): related party transactions

Dependent variable: Ratio of related loans to total assets		
	(1)	(2)
Minority	-0.199***	
	(-2.75)	
Independent		-0.392***
		(-2.93)
BoardSize	-1.047***	-1.547***
	(-3.51)	(-4.52)
Size	0.340	0.247
	(1.13)	(0.79)
Growth	-0.0120**	-0.0141***
	(-2.41)	(-2.76)
Capital	-0.00475	-0.0276
	(-0.24)	(-1.35)
Operating	-0.0822	-0.00913
	(-1.25)	(-0.14)
Risk	0.00138	0.00243
	(0.51)	(0.77)
OneTierBoard	0.305	-0.129
	(0.77)	(-0.29)
Legal	-0.162**	-0.274***
	(-2.49)	(-4.62)
GDP	0.0602	0.0189
	(1.11)	(0.33)
Constant	4.684***	9.222***
	(4.60)	(5.56)
Observations	284	284
FE vs RE test		
Chi-square	7.776	8.257
p-value	[0.56]	[0.51]

Notes. This table reports the results of the following equation to examine the effect of the presence/influence of minority directors/"independent" directors on related party transactions:

$$LoansRPT_{ijt} = \alpha + \beta Relatedness_{ij} + \sum_{m} \theta_m BankControl_{ijt} + \sum_{n} \gamma_n CountryControl_{jt} + \varepsilon_{ijt}$$

The dependent variable is the ratio of related loans to total assets. The variables "*Minority*" and "*Independent*" are the indices measuring the presence/influence of minority directors and "independent" directors, respectively. All other variables are as defined in Table 1.2. To obtain the results, we estimate the above equation by using the GLS random effects estimator. The last two lines of the table report the results of robust Hausman tests test (*fixed*

effects vs random effects). Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

"Active" Institutional investors

We now examine whether minority shareholders that are "active" institutional investors (i.e. pension and mutual funds and investment companies) could achieve better monitoring of controlling shareholders and consequent limitation of expropriation behavior through the appointment of directors that are related to them. More than 87% of these directors are related to "active" institutional shareholders through being one of their employees, with presumably significant skills and incentives to further the interests of their employers.

To examine this potential channel of impact, we first augment Equation (1) with interaction terms between the index measuring the presence/influence of minority directors (*Minority$_{ij}$*) and a dummy variable taking the value of one if at least one of the minority directors is related to an "active" institutional shareholder. Our results are shown in Table 1.6, Panel A. We observe that the positive impact of minority directors on Tobin's Q appears to hold only if at least one of the minority directors is related to an "active" institutional shareholder, confirming the role of this potential channel. Furthermore, we note at the same time that the risk reducing impact of minority directors appears to be significantly driven by those related to "active" institutional shareholders, whereas absence of any minority director related to an "active" institutional shareholder seems to in fact lead to increased risk taking (in line with our hypothesis H2a).

We further analyze the impact on market valuation and default risk of having directors related to "active" institutional shareholders as compared to having directors related to the other minority shareholder types. In our sample, around 17% of directors are related to "active" institutional shareholders as minority shareholders, 40% to "dependent" institutional investors, i.e. banks and insurance companies, 30% to individuals/families, 12.5 % to non-financial companies, 2.5% to foundations/research institutes, and none related to a government or a public authority. We exclude the group of minority directors related to "active" institutional investors; we are thus able to determine if a shift in the number of directors related to "active" institutional investors to another type of related directors results in an increase or a decrease in Tobin's Q and default risk. The results in Table 1.6 Panel B show that a shift from directors related to "active" institutional shareholders to any other minority director type is significantly associated with a decrease in Tobin's Q. These results confirm the role played by directors related to "active" institutional shareholders as a channel to explain the positive relationship

we observed between market valuation and the presence of minority directors. Moreover, our results show that a shift in directors related to "active" institutional shareholders to other types of minority directors does not imply a different level of default risk, except for those related to foundations/research institutes and families/individuals (but only at a 10% significance level).

Table 1.6. Channels of impact (2): minority directors related to "active" institutional investors

	Tobin's Q	Distance to default
Panel A : Minority directors related to "active" institutional investors		
Minority ($\beta1$)	-0.00288	-0.0808**
	(-0.80)	(-2.08)
Minority * *DInstActive* ($\beta2$)	0.0288***	0.363***
	(6.31)	(5.60)
Control variables	Yes	Yes
Wald test		
$\beta1 + \beta2 = 0$	0.0260***	0.283***
	[0.00]	[0.00]
Panel B : Minority directors related to various minority shareholder types compared to those related to "active" institutional shareholders		
PctMinorityFamily	-0.408***	-0.853*
	(-7.56)	(-1.70)
PctMinorityIndust	-0.429***	-0.777
	(-4.97)	(-1.37)
PctMinorityInstDep	-0.356***	-0.248
	(-7.10)	(-0.55)
PctMinorityFund	-0.468***	-3.398***
	(-5.72)	(-4.53)
Control variables	Yes	Yes

Notes. The regressions in this table examine the potential channel of impact of minority directors being related to "active" institutional investors (pension and mutual funds, and investment companies). Panel A reports estimation results of Equation (1) when augmented with an interaction term between the index measuring the presence/influence of minority directors (*Minority)* and the dummy variable *DInstActive,* which takes the value of one if at least one of the minority directors is related to an "active" institutional investor. Corresponding Wald tests are reported at the end of Panel A. Other variables are as defined in Table 1.2. Panel B reports estimation results which investigate the impact of having minority directors related to "active" institutional shareholders as compared to having directors related to the other minority shareholder types. The results are obtained by carrying out the following regression:

$$Y_{ijt} = \alpha + \beta_1 PctMinorityInstDep_{ij} + \beta_2 PctMinorityIFamily_{ij} + \beta_3 PctMinorityIndust_{ij} + \beta_4 PctMinorityFound_{ij} + \sum_m \theta_m BankControl_{ijt} + \sum_n \gamma_n CountryControl_{jt} + \varepsilon_{ijt}$$

where *PctMinorityInstDep*, *PctMinorityFamily*, *PctMinorityIndust* and *PctMinorityFund* are the percentage of minority directors related to banks/insurance companies, individuals/families, industrial companies and foundations/research institutes, respectively; we exclude the percentage of minority directors related to "active" institutional investors. The resulting impact on Tobin's Q and the distance to default are reported in Columns (1) and (2), respectively. We use the GLS random effects estimator; control variables are included in the regressions, but not reported in this table. Z-statistics are in parentheses (p-values are in parentheses in the Wald tests), with *, **, and *** denoting significance at 10%, 5% and 1% levels.

1.5.   When do minority directors matter most?

We now examine in greater detail whether there are particular circumstances or contexts in which the presence/influence of minority directors on boards has the most significant impact on market valuation and/or risk.

1.5.1. Degrees of "minor"

In our analysis so far, we have defined a minority director as being related to shareholders with less than a 10% stake. We now examine whether there are any differences in results when minority directors are related to minority shareholders holding particular levels of stakes within that less than 10% range. Table A1.5 displays the percentage of minority directors related to shareholders holding either less than 1% of shares, between 1-2%, 2-3%, 3-4% or 5-10%. In our sample, around 70% of minority directors are related to shareholders holding less than 1% of shares, 19% to shareholders holding between 1 to 5% of shares, and only 11% to shareholders holding between 5 to 10% of shares. We thus disaggregate our index measuring the presence/influence of minority directors over three ranges below the 10% threshold, i.e. below 1% ($MinorityInf1_{ij}$), between 1% and 5% ($Minority1to5_{ij}$), and between 5% and 10% ($Minority5to10_{ij}$). When we rerun Equation (1) with those three sub-indices, we observe that the positive impact on Tobin's Q is driven by minority directors that are related to shareholders with less than 5% holdings (see Table 1.7, Panel A), whereas we find a negative impact on Tobin's Q when minority directors are related to shareholders with more than 5% holdings. The result that minority directors are linked to lower bank risk seems to hold independently of the levels of shares held by the minority shareholder they are related to.

We similarly reexamine the potential channel of impact of minority directors being related to "active" institutional shareholders. In our sample, minority directors are mostly related to "active" institutional shareholders holding either less than 1% of shares or between 1 to 5% of shares, but are absent in the 5 to 10% range of shareholdings. We therefore only interact the two disaggregated indices $MinorityInf1_{ij}$ and $Minority1to5_{ij}$ with a dummy variable taking the value of one if at least one of the minority directors is related to an "active" institutional shareholder. Results in Table 1.7 Panel B show that the presence of minority directors that are related to "active" institutional shareholders has a positive impact on market valuation irrespective of the proportion of shares held by them.

The presence of minority directors related to the other shareholder types has a negative impact if they hold more than 1% of shares. Our results also confirm that only the presence of minority

directors related to "active" institutional shareholders is associated with an increase in the distance to default (i.e. a decrease in default risk).

Table 1.7. Impact of differences in degrees of "minority" and the role of "active" institutional shareholders

	Tobin's Q	Distance to default
Panel A: Minority directors related to minority shareholders holding various levels of shares		
MinorityInf1	0.0137***	0.131***
	(5.58)	(2.88)
Minority1to5	0.0202***	0.135**
	(9.91)	(2.21)
Minority5to10	-0.0270***	0.112**
	(-2.77)	(2.21)
Control variables	Yes	Yes
Panel B: Minority directors related to "active" institutional investors holding various levels of shares		
MinorityInf1 (v1)	-0.00374	0.0296
	(-0.72)	(0.49)
MinorityInf1*DInstActive (v2)	0.0160**	0.183**
	(2.44)	(2.18)
MinorityInf5 (v3)	-0.0244*	-0.0846
	(-1.90)	(-1.38)
MinorityInf5*DInstActive (v4)	0.0583***	0.338***
	(4.23)	(3.71)
MinoritySup5	-0.0373**	0.127
	(-2.28)	(0.86)
Control variables	Yes	Yes
Wald test		
v1+ v2=0	0.0123***	0.212***
	[0.00]	[0.00]
v3+ v4=0	0.0339***	0.254***
	[0.00]	[0.00]

Notes. The regressions in this table investigate the impact of minority directors for different degrees of "minor" on market valuation (Column (1)) and on the distance to default (Column (2)). Variables are defined as in Table 1.2. Panel A reports results where minority directors are related to minority shareholders holding varying levels of shareholdings. We use the indices *"MinorityInf1"*, *"Minority1to5* and *"Minority5to10"* to measure the presence/influence of minority directors related to shareholders holding less than 1%, between 1% and 5%, and between 5% and 10% of shareholdings, respectively. Panel B reports results of the potential channel of impact of minority directors related to "active" institutional shareholders, with different degrees of "minor". The results in panel B are obtained by including in our regressions the interaction terms between the two indices of minority directors *"MinorityInf1"* and *"Minority1to5"* with the dummy variable *DInstActive,* which takes the value of one if at least one of the minority directors is related to an "active" institutional shareholder. The variable *DInstActive* is not interacted with *"Minority5to10"* as "active" institutional shareholder are absent in the 5 to 10% range of shareholdings. The corresponding Wald tests are reported at the end of Panel B. We use the GLS random effects estimator; control variables are included in the regressions, but not reported in this table. Z-statistics are in parentheses (p-values are in parentheses in the Wald tests), with *, **, and *** denoting significance at 10%, 5% and 1% level.

1.5.2. Institutional, regulatory and market environment

We then investigate whether a strong regulatory and institutional environment, 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 bank stakeholders. In strict supervisory systems, supervisors can issue fines against, or even dismiss, bank directors without formal proceedings, and/or mandate new board elections. This might give strong incentives to directors to soundly monitor insiders if they seek to keep their board seat. The effectiveness of directors' monitoring might also depend crucially on the level of minority shareholder protection. If minority shareholders want to nominate directors to board positions, they might 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. On the other hand, greater minority shareholder protection might limit the opportunistic expropriation behavior of bank insiders. Effective monitoring by directors may therefore be less essential in controlling potential agency conflicts in countries with higher levels of minority shareholder protection (Dahya et al. 2008). To examine whether country-level governance plays a role in minority directors' impact on the reduction of agency conflicts, we augment Equation (1) with interaction terms between the different indices of relatedness and a variable capturing the regulatory and institutional environment.

To measure the strength of the supervisory regime, we compute the index $SupPow_j$ using the World Bank's 2013 Bank Regulation and Supervision database (Barth et al., 2013). It measures propensities of regulatory authorities to do on-site examinations, in order to make an overall assessment of a bank's 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 1.2 for details). The index $SupPow_j$ ranges in principle from 0 to 13, with a higher index indicating stronger supervisory strength. If stronger supervisory regimes provide incentives to minority directors to soundly monitor insiders, we expect the interaction term to be significant and positive.

To measure the level of minority shareholder protection, we follow Rossi and Volpi (2004), Hagendorff et al. (2010) and Dahya et al. (2008) and construct an index that combines two established indices, one measuring the level of shareholder rights (revised anti-director rights index of Djankov et al. (2007)) and one measuring the quality of law enforcement (the rule of

law index from the Worldwide Governance Indicators (World Bank)). The anti-director rights 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 0 to 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 a minority director's monitoring actions depends on the level of shareholder protection, we expect the interaction term to be significant and positive for both the Tobin's Q ratio and the distance to default. On the other hand, we expect the interaction term to be significant and negative if monitoring of minority directors is less essential to reducing potential agency conflicts in countries with higher levels of minority shareholder protection.

The estimation results for the augmented Equation (1) are given in Tables A1.7 in Appendix A. To facilitate interpretation, we comment the marginal effects evaluated at quartile levels for the index of strength of supervisory regime and the index of minority shareholder protection, as reported in Table 1.8; the two regulatory and institutional indices are scaled to have a minimum of zero. We observe 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 (see columns 1 to 4, Table 1.8). 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 other hand, we find that the positive impact of the presence/influence of minority directors on Tobin's Q is decreasing for higher levels of minority shareholder protection, while the positive impact on the distance to default is increasing for higher levels of minority shareholder protection (see columns 5 to 8, Table 1.8).

We next examine whether the degree of competition in the banking market could influence the relationship between the presence/influence of minority directors and bank performance. Aghion and Howitt (1998) and Aghion et al. (1999) theoretically show that competition appears to be a substitute to "good" governance at the firm level. This substitution effect implies that when corporate governance is weak, competition impels insiders to behave efficiently, with

competition acting as a disciplining force. On the contrary, Holmström and Milgrom (1994) argue that corporate governance and competition are complementary mechanisms. Previous empirical studies also provide mixed results in line with either the substitute mechanism hypothesis (e.g. Giroud and Mueller, 2010, 2011) or the complementary mechanism hypothesis (Grosfeld and Tressel, 2002).

To investigate this in our context, we additionally consider the role of competition as measured by the Herfindahl Index (HHI_{jt}) of bank market shares in terms of total assets. The estimation results for the augmented Equation (1) are given in Table A1.7 in Appendix A, and the marginal effects in Table 1.8 (columns 9 to 12). We observe from Table A1.7 that the positive impact of the presence/influence of minority directors on Tobin's Q does not depend on the strength of competition. On the other hand, our results show that the positive impact of minority directors on the distance to default is decreasing with the strength of competition.

Table 1.8. The role of the institutional, regulatory and market environment

Marginal effects at	Supervisory Power				Shareholder protection				Competition			
	SupPow (Q0)	SupPow (Q25)	SupPow (Q50)	SupPow (Q75)	Legal (Q0)	Legal (Q25)	Legal (Q50)	Legal (Q75)	HHI (Q0)	HHI (Q25)	HHI (Q50)	HHI (Q75)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Tobin's Q												
Minority	-0.0187***	0.0071***	0.0175***	0.0278***	0.0303***	0.0198***	0.0136***	0.0097***	0.014***	0.014***	0.014***	0.014***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distance to default												
Minority	0.009	0.068***	0.092***	0.116***	0.019*	0.045***	0.061***	0.07***	0.139***	0.130***	0.0992***	0.0402**
	(0.27)	(0.00)	(0.00)	(0.00)	(0.17)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)

Notes. This table reports marginal effects for different levels of the institutional, regulatory and market environment. The results in this table are computed from Table A1.7 in Appendix A. Variables are defined as in Table 1.2. Columns (1) to (4) report the marginal effects evaluated at quantile levels for the index of strength of supervisory regime, which is measured by the index *SupPow* from the World Bank's 2013 Bank Regulation and Supervision database. Columns (5) to (8) show the marginal effects for different levels of minority shareholder protection, which is measured by the index *Legal*. The index *Legal* combines two indices, one measuring the level of shareholder rights (revised anti-director rights index of Djankov et al. (2007)), and one measuring the quality of law enforcement (the rule of law index from the Worldwide Governance Indicators (World Bank)). Columns (9) to (12) present the marginal effects for different degree of competition in the banking market. The Herfindahl Index (HHI_{jt}) of bank market shares in terms of total assets is used to measure the competition in the banking market in each country in the sample. P-values are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

1.6. Robustness

We subject our results to a wide range of robustness checks relating to possible empirical misspecification and sample issues, and the criteria used to identify controlling shareholders and related directors (see Tables A1.8 to A1.11 below).

Alternative variable definitions, time periods and specifications

We verify our results using alternative measures of our dependent variables (see Table 1.2 for a definition). For the market valuation, we alternatively use Shareholder Market Return (SMR) based on De Andres and Vallelado (2008), and the cost of equity as in Barnes and Lopez (2006) and King (2009). We still find that the presence of minority directors on the board has a positive impact on market valuation. We use the single-factor capital asset pricing model to estimate the cost of equity, as in Barnes and Lopez (2006) and King (2009). The cost of equity of a bank is the sum of the time value of money expressed by the risk free rate R_f, and the bank's risk expressed by the bank-specific premium, computed as the product of the CAPM beta (β_{im}) and a country's historical equity market risk premium ($E[R_m] - R_f$), with $E[R_m]$ the estimated market return.[15] The presence of minority directors and is associated with a lower cost of equity, whereas the presence of "independent" directors has no significant impact. We also consider two alternative measures of bank insolvency risk. We first use the method developed by Bharath and Shumway (2008) to compute a "naïve" distance to default, which is relatively simpler to implement than the Merton model. We also consider the widely used Z-score defined as $Z_{ROA} = (\mu_{ROA} + Capital)/\sigma_{ROA}$, with μ_{ROA} and σ_{ROA} respectively the mean and the standard deviation of *ROA*, and *Capital* 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 *Capital*. 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. Both of these two alternative risk measures confirm our results.

We also include country and year dummies in our regressions, excluding country-level variables, and find similar results. To examine whether our results are sensitive to the particular time period chosen, we also rerun our regressions for the periods 2012-2014 and 2013-2015 instead of 2011-2013; our results remain unchanged.

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[15] We use monthly data extracted from Bloomberg, and calculate a 60 months rolling window beta. The estimated market return is taken from the Dividend Discount Model in the Bloomberg database. Our measure of cost of equity is adjusted for inflation by subtracting year-ahead inflation expectations from the nominal risk-adjusted cost of equity.

Criteria to identify controlling shareholders and related directors

We alternatively use voting rights of shareholders instead of their relative voting power to construct our indices of relatedness *Minority* and *Independent*, and find similar results. We also re-estimate our regressions with the percentages of directors in the given relatedness categories; results are again unchanged. We furthermore use the control threshold of 20% instead of 10% to identify controlling and minority shareholders. This alternative minimum control threshold changes our sample as we end up with 71 controlled banks, of which only 29 have minority directors; however, our conclusions remain unchanged.

Sub sample analysis

We rerun our regressions on different sub-samples to test the robustness of our analysis. We first exclude Spain and Italy from the initial sample to ensure that our results are not driven by their inclusion, as these are the only two countries to prescribe the presence of minority directors (with however no obligation for companies to comply or explain deviations from this). Results show that our main conclusions are unchanged.

We also exclude from the initial sample banks cross-listed on a US exchange. Theoretical and empirical work on corporate governance shows that cross-listing on a more transparent market, with higher requirements in terms of published information, can be considered as 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 ones of countries in our study. We consequently exclude four banks 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. Excluding the four banks having dual class stock, our conclusions from previous sections prevail. 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 as shareholders when it is not a common family name in each country (8 directors in our sample). We also went further and did not consider these directors at all as their relatedness may be exposed to a potentially more substantial risk of misclassification; our main conclusions remained unchanged.

1.7. Conclusion

Our investigation examined whether banks with controlling shareholders that allow minority shareholders to appoint board directors can benefit from an increased market valuation as a consequence, and whether or not this presence of minority directors would, however, be accompanied by increased bank risk taking. For this, we analyse the impact of the presence/influence of such minority directors, compared to "independent" directors, on stock market valuation and bank default risk, using a hand-collected data set on banks' ultimate control and relatedness of board directors to shareholders for a sample of listed European banks.

We find that the presence and influence of minority directors on bank boards has a positive and significant impact on market valuation. We provide evidence that minority directors might generate value by decreasing the risk of expropriation, as we find that their presence on boards has a negative impact on the magnitude of related party transactions. Hence, our results confirm that minority directors can be a way for banks with controlling shareholders to credibly commit that they will not expropriate minority shareholders. One of the potential channels of impact we examined is the role of minority shareholders classified as "active" institutional investors (i.e. pension and mutual funds, and investment companies) in the limitation of expropriation behavior of controlling shareholders. This could be achieved through appointing directors that are related to them (e.g. through being one of their employees) in order to achieve better monitoring of controlling shareholders. Our results confirm the role played by directors related to "active" institutional investors as a channel to explain the positive relationship we observe between Tobin's Q and the presence of minority directors.

Our overall results further suggest that the presence of minority directors on boards is associated with lower risk. However, further investigation interestingly reveals that risk is seen to be lower only in banks where at least one minority director is related to "active" institutional investors, but is in fact higher otherwise. This result points to the importance of including minority directors with connections to "active" institutional investors when aiming to credibly commit to non-expropriation of minority shareholders while at the same time reducing risk taking incentives.

Regarding the impact of the presence of "independent" directors, we find that it is associated with a non-significant impact on both market valuation and risk-taking. It appears therefore that the presence of "independent" directors on boards does not credibly signal a strong board likely to restrain controlling shareholders from diversion of firm resources. An approach of allowing minority shareholders to appoint directors seems therefore a more effective way to

achieve the twin objectives of not only enhancing welfare of shareholders but also of depositors, debtholders and regulators.

We further observe that stronger supervisory regimes might 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.

Overall, our findings contribute to the current policy debate on what forms of corporate governance in banks could lead to the most efficient outcome for stakeholders in terms of both market valuation and financial stability. Some regulators have suggested amending Codes of Corporate Governance with the recommendation that at least one director should be nominated by banking regulators to reduce the agency conflict between shareholders and depositors/debt holders/regulators (Acharya et al., 2009). However, such a recommendation might be considered unacceptable for many bank insiders and may thus not be widely applied. Our work suggests instead that recommending a sufficient presence of minority directors could increase bank board effectiveness for controlled banks, in particular if they are related to "active" institutional investors as they might be more willing to challenge controlling shareholders' decisions and limit any expropriation behavior. Firstly, this could ensure that the risk-taking incentives of insiders are better aligned with the interests of other stakeholders such as depositors, debt holders and banking supervisors. Secondly, it could also allow controlling shareholders to credibly commit that they will not divert corporate resources, leading to higher market valuations. As a consequence, it seems advisable that Corporate Governance Codes should recommend allowing minority directors to be present in bank boards. Of course, to a controlling shareholder, the cost of including minority directors is the potential reduction in perquisites linked to being in a controlling position, which might thus plausibly result in resistance to the introduction of any such changes. A final 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.

Appendix

Appendix A

Table A1.1. Distribution of banks by country

Country	Number of listed banks	Number of controlled banks in the sample	Total assets of sample banks divided by total assets of all listed banks in Bankscope (%)
Austria	6	5	99.91
Belgium	4	3	98.98
Denmark	28	10	97.95
Finland	4	3	81.36
France	9	9	100
Germany	13	10	32.01
Greece	7	6	99.15
Ireland	2	1	45.27
Italy	19	12	11.57
Luxembourg	2	0	0.00
Netherlands	5	2	93.16
Norway	2	2	100
Portugal	4	3	93.97
Spain	7	5	48.11
Sweden	5	4	99.99
Switzerland	16	12	54.93
United Kingdom	12	9	45.75
Total	**145**	**96**	**70.71**

Notes. For each country, the table reports the number of listed banks, the number of banks with at least one controlling shareholder, and its sample's representativeness, which is given as the ratio of aggregate total assets of controlled banks contained in the sample to aggregate total assets of all listed banks provided by BvD Bankscope in 2013.

Table A1.2. Overview of Corporate Governance Codes regarding relatedness of board directors

Country	First code (1)	Last update (2)	Definition of criteria of independence (3)			Presence of independent directors (4)			Presence of minority directors (5)	Disclosure on controlling shareholders (6)
			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

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

Notes. This table presents the following set of information regarding independence criteria of board of directors and their mode of implementation for each country in our sample: (1) The first year of implementation of a Corporate Governance Code; (2) The last update of the code; (3) Does the code clarify the criteria of directors' independence, in general and from managers and controlling shareholders? (4) Does the code require/recommend a number of independent directors on the board, in general and from managers and controlling shareholders? (5) Does the code contain any requirements/recommendations about the presence of minority directors on boards? (6) Does the code require/recommend any information disclosure about controlling shareholders? The information is extracted from the Corporate Governance Code of each country, which is available on the website of the European Corporate Governance Institute (http://www.ecgi.org/). In each column, "N" means that there are no criteria; "Y" means that the code contains criteria; "C" means that the criteria are not mandatory but companies choosing not to comply are required to give reasons for the non-compliance; "R" means that the criteria are recommended but not mandatory.

Table A1.3. Descriptive statistics on ownership structure

	Banks with only direct controlling shareholders	Banks with pyramidal structure	Banks with multiple controlling shareholders	Average voting rights of the biggest shareholder	Average voting rights of all controlling shareholders	Average voting rights of minority shareholders
	(1)	(2)	(3)	(4)	(5)	(6)
Austria	20	80	20	59.16	59.16	40.84
Belgium	33.33	66.67	100	41.34	64.54	35.46
Denmark	70	30	40	36.72	43.98	56.02
Finland	33.33	66.67	33	44.41	47.86	52.14
France	33.33	66.67	44	42.71	53.82	46.18
Germany	60	40	20	56.37	60.53	39.47
Greece	50	50	100	52.75	63.95	36.05
Ireland	100	0	0	99.42	99.42	0.58
Italy	66.67	33.33	42	48.58	62.62	37.38
Netherlands	50	50	50	97.81	97.81	2.19
Norway	100	0	0	32.50	32.50	67.50
Portugal	66.67	33.33	67	26.77	39.30	60.70
Spain	40	60	40	40.91	43.01	56.99
Sweden	75	25	25	16.64	19.22	80.79
Switzerland	50	50	58	46.13	54.25	45.75
United Kingdom	44.44	55.56	44	33.54	39.65	60.35
Sample average	**-**	**-**	**-**	**45.15**	**52.87**	**47.13**

Notes. This table reports some descriptive statistics on the ownership structure of banks, on average per country. Columns (1) and (2) show the percentage of banks with either only direct controlling shareholders or a pyramidal structure (i.e. with indirect ultimate owners). Column (3) presents the percentage of banks with multiple controlling shareholders. Columns (4) to (6) report the average voting rights of the biggest shareholder, of all controlling shareholders, and of minority shareholders, respectively. Figures are in percentages.

Table A1.4. Criteria of relatedness of directors to shareholders

	Relatedness to minority shareholders				Relatedness to controlling shareholders			
	Employee of SH	Direct / Indirect SH of the bank	Same family name with SH	Employee of government agencies	Employee of SH	Direct / Indirect SH of the bank	Same family name with SH	Employee of government agencies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Austria	100	0	0	0	100	0	0	0
Belgium	100	0	0	0	88.89	0	0	11.11
Denmark	100	0	0	0	100	0	0	0
Finland	100	0	0	0	100	0	0	0
France	77.78	7.04	15.19	0	100	0	0	0
Germany	100	0	0	0	77.50	22.50	0	0
Greece	0	0	0	0	100	0	0	0
Ireland	0	0	0	0	0	0	0	0
Italy	82.50	17.50	0	0	79.63	20.37	0	0
Netherlands	100	0	0	0	100	0	0	0
Norway	100	0	0	0	0	0	0	0
Portugal	77.78	0	22.22	0	100	0	0	0
Spain	2.50	97.50	0	0	35	65	0	0
Sweden	100	0	0	0	50	50	0	0
Switzerland	60	40	0	0	100	0	0	0
United Kingdom	29.45	63.51	7.03	0	40	60	0	0
Sample average	**80.71**	**16.11**	**3.17**	**0**	**83.64**	**15.56**	**0**	**0.79**

Notes. This table shows statistics on criteria of relatedness of directors to shareholders. Columns (1) to (4) and columns (5) to (8) report the percentage of directors related to minority shareholders and controlling shareholders, respectively, according to four criteria: (1) they are an employee of minority or controlling shareholders (columns (1) and (5)); (2) they are minority or controlling shareholders of the bank (columns (2) and (6)); (3) they have the same family name as minority or controlling shareholders of the bank (columns (3) and (7)); (4) they are an employee of a government agency if the bank is state-owned (columns (4) and (8)). The percentage of related directors according to each criterion is calculated as the number of related directors according to this criterion to the total number of related directors. SH is the abbreviation for shareholder(s). Figures are in percentages.

Table A1.5. Percentage of minority directors for different levels of shareholdings of minority shareholders

	Percentage of minority directors related to minority shareholders holding X% of shares					
	X< 1%	1% ≤ X < 2%	2% ≤ X < 3%	3% ≤ X < 4%	4% ≤ X < 5%	5% ≤ X < 10%
Austria	44.44	16.67	0	0	16.67	22.22
Belgium	33.33	0	0	16.67	0	50
Denmark	75	0	0	0	0	25
Finland	100	0	0	0	0	0
France	57.95	26.52	1.52	0	0	14.02
Germany	50	0	0	0	16.67	33.33
Greece	-	-	-	-	-	-
Ireland	-	-	-	-	-	-
Italy	45.73	7.50	24.73	5.91	5	11.14
Netherlands	66.67	0	0	33.33	0	0
Norway	0	100	0	0	0	0
Portugal	55.56	44.44	0	0	0	0
Spain	98.21	0	0	0	1.79	0
Sweden	100	0	0	0	0	0
Switzerland	75	0	0	0	0	25
United Kingdom	98.48	0.76	0.76	0	0	0
Sample average	**70.04**	**9.29**	**4.27**	**3.10**	**2.35**	**10.95**

Notes. This table reports the percentage of minority directors related to minority shareholders holding less than 1%, between 1% and 2%, between 2% and 3%, between 3% and 4%, between 4% and 5%, and between 5% and 10% of shares.

Table A1.6. Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	Tobin_Q	1												
(2)	DD	0.673***	1											
(3)	Minority	0.0560	0.171**	1										
(4)	Independent	0.0423	-0.150*	-0.595***	1									
(5)	BoardSize	-0.165**	-0.123*	0.125*	-0.165**	1								
(6)	Size	-0.356***	-0.513***	0.112	0.0110	-0.000	1							
(7)	Growth	0.163**	0.140*	0.0242	-0.0461	-0.217***	-0.121*	1						
(8)	Capital	0.161**	0.611***	0.201***	-0.201***	0.00777	-0.0394	-0.120*	1					
(9)	Loan	0.0298	-0.00739	-0.0958	0.118	-0.00587	-0.0250	-0.154*	-0.0236	1				
(10)	Risk	-0.0124	-0.0381	-0.0665	0.103	0.00578	0.0208	-0.0373	-0.0102	0.0134	1			
(11)	Deposit	-0.183**	-0.404***	-0.259***	0.206***	-0.223***	-0.0233	0.146*	-0.106***	0.264***	0.0253	1		
(12)	Operating	0.00243	-0.0323	-0.0552	0.0997	0.0191	0.0264	-0.0190	-0.0327	0.0699	0.0080	0.0378	1	
(13)	OneTierBoard	0.107	0.177**	0.270***	-0.0369	0.0656	-0.0587	0.0899	0.167**	-0.0915	0.0500	-0.273***	0.0491	1

Notes. This table shows the correlation matrix for bank-level variables. The variables *"Minority"* and *"Independent"* are the indices of relatedness. All variables are as defined in Table 1.2. *, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

Table A1.7. Role of the institutional, regulatory and market environment

Dependent variable	Tobin's Q			Distance to default		
	Y = SupPow	Y = Legal	Y = Competition	Y = SupPow	Y = Legal	Y = Competition
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	-0.0187***	0.0303***	0.0139***	0.00959	0.0194	0.139***
	(-3.12)	(6.30)	(4.22)	(0.27)	(0.66)	(6.50)
Minority * Y	0.00518***	-0.00208***	-0.0490	0.0118*	0.00516*	-1.038***
	(4.71)	(-4.44)	(-0.90)	(1.89)	(1.72)	(-4.16)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	282	282	282	271	271	271
Robust Hausman test						
Chi 2 - stat	10.689	12.485	10.332	8.761	9.539	11.191
p-value	0.2200	0.2539	0.2425	0.1875	0.2989	0.1305

Notes. The regressions in this table examine the effects of different levels of institutional, regulatory and market environment on the impact of minority directors on market valuation (Columns (1) to (3)), and distance to default (Columns (4) to (6)). The variable *Minority* is the index measuring the presence/influence of minority directors on the board. All variables are as defined in Table 1.2. We augment Equation (1) with interaction terms between the index *Minority* and a variable capturing alternatively the strength of the supervisory regime (*SupPow),* the level of shareholder protection (*Legal),* or the degree of competition in the banking market (*Competition).* The marginal effects of these regressions are reported in Table 1.8. We use the generalized least squares (GLS) random effects estimator; control variables are included in the regressions, but not reported in this table. The results of robust Hausman tests (*fixed effects vs random effects*) are reported in the last two lines. Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A1.8. Robustness tests using alternative measures of dependent variables

Dependent variable	SMR (1)	Cost of Equity (2)	Z-score (3)	DD naive (4)
Minority	0.103*	-0.306***	0.0739***	0.0415***
	(1.65)	(-4.55)	(3.37)	(4.99)
BoardSize	0.397	2.038***	0.00785	-0.0300
	(1.62)	(6.93)	(0.09)	(-1.01)
Size	-0.275	2.335***	0.0482	-0.165***
	(-1.02)	(10.46)	(0.45)	(-5.05)
Growth	-0.00755	-0.182***	-0.00829**	0.0166***
	(-0.87)	(-2.75)	(-2.39)	(12.20)
Capital	0.114***		-0.00960	0.0823***
	(5.33)		(-1.40)	(34.13)
Loan	0.00463	-1.202***	-0.000974	0.00366***
	(0.48)	(-5.41)	(-0.27)	(2.73)
Risk	-0.000588	-0.0682***		
	(-0.20)	(-9.07)		
Deposit			0.00144	-0.000535
			(0.30)	(-0.35)
Operating			-0.0000437	0.0000489
			(-0.65)	(0.50)
Tier1	0.0412	0.00992	-0.250	-0.00554
	(0.09)	(0.60)	(-1.40)	(-0.09)
SupPow	-0.144	0.0137***	0.00154	-0.0348**
	(-1.37)	(3.35)	(0.03)	(-2.07)
Legal	-0.0109	1.378***	-0.00152	0.0101
	(-0.20)	(5.63)	(-0.06)	(1.35)
GDP	0.0297	-0.534***	0.0629*	0.0721***
	(0.35)	(-6.08)	(1.74)	(6.54)
Constant	0.162	11.79***	3.394***	-0.252
	(0.09)	(9.80)	(4.36)	(-0.84)
Observations	282	233	241	275

Notes. The regressions in this table report the results of robustness tests of the impact of the presence/influence of minority directors on market valuation and bank risk. The variable "*Minority*" is the indice measuring the presence/influence of minority directors. All other variables are as defined in Table 1.2. Columns (1) and (2) report results of the impact of the presence/influence of minority directors on market valuation measured by Shareholder Market Return (*SMR*) and *Cost of Equity*, respectively. Columns (3) and (4) report results of the impact of the presence/influence of minority directors on bank risk taking measured by *Z-score* and Distance to default "naïve" (*DD naïve)*, respectively. All regressions use the GLS random-effects estimator. The Zstatistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A1.9. Robustness tests using alternative time period, country and year dummies

Dependent variable	Tobin Q				Distance to default			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	0.0797***	0.0141***	0.0145***	0.0177***	0.0760***	0.0705***	0.0551***	0.0314*
	(6.85)	(6.03)	(5.42)	(4.71)	(3.62)	(4.80)	(2.90)	(1.77)
BoardSize	-0.208***	-0.054***	-0.076***	-0.052***	-0.216***	-0.137***	-0.0339	-0.0355
	(-6.63)	(-8.82)	(-8.00)	(-4.43)	(-2.96)	(-2.65)	(-0.56)	(-0.51)
Size	-0.296***	-0.105***	-0.112***	-0.142***	-0.706***	-0.561***	-0.483***	-0.449***
	(-8.16)	(-12.38)	(-8.33)	(-9.06)	(-9.34)	(-8.92)	(-7.13)	(-5.74)
Growth	-0.000473	0.000202	-0.00073	0.0020***	0.0172***	0.0152***	0.0144***	0.0297***
	(-0.70)	(1.12)	(-0.25)	(3.45)	(9.61)	(9.19)	(5.21)	(7.29)
Capital	-0.00430**	0.000455	0.0016***	0.0027***	0.0604***	0.0709***	0.0865***	0.0945***
	(-2.39)	(1.08)	(3.49)	(3.06)	(11.00)	(15.16)	(36.19)	(13.03)
Loan	-0.00226**	-0.00025	0.000487	0.000132	0.0114***	0.0084***	0.0076***	0.0051**
	(-1.96)	(-0.99)	(1.27)	(0.32)	(5.35)	(4.26)	(2.76)	(2.55)
Risk	0.000133	0.00193*	0.0145	-0.0231				
	(0.58)	(1.74)	(0.64)	(-0.54)				
Deposit					-0.019***	-0.018***	-0.016***	-0.016***
					(-6.61)	(-7.46)	(-5.89)	(-4.77)
Operating					0.000831	0.000830	0.0001***	0.000184
					(0.74)	(0.79)	(4.55)	(0.62)
Tier1	0.0979	0.00111	0.0298*	0.0681**	0.757*	-0.0667	-0.0406	0.186**
	(0.47)	(0.09)	(1.79)	(2.38)	(1.65)	(-0.67)	(-0.30)	(2.49)
SupPow		-0.010***	-0.0116**	-0.00710		-0.0550**	-0.067***	0.0289
		(-3.43)	(-2.19)	(-1.08)		(-2.08)	(-3.00)	(0.97)
Legal		-0.006***	-0.0049*	-0.0086**		0.00360	-0.0215	0.0152
		(-3.56)	(-1.93)	(-2.44)		(0.26)	(-1.33)	(0.87)
GDP		0.0064***	0.00196	0.00834		-0.00491	0.192***	0.191***
		(2.66)	(0.47)	(1.46)		(-0.21)	(5.72)	(5.97)
Constant	0.955***	1.186***	1.131***	1.099***	0.652	1.354***	1.594***	0.293
	(6.56)	(22.05)	(13.24)	(10.29)	(1.63)	(2.94)	(3.49)	(0.70)
Country dummies	Yes	No	No	No	Yes	No	No	No
Year dummies	No	Yes	No	No	No	Yes	No	No
Time period	2011-2013	2011-2013	2012-2014	2013-2015	2011-2013	2011-2013	2012-2014	2013-2015
Observations	282	282	259	193	271	271	249	132

Notes. The regressions in this table report the results of robustness tests of the impact of the presence/influence of minority directors on market valuation and bank risk. The variable "*Minority*" is the indice measuring the presence/influence of minority directors. All other variables are as defined in Table 1.2. Columns (1) and (5) report results of regressions using country dummies of the impact of the presence/influence of minority directors on Tobin Q and Distance to default, respectively. Columns (2) and (6) report results of regressions using time dummies of the impact of the presence/influence of minority directors on Tobin Q and Distance to default, respectively. Columns (3) and (7) report results of regressions for the period 2012-2014 of the impact of the presence/influence of minority directors on Tobin Q and Distance to default, respectively. Columns (4) and (8) report results of regressions for the period 2013-2015 of the impact of the presence/influence of minority directors on Tobin Q and Distance to default, respectively. All regressions use the GLS random-effects estimator. The Zstatistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A1.10. Robustness tests using alternative criteria to identify controlling and related directors

Dependent variable	Tobin Q			Distance to default		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	0.0165***	0.00218***	0.0174***	0.0900***	0.0122***	0.106***
	(7.23)	(6.14)	(6.72)	(5.50)	(5.30)	(5.29)
BoardSize	-0.0592***	-0.0633***	-0.0834***	-0.151***	-0.146***	-0.224***
	(-7.63)	(-8.18)	(-8.83)	(-2.79)	(-2.91)	(-3.05)
Size	-0.100***	-0.112***	-0.115***	-0.616***	-0.619***	-0.717***
	(-11.97)	(-12.54)	(-10.49)	(-9.97)	(-11.46)	(-10.41)
Growth	0.0006***	0.000596***	0.000385**	0.0153***	0.0163***	0.0147***
	(3.46)	(3.99)	(2.07)	(9.77)	(11.25)	(8.95)
Capital	0.000595	0.000451	0.000620	0.0649***	0.0630***	0.0617***
	(1.51)	(1.09)	(1.16)	(13.56)	(13.36)	(10.95)
Loan	0.000117	-0.000193	0.000124	0.00960***	0.00856***	0.0128***
	(0.43)	(-0.75)	(0.32)	(4.65)	(4.49)	(5.35)
Risk	0.000198*	0.000210*	0.00110***			
	(1.73)	(1.86)	(5.63)			
Deposit				-0.0185***	-0.0207***	-0.0219***
				(-8.30)	(-9.60)	(-7.94)
Operating				0.0000548	0.0000631	0.0000526
				(0.50)	(0.58)	(0.45)
Tier1	-0.00882	-0.00466	0.0144	-0.0410	0.0164	0.0422
	(-0.63)	(-0.32)	(0.77)	(-0.45)	(0.21)	(0.36)
SupPow	-0.0104***	-0.0137***	-0.0153***	-0.0775***	-0.0605**	-0.0945**
	(-3.47)	(-4.45)	(-3.23)	(-2.85)	(-2.44)	(-2.46)
Legal	-0.0062***	-0.00821***	-0.00440**	-0.0205	-0.0155	-0.0145
	(-4.52)	(-5.43)	(-2.04)	(-1.60)	(-1.34)	(-0.89)
GDP	0.00345*	0.00387**	0.00411*	0.0586***	0.0536***	0.0561**
	(1.82)	(2.30)	(1.80)	(3.37)	(3.30)	(2.50)
Constant	1.175***	1.253***	1.186***	1.849***	1.826***	1.883***
	(23.66)	(23.48)	(15.48)	(3.92)	(4.26)	(2.73)
Criteria used	Voting rights	Percentage of related directors	Control threshold of 20%	Voting rights	Percentage of related directors	Control threshold of 20%
Observations	282	282	213	271	271	211

Notes. The regressions in this table report the results of robustness tests of the impact of the presence/influence of minority directors on market valuation and bank risk. Columns (1) to (3) report results of the impact of the presence/influence of minority directors on Tobin Q by using voting rights of shareholders, percentage of minority directors and the control threshold of 20% to create variable "*Minority*", respectively. Columns (4) to (6) report results of the impact of the presence/influence of minority directors on Distance to default by using voting rights of shareholders, percentage of minority directors and the control threshold of 20% to create variable "*Minority*", respectively. All other variables are as defined in Table 1.2. All regressions use the GLS random-effects estimator. The Zstatistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A1.11. Robustness tests using sub sample analysis

Dependent variable	Tobin Q				Distance to default			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minority	0.0136***	0.0131***	0.0152***	0.0186***	0.0789***	0.0647***	0.0855***	0.113***
	(4.46)	(5.55)	(6.11)	(7.60)	(4.64)	(5.13)	(5.51)	(7.15)
BoardSize	-0.048***	-0.066***	-0.060***	-0.066***	-0.106*	-0.109***	-0.140***	-0.184***
	(-5.36)	(-7.73)	(-7.18)	(-8.17)	(-1.71)	(-2.61)	(-2.87)	(-3.43)
Size	-0.124***	-0.112***	-0.104***	-0.108***	-0.514***	-0.549***	-0.597***	-0.670***
	(-10.48)	(-12.48)	(-11.68)	(-11.91)	(-8.17)	(-11.53)	(-10.49)	(-11.67)
Growth	0.0093***	0.0056***	0.0058***	0.00321*	0.0211***	0.0169***	0.0162***	0.0169***
	(3.80)	(3.26)	(3.31)	(1.71)	(13.24)	(12.36)	(10.59)	(12.32)
Capital	0.000867	0.000311	0.000543	0.000326	0.0727***	0.0681***	0.0671***	0.0594***
	(1.64)	(0.75)	(1.30)	(0.76)	(14.78)	(15.46)	(14.46)	(12.73)
Loan	0.000455	-0.00132	0.000573	0.000137	0.0087***	0.0091***	0.0108***	0.0080***
	(1.46)	(-0.46)	(0.20)	(0.46)	(3.45)	(5.20)	(5.22)	(5.11)
Risk	0.000223*	0.00022*	0.000185	0.00020*				
	(1.84)	(1.90)	(1.58)	(1.80)				
Deposit					-0.0201***	-0.0199***	-0.018***	-0.020***
					(-7.68)	(-9.11)	(-8.11)	(-8.98)
Operating					0.000271	0.000562	0.000417	0.000432
					(0.25)	(0.51)	(0.38)	(0.40)
Tier1	-0.00502	0.000925	0.00301	-0.00883	0.0490	0.0410	-0.00520	-0.0410
	(-0.29)	(0.06)	(0.20)	(-0.58)	(0.43)	(0.52)	(-0.06)	(-0.45)
SupPow	-0.014***	-0.015***	-0.011***	-0.011***	-0.0186	-0.0652***	-0.088***	-0.0501**
	(-3.67)	(-4.22)	(-3.16)	(-3.33)	(-0.58)	(-2.87)	(-5.07)	(-1.97)
Legal	-0.009***	-0.007***	-0.006***	-0.006***	-0.00575	-0.00452	-0.0189*	-0.00930
	(-5.24)	(-4.56)	(-3.87)	(-3.86)	(-0.40)	(-0.42)	(-1.66)	(-0.83)
GDP	0.0071***	0.0051**	0.0042**	0.00372*	0.000679	0.0426***	0.0585***	0.0157**
	(3.36)	(2.51)	(2.05)	(1.81)	(0.03)	(2.80)	(3.52)	(2.03)
Constant	1.236***	1.258***	1.184***	1.174***	1.079*	1.579***	1.839***	1.566***
	(22.83)	(20.59)	(21.85)	(21.54)	(1.89)	(3.76)	(5.62)	(3.61)
Sample	Exclude Spain and Italy	Exclude cross listed	Exclude dual class shares	Exclude criterion of having same family name	Exclude Spain and Italy	Exclude cross listed	Exclude dual class shares	Exclude criterion of having same family name
Observations	233	273	273	282	224	262	262	271

Notes. The regressions in this table report the results of robustness tests of the impact of the presence/influence of minority directors on market valuation and bank risk. Columns (1) to (4) report results of the impact of the presence/influence of minority directors on Tobin Q on the sub sample of exclusion Spain and Italy, exclusion banks cross-listed on a US exchange, exclusion banks having dual class shares, exclusion the criterion of "having the same family name with shareholder" from criteria to identify minority directors, respectively. Columns (5) to (8) report results of the impact of the presence/influence of minority directors on Distance to default on the sub sample of exclusion Spain and Italy, exclusion banks cross-listed on a US exchange, exclusion banks having dual class shares, exclusion the criterion of "having the same family name with shareholder" from criteria to identify minority directors, respectively. All other variables are as defined in Table 1.2. All regressions use the GLS random-effects estimator. The Zstatistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Appendix B

B1.1. Example of a control chain
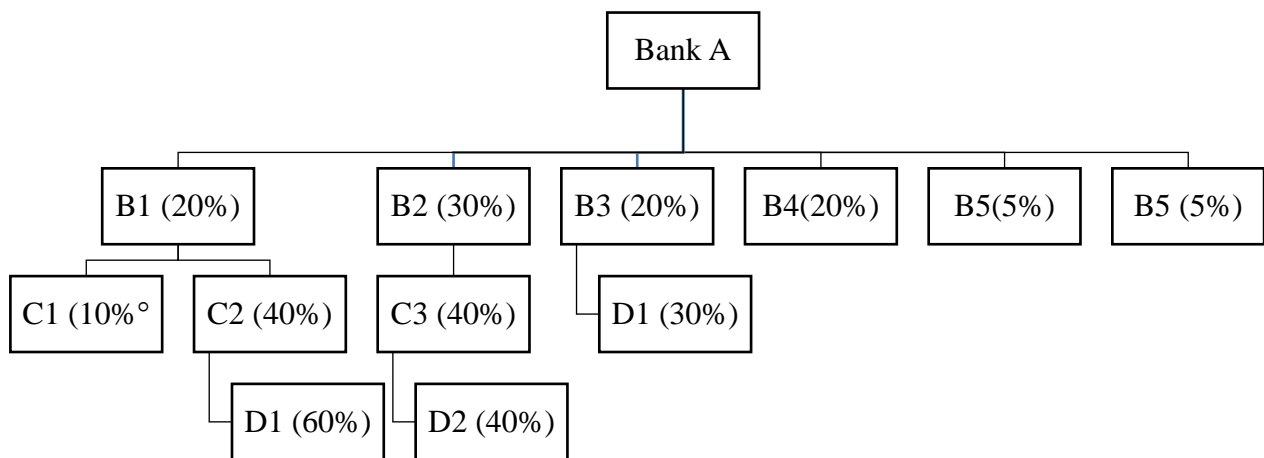
Figure B1.1. Example of a control chain.

This figure provides an example of a control chain for a bank with a pyramidal structure. We have three owners at the 10% control threshold: (i) one direct owner: B4, with 20% of voting rights; (ii) two indirect ultimate owners: D1 and D2, with respectively 40% (20% + 20%) and 30% of voting rights.

B1.2. The Banzhaf Power Index

The construction of the Banzhaf Power Index (BPI) is based on the underlying theory of coalitions. In this, 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 of votes needed to pass a decision; the quota is 51.

We provide an example based on our Figure B1.1 by calculating the BPI of direct shareholders (B1 to B6) and ultimate owners (B4, D1 and D2). As we need to sum up to 100% of shares to compute the BPI at the first level of the control chain, two BPI will be computed for direct shareholders that are also ultimate owners (for example B4); we then keep the BPI associated with their ultimate owner position.

Step 1: We determine all *winning* coalitions in Tables B1.1, i.e. coalitions with a total of shares greater than 51%.

Table B1.1. *Winning* **coalitions at the first and last levels of the control chain**

	Number of shareholders in a winning coalition				
	2 shareholders	3 shareholders	4 shareholders	5 shareholders	6 shareholders
Panel A: *Winning* coalitions at the first level of the control chain (direct shareholders)		{B1, B2, B3} {B1, B2, B4} {B1, B2, B5} {B1, B2, B6} {B1, B3, B4} {B2, B3, B4} {B2, B3, B5} {B2, B3, B6} {B2, B4, B5} {B2, B4, B6}	{B1, B2, B3, B4} {B1, B2, B3, B5} {B1, B2, B3, B6} {B1, B2, B4, B5} {B1, B2, B4, B6} {B1, B2, B5, B6} {B1, B3, B4, B5} {B1, B3, B4, B6} {B2, B3, B4, B5} {B2, B3, B4, B6} {B2, B3, B5, B6} {B2, B4, B5, B6}	{B1, B2, B3, B4, B5} {B1, B2, B3, B4, B6} {B1, B2, B4, B5, B6} {B1, B2, B3, B5, B6} {B1, B3, B4, B5, B6} {B2, B3, B4, B5, B6}	{B1, B2, B3, B4, B5, B6}
Panel B: *Winning* coalitions at the last level of the control chain (ultimate owners)	{D1, D2} {B4, D1}	{B4, D1, D2}			

Notes. This Table presents the coalitions at the first and last levels in the control chain that total more than 51% of shares, based on Figure B1.1 in Appendix B. Voting rights of direct shareholders B1, B2, B3, B4, B5, B6 are 20, 30, 20, 20, 5 and 5, respectively. Voting rights of ultimate owners B4, D2 and D1 are 20, 30, and 40, respectively. Critical players are underlined.

Step 2: Critical players are determined for each winning coalition. We count the number of votes the coalition has without a particular Player, and if the coalition has no longer enough votes to win (i.e. less than 51% of shares), then that Player is critical. In our example, the critical players are underlined in Table B1.1.

Step 3: We determine the number of times all players are critical: 54 at the first level in the control chain and 5 at the last level (see Table B1.1).

Step 4: We determine the number of times Player P is critical. At the first level of the control chain, we have B1, B3 and B4 that are critical 9 times, B2 21 times, B5 and B6 3 times. For the ultimate owners, D1 is critical 3 times, D2 and B4 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). For the first level in the control chain, we have: BPI(B1) = BPI(B3) = BPI(B4) = 9/54 = 16.7%; BPI(B2) = 21/54 = 38.9%; and BPI(B5) = BPI(B6) = 3/54 = 5.6%. For the ultimate owners, we have: BPI(D1) = 3/5 = 60%; BPI(D2) = 1/5 =20%; BPI(B4) = 1/5 = 20%. For B4, we retain the BPI of the ultimate owner position, i.e. 20%.

B1.3. Construction of the indices of relatedness of directors

We assign weights to the three factors we consider to characterize the strength of the relatedness between a director and an ultimate owner, 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 direct or indirect ultimate owner; (2) the related director is a Chairman or a Vice Chairman of the board; and (3) the relatedness between the director and the ultimate owner is current. For each director, we sum up the weights for all the connections they have with ultimate owners to obtain the "score of relatedness" of a director (see Table B1.2).

Table B1.2. Score of relatedness of director

	Not related (0)	Related (1)			
		Chairman/Vice Chairman (1)		Other board members (0)	
		Present (1)	Past (0)	Present (1)	Past (0)
Score of relatedness	0	3	2	2	1

Notes. This table explains the way the score of relatedness of a director is calculated. We give a weight of one (as compared to zero) for each following criteria: (1) if directors are related to minority/controlling shareholders; (2) if the related director is Chairman or Vice Chairman of the board; (3) if the relationship is in the present.

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 the index $Minority_i$ that measures the presence/influence of minority directors in their board, and the index $Controlling_i$ that measures the presence/influence of directors that are related to controlling ultimate owners. The presence of independent directors is 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):

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

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

CHAPTER 2

How to increase the presence of minority directors on bank boards?

2.1. Introduction

The corporate governance of banks has received growing attention after the financial crisis of 2007-2008. The failures and weaknesses in corporate governance mechanisms are considered a major cause of the crisis (Kirkpatrick, 2009; Mülbert, 2010). A reform in the corporate governance of banks is taking place at an international level (OECD, 2010 for OECD countries; McCreevy, 2008 for EU countries; Walker, 2009 for the United Kingdom). In this context, Barry et al. (2018) show that minority directors who are related to minority shareholders, are a signal of a "strong" board for banks with controlling shareholders. The presence of minority directors seems to be important for governance in controlled banks. Our aim in this study is therefore to determine the factors that could favor the presence of minority directors on boards of directors of banks with a concentrated ownership structure.

Corporate governance in banks differs from that of non-financial firms due to several aspects. Firstly, banking activities are specific, for example, highly leveraged, highly regulated and supervised, opacity and complexity in their activities and interconnection between banks. Secondly, due to the particularities of banking activities, there are two types of agency conflicts in banks, one between insiders (managers or controlling shareholders) and minority shareholders, and another one between shareholders and other stakeholders (debtholders and regulators). Due to these multiple agency conflicts, the OECD (2010) and the European Union (2010) recommend that the corporate governance of banks should have multifaceted objectives to enhance the welfare, not only of shareholders, but also of depositors and regulators. The Basel Committee on Banking Supervision (2015) also points out in its Corporate Governance Principles for banks that: "the primary objective of corporate governance should be safeguarding stakeholders' interest in conformity with public interest on a sustainable basis. Among stakeholders, particularly with respect to retail banks, shareholders' interest would be secondary to depositors' interest". Thirdly, the particularities of the banking industry reduce the effectiveness of some governance mechanisms. Executive compensation based on performance seems not to be effective for banks (Adams and Mehran, 2003) because they want to limit the issue of stock options as it might affect their cost of issuing debt. Hostile takeovers furthermore hardly exist in the banking industry (Prowse, 1997; Adams and Mehran, 2003) because of tight regulation on entry, mergers, and takeovers (Cheng et al., 1989; Prowse, 1997). Moreover, the specific capital structure of banks makes it difficult for the acquirer to borrow the funds for the acquisition investment. All these particularities require specific corporate

governance mechanisms for banks, revealing the important role of monitoring by a board of directors.

The Code of Best Practices for Corporate Governance has been implemented in many countries. The objective of the Corporate Governance Codes is to insure a good corporate governance and corporate control through recommendations on board composition and auditing. One of the prevailing recommendations of the Corporate Governance Codes is the presence of independent directors on boards of directors, which should reduce the risk of expropriation of shareholders. However, in most of the Corporate Governance Codes, they do not distinguish their recommendations for widely held firms from that of controlled firms, while they have different agency conflicts. The agency conflict in firms with a dispersed ownership structure is between managers and shareholders whilst in controlled firms it is between controlling and minority shareholders. However, the recommendation on independent directors focuses on their independence from managers, which might be a solution to reduce agency conflicts in widely held firms, but not in controlled firms. Independent directors in controlled firms might not be "strictly" independent as they might be nominated by controlling shareholders, or by an "independent" nomination committee, which in turn is appointed by controlling shareholders. We then need another corporate governance mechanism in firms with a concentrated ownership structure.

Some jurisdictions in Europe where concentrated ownership structure is prevalent have created a new type of board director in their Corporate Governance Code who 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 a concentrated ownership structure, as they are not appointed by controlling shareholders. In line with this argument, Barry et al. (2018), working on a panel of European controlled banks, find that the presence of minority directors on bank boards allows a higher market valuation to be achieved without increasing risk. The presence of minority directors seems to be a "good" corporate governance mechanism for banks in terms of both performance and financial stability. However, there are only two countries in Europe – Italy and Spain – that have recommendations on the presence of minority directors on boards. Hence, our objective in this paper is to identify if there are other factors that could favor the presence of minority directors on boards of directors of controlled banks, and on which regulators could additionally draw.

The existing empirical literature analyzing the determinant of board composition mainly focuses on factors determining the presence of independent directors on boards of widely held firms (Boone et al., 2007; Iwasaki, 2008; Guest, 2008). These studies show that the bargaining power of managers and the presence of outside directors (not related to the CEO) are the main factors impacting the presence of independent directors on boards, in line with the theoretical model of Hermalin and Weisbach (1998). More specifically, they find that the influence of a CEO (proxied by CEO's share ownership, CEO's job tenure or ownership of a management group) has a negative impact on the presence of independent directors on a board. They also find that factors restraining a CEO's influence (such as ownership by outside directors, the presence of a venture capitalist) increase the presence of independent directors. There are only a few papers analyzing the determinants of board composition in firms with a concentrated ownership structure. Yeh and Woidtke (2005) investigate the factors that increase the presence of directors who are related to the largest controlling shareholders, with the hypothesis that the presence of such directors should be considered as a signal of expropriation by controlling shareholders, which could then reduce the firm's value. They find, for a panel of Taiwanese non-financial listed firms, that the presence of directors who are related to the largest controlling shareholder increases if the largest controlling shareholder has a high divergence between control and cash flow rights, or if the largest controlling shareholder is also the CEO and the chairman. Lefort and Urzua (2008), on the contrary, investigate the determinants of the presence of outside directors who are independent from controlling shareholders and are elected with minority shareholders' votes. They find that the higher the voting rights of controlling shareholders, the lower the percentage of outside directors.

We contribute to this literature by investigating the factors that could promote the presence of minority directors on boards for banks with a concentrated ownership structure. We take the negotiation model of Hermalin and Weisbach (1998) to consider that in concentrated ownership structure, board composition might reflect the bargaining power between controlling and minority shareholders. We therefore examine whether controlling shareholders use their voting power to limit the presence of minority directors who do not represent their interest and might limit any expropriation behavior. On the other hand, controlling shareholders might also facilitate the presence of minority directors as a signal of non-expropriation in order to benefit from a higher market valuation. We furthermore examine whether a high degree of opacity, might provide greater opportunities for expropriation, limiting the presence of minority directors. This is particularly relevant for banks which have a number of

characteristics that make them inherently more opaque than other firms (Morgan, 2002). But again, controlling shareholders of banks with higher degrees of opacity might aim to increase the presence of minority directors to signal they will not expropriate minority shareholders. We also investigate whether the institutional environment could influence the presence of minority directors on bank boards. If a strong institutional environment, such as a high level of shareholder protection and a strict supervisory regime, restrict expropriation behavior from controlling shareholders, minority shareholders might need fewer minority directors to protect their interest. In this case, a strong institutional environment could reduce the presence of minority directors on boards, acting as a substitute for the presence of minority directors. On the other hand, a strong institutional environment might make it easier for minority shareholders to nominate minority directors to protect their interest.

We conduct our analysis by using a manually collected data set on the ownership structure and board composition of a sample of listed European banks with controlling shareholders. We classify directors as minority directors if they are related to minority shareholders according to different criteria, such as being employed by one of the minority shareholders or having the same family name as one of the minority shareholders. Taking into account the potential endogeneity problem between board composition and ownership structure, we run regressions using variables of the business environment as instrumental variables to control for the endogeneity problem. We find that the voting rights of controlling shareholders have a positive impact on the presence of minority directors on bank boards. When controlling shareholders have stronger powers of decision, they encourage the presence of minority directors on the board potentially as a signal of non-expropriation behavior. They might benefit from a higher market valuation (Barry et al., 2018). Regarding bank characteristics, we find a negative relationship between the level of opacity and the percentage of minority directors. Our results further show that the quality of recommendations on board structure in Corporate Governance Codes and the level of shareholder protection are among the factors that favor the presence of minority directors. However, we find that a strict supervisory regime contributes to decreasing the presence of minority directors.

The remainder of this paper is organized as follows. Section 2.2 describes the sample and defines variables. Section 2.3 presents the econometric specification and the main results. Section 2.4 shows further investigation results and robustness tests. Section 2.5 concludes the paper.

2.2. Data and methodology

2.2.1   Sample and data sources

As European banks are characterized by highly a concentrated ownership structure (Faccio and Lang, 2002), we focus our analysis on banks in 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). We collect data on ownership structure and boards of directors as of 2013 for banks in these countries. Our raw sample consists of 145 active listed banks provided by BvD Bankscope database, including bank holding companies, commercial banks and investment banks.

The data on the board of directors and ownership structure are collected manually from bank corporate governance reports and bank annual reports as well as being extracted from the Bloomberg, Bankscope and Amadeus databases. There are 118 banks with information about ownership structures and boards of directors. Following the existing literature (La Porta et al., 1999, 2002; Caprio et al., 2007; Lepetit et al., 2015), we use the control threshold of 10%. We then only keep banks which have at least one shareholder holding 10% or more of total outstanding shares. This leaves us with a final sample of 96 banks. On average, our final sample covers more than 71% of the total assets of all publicly trading banks provided by BvD Bankscope (see Table 2.1). The number of banks by country is shown in Table 2.1.

We also utilize market data from the Bloomberg database and financial data from the Bankscope database in 2013 to compute our variables. Financial variables are winsorized at the 1% and 99% levels.

Table 2.1. Number of controlled banks in the sample by country

Country	Number of listed banks	Number of controlled banks in the sample	Total assets of sample banks divided by total assets of all listed banks in Bankscope (%)
Austria	6	5	99.91
Belgium	4	3	98.98
Denmark	28	10	97.95
Finland	4	3	81.36
France	9	9	100
Germany	13	10	32.01
Greece	7	6	99.15
Ireland	2	1	45.27
Italy	19	12	11.57
Luxembourg	2	0	0.00
Netherlands	5	2	93.16
Norway	2	2	100
Portugal	4	3	93.97
Spain	7	5	48.11
Sweden	5	4	99.99
Switzerland	16	12	54.93
United Kingdom	12	9	45.75
Total	**145**	**96**	**70.71**

Note: This table reports the number of listed banks, the number of banks with a concentrated ownership structure and its sample's representativeness in each country.

2.2.2. Definition of variables of interest

2.2.2.1 The presence of minority directors

Our first step is to identify minority shareholders for each bank. We collect the list of shareholders and their voting rights in order to identify direct minority shareholders holding less than 10% of the total outstanding shares.

We next identify directors on bank boards who are related to these minority shareholders. We use for this information on the director's biography. We consider directors to be related to minority shareholders when: (1) they are an employee of one of the minority shareholders of

the bank; (2) they are one of the minority shareholders of the bank; (3) they have the same family name as one of the minority shareholders of the bank[16]; (4) they are an employee of a government agency if one of the minority shareholders of the bank is a state.[17]

The percentage of minority directors (*Pct_MinorityDir)* is the number of directors who are related to minority shareholders divided by the total number of directors. In our sample, 48.96% of banks have minority directors on their board. Minority directors, when present, represent on average 24.16% of the board (see Table 2.2).

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[16] In our sample, 25 directors have the same family name as minority shareholders of the bank. Taking into account only directors with the same family name as owners when the name is not common in each country, we are left with 8 minority directors under to this criterion. As a robustness test, we remove all these cases from the sample.
[17] In our sample, there is no director who is considered as a minority director under this criterion.

Table 2.2. Statistics on banks having minority directors on their board.

	Number of directors		Banks with minority directors					Banks without minority directors			
	Total	Average per bank	% of banks	% of minority directors	Number of controlling shareholders	% voting rights of controlling shareholders	% shares held by the biggest controlling shareholders	% of banks	Number of controlling shareholders	% voting rights of controlling shareholders	% shares held by the biggest controlling shareholders
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Austria	91	18.20	40	14.35	1	36.95	36.95	60	2	73.96	73.96
Belgium	44	14.67	33.33	17.65	2	51	51	66.67	2.50	71.31	36.51
Denmark	105	10.50	10	10.53	2	45.84	23	90	1.56	43.77	38.25
Finland	24	8	66.67	14.29	1.50	21.79	16.61	33.33	1	100	100
France	102	11.33	66.67	38.09	2	45.10	33.34	33.33	2	71.27	61.45
Germany	101	10.10	20	11.01	1	40.64	40.63	80	1.63	65.50	60.30
Greece	87	14.50	0	-	-	-	-	100	2.67	63.95	52.75
Ireland	11	11	0	-	-	-	-	100	1	99.42	99.42
Italy	130	10.83	50	20.29	2.17	58.20	40.46	50	1.33	67.04	56.71
Netherlands	16	8	50	11.11	1	98	98	50	2	97.61	97.61
Norway	13	6.50	50	25	1	34	34	50	1	31	31
Portugal	64	21.33	100	7.73	2	39.30	26.77	0	-	-	-
Spain	65	13	100	64.72	2.20	43.01	40.91	0	-	-	-
Sweden	49	12.25	100	24.20	1.25	19.22	16.64	0	-	-	-
Switzerland	87	7.25	41.67	32.29	2.20	46.57	35.68	58.33	1.57	59.73	53.59
United Kingdom	103	11.44	88.89	47.02	1.75	35.77	28.89	11.11	1	70.70	70.70
Sample average	**1092**	**11.81**	**48.96**	**24.16**	**1.81**	**43.96**	**34**	**51.04**	**1.63**	**70.40**	**64.02**

Note: This table reports statistics on minority directors in each country for our sample of 96 European banks. The first two columns show the total and average number of directors per bank in each country. Columns (3) to (7) report statistics on banks having minority directors on the board. Columns (8) to (11) represent statistics on banks without minority directors on the board.

Table 2.3 further provides statistics on the four different criteria used to determine if a director is related to a minority shareholder. We find that on average around 80% of directors identified as being related to minority shareholders are related through being employed by one of them. Directors who are minority shareholders of the bank represent around 16% of the cases of minority directors, while minority directors as having same family name with one of the minority shareholders account for more than 3% of all cases.

Table 2.3. Statistics on the presence of minority directors according to different criteria.

	Relatedness to minority shareholders			
	Employee of shareholders (%)	Direct / Indirect shareholders of the bank (%)	Same family name with shareholders (%)	Politician / Employee of government agency (%)
Austria	100	0	0	0
Belgium	100	0	0	0
Denmark	100	0	0	0
Finland	100	0	0	0
France	77.78	7.04	15.19	0
Germany	100	0	0	0
Greece	-	-	-	-
Ireland	-	-	-	-
Italy	82.50	17.50	0	0
Netherlands	100	0	0	0
Norway	100	0	0	0
Portugal	77.78	0	22.22	0
Spain	2.50	97.50	0	0
Sweden	100	0	0	0
Switzerland	60	40	0	0
United Kingdom	29.45	63.51	7.03	0
Sample average	**80.71**	**16.11**	**3.17**	**0**

Note: This table reports the percentage of minority directors according to the four criteria: (1) as employee of one of the minority shareholders of the bank; (2) as one of the direct/indirect minority shareholders of the bank; (3) as having the same family name as one of the minority shareholders of the bank; (4) as an employee of a government agency if one of the minority shareholders of the bank is a state.

2.2.2.2 Voting power of controlling shareholders

We proxy the decision power of ultimate owners with their voting rights (*PowerControlling)*. To do this, we first need to build the control chain to identify both direct and indirect ultimate owners of each bank. By using the control threshold of 10%, we identify direct controlling shareholders holding at least 10% of the total outstanding shares. If a

controlling shareholder is an individual, a family, a government or a widely held company, we define him as the direct ultimate owner of the bank. If controlling shareholders are controlled by other entities, we continue building the control chains to identify all indirect ultimate owners (see Appendix B2.1 for details on control chains).

We follow La Porta et al. (1999) to calculate the direct and indirect voting rights of an ultimate owner. The voting rights of a direct ultimate owner are defined as the percentage of shares owned directly by this ultimate owner. The voting rights for each indirect ultimate owner are defined as the percentage of shares held by the shareholder at the first level in the control chain, which is controlled by the ultimate owner through the intermediate entities in the chain of control. An ultimate owner could be both a direct and an indirect ultimate owner of the bank. Thus, the aggregate voting rights of this ultimate owner are the sum of their direct and indirect voting rights held in the bank.

In our sample, our statistics indicate that in banks having directors related to minority shareholders, the voting rights of controlling shareholders are around 43.96% (see Table 2.2). In banks without minority directors on the board, the voting rights of controlling shareholders are 70.40% in average.

We potentially expect two alternative impacts of the voting power of controlling ultimate owners on the presence of minority directors on bank boards. On the one hand, if controlling owners want to expropriate minority shareholders, they might use their voting power to limit the presence of minority directors on boards. This leads to the "expropriation hypothesis" where we expect to find a negative relation between the voting rights of controlling shareholders (*PowerControlling)* and the presence of minority directors on boards (*Pct_MinorityDir).* On the other hand, controlling owners might increase the presence of minority directors if they want to signal that they will not expropriate minority shareholders. This could be rewarded by an increase in market valuation (Barry et al., 2018). This argument leads us to the "signaling hypothesis"*,* with higher voting rights of controlling shareholders (*PowerControlling)* associated with a larger number of minority directors (*Pct_MinorityDir).*

2.2.2.3 Institutional variables

To measure the country-level institutional characteristics which might impact the presence of minority directors on bank boards, we use three indices: the index of Quality of Recommendations on Board Composition (*RecomBComp),* the Shareholder Protection index *(RADI)*, and the Supervisory Power index *(SupPow).*

Index of Quality of Recommendations on Board Composition

Code of Best Practices for Corporate Governance has been implemented in all countries in our sample. The Corporate Governance Codes cover different aspects of corporate governance including composition of boards of directors.

Based on recommendations on board composition of the countries in our sample, we compute an index measuring the Quality of Recommendations on Board Composition (*RecomBComp)* for each country. This index takes into account the following criteria: (1) whether there is a requirement on the presence of independent directors in different types of ownership structure, ie directors who are independent from managers in widely held firms, and who are independent from controlling shareholders in controlled firms; (2) whether there is a requirement/recommendation on the number of independent directors on the board of directors, ie the percentage of directors who are independent from managers in widely held firms, and who are independent from controlling shareholders in controlled firms; (3) whether there is any requirement for the presence of minority directors on the board; (4) whether there is any requirement/recommendation on information disclosure (list of directors, number of directors) about the presence of independent directors or minority directors on the board; (5) whether there is any requirement/recommendation on information disclosure about controlling shareholders. The detailed questions used to construct this index are given in Table 2.4.

The higher the *RecomBComp* index, the higher the quality of recommendations in terms of board composition. This index ranges in principle from 0 to 18; in our sample, it has the median of 9, with a minimum of 3 (Germany, Switzerland), and a maximum of 15 (Spain). There is therefore a strong heterogeneity in our sample regarding the quality of recommendations on board composition.

We expect that the quality of recommendations on board composition might be a factor that could promote the presence of minority directors on bank boards. Even if the Code of Best Practices for Corporate Governance in most of countries is based on voluntary compliance, companies that do not comply with the Code's recommendations have to explain their non-compliance. Investors are therefore able to penalize companies for non-compliance with the Code. If the recommendation is to have a minimum number of minority directors in firms with a concentrated ownership structure, firms have to comply or give reasons in case of non-compliance. This recommendation might then facilitate the presence of minority directors on the board. We expect banks in countries with a higher value of *RecomBComp* index to have a larger number of minority directors on their board.

Shareholder protection index

We use the revised anti-director rights index (*RADI)* from Djankov et al. (2008) to measure the degree of shareholder protection in each country. The anti-director rights index measures the level of protection of minority shareholders vis-à-vis managers or controlling shareholders by laws or explicit rules in the corporate decision-making process. This index varies from 0 (weakest protection) to 5 (strongest protection). The level of shareholder protection is heterogeneous between countries in our sample as it takes the median of 3.5; with Greece and Italy having the minimum of 2 and Spain, Ireland, United Kingdom having the maximum of 5 for this index.

The impact of strong levels of shareholder protection on the presence of minority directors is not clearly define. Firstly, there are specific regimes to insure the execution of the rights of minority shareholders in countries having stronger levels of shareholder protection. If minority shareholders want to nominate directors to board positions, a strong shareholder protection environment might oversee and safeguard the legal procedures. Therefore, strong levels of shareholder protection might increase the presence of minority directors. Alternatively, it is also possible that strong levels of shareholder protection might already limit the opportunistic expropriation behavior of bank insiders. Internal governance by minority directors might therefore become less essential in these countries. Strong levels of shareholder protection might then reduce the number of minority directors on boards, acting as a substitute for minority directors.

Supervisory power index

We use the supervisory power index (*SupPow)* computing from the World Bank's 2013 Bank Regulation and Supervision database (Barth et al., 2013) to measure the strength of the supervisory regime. This index considers several aspects of bank regulatory and supervisory policies, such as regulations on banking activities (conditions under which banks can engage in risky activities such as securities, real estate, etc.), the powers of official supervisory agencies (power of supervisory authorities to restructure even to the extent of removing bank managers and directors in troubled banks, etc.), external governance mechanisms (effectiveness of external audit, transparency of financial statements, etc.), etc. This index ranges from 0 to 16. A high supervisory power index indicates wider and stronger authority for bank supervisors. This index varies across countries, with Italy getting the highest value of this index at 13, and Sweden getting the minimum at 4.

In strict supervisory systems, supervisors can issue fines against, or even dismiss bank directors without formal proceedings, or mandate new board elections. In countries having stronger supervisory regimes the presence of minority directors could be less essential in reducing agency conflicts between insiders and minority shareholders. We then expect a negative impact of the strength of the supervisory regime on the presence of minority directors on bank boards.

2.2.2.4 Bank opacity

One of the particularities of banks is the opacity of their activities. To measure the degree of opacity, we use market data to compute an opacity index (*Opacity)*. Following Anderson et al. (2009), we calculate the natural logarithm of the average daily trading volumes during the fiscal year, and bid-ask spread as the difference of ask price and bid price over the average of bid and ask prices. We rank each of these two proxies from the value of 1 (for banks with high trading volume, or small bid-ask spread) to the value of 10 (for banks with low trading volumes, or high bid-ask spreads). We then take their average to capture the opacity level of each bank, with the most transparent bank having a value of 1 and the most opaque bank a value of 10.

Again, the relationship between the degree of opacity and the presence of minority directors is not a clear cut issue. Higher opacity indicates that there is higher information asymmetry between insiders and minority shareholders. In this context, minority shareholders might have less information on bank activities. In banks having higher levels of opacity, controlling shareholders might have more opportunities to expropriate minority shareholders. They then might want to limit the presence of minority directors on the board to facilitate their expropriation activities. This argument is in line with the "expropriation hypothesis". However, controlling shareholders in banks with higher levels of opacity might also increase the number of minority directors to signal that they will not expropriate minority shareholders, in line with the "signaling hypothesis".

Table 2.4. Variable definitions, data sources and summary statistics

Variables	Definition	Source	Mean	Median	Standard Deviation	Min.	Max
Dependent variable							
Pct_MinorityDir	Percentage of related directors to *minority* shareholders having less than 10% of control rights. (%)	Bloomberg, annual reports	17.48	8.92	23.71	0	100
d_MinorityDir	Dummy variable that takes the value of 1 for banks having minority directors on the board, and 0 for otherwise.	ibid	0.45	0	0.50	0	1
Ownership structure variable							
PowerControlling	Total voting rights of controlling shareholders	Bankscope	52.86	56.27	27.44	10.3	100
Uo_BPI	Relative voting power of the biggest ultimate owner	ibid	0.64	0.99	0.38	0.08	1
Bank characteristic variables							
BoardSize	Natural logarithm of the number of directors on the board	Bloomberg	2.33	2.39	0.47	1.09	3.22
Size	Natural logarithm of Total Assets (orthogonalized on BoardSize)	Bankscope	16.79	16.67	2.61	9.88	21.65
Loan	The ratio of gross loans to total assets (%)	ibid	47.14	51.61	25.60	0.59	89.67
Opacity	The average of the rank from 1 to 10 of two indicators about Opacity (Trading volume: the natural logarithm of the average trading volume during the fiscal year. Bid–ask spread: ask price minus the bid price divided by the average of the bid and ask prices)	Bloomberg	5.92	6.0	2.59	1	10
Performance	Lagged one year of return on equity (ROE) (%)	Bankscope	7.02	6.81	17.26	-35.66	53.88
Country-level variables							
RADI	Revised anti-director index (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.	Djankov et al. (2008)	3.32	3.5	0.96	2	5

SupPow	Index measuring the strength of a 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 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.	Bank regulation and supervision database (Barth et al., 2013)	10	11	2.33	4	13
RecomBComp	Index measuring the quality of recommendations on boards of directors in Corporate Governance Codes. Each of the following criteria might exist in the form of "Comply or explain" principle, Recommendation, or might not be mentioned in the Code of Best Practices, which are coded as 2/1/0: (1) Do regulators require a sufficient number of independent directors on the board?; (2) Are there criteria on the independence from managers?; (3) Are there criteria on the independence from controlling shareholders?; (4) Do firms/banks have to disclose the percentage of independent directors on the board?; (5) Do firms/banks have to disclose the percentage of independent	Code of Best Practices for Good Corporate Governance	8.35	9	3.32	3	15

directors from managers on the board?; (6) Do firms/banks have to disclose the percentage of independent directors from managers on the board?; (7) Do firms/banks have to disclose the percentage of independent directors from controlling shareholders on the board?; (8) Is the presence of directors related to minority shareholders required?; (9) Does the independence of directors have to be reported (list of independent directors, by which criteria a director is considered not independent, etc.)?; (10) Is the list of controlling shareholders disclosed?

Individualism	The individualism/collectivism dichotomy personifies the distinction between collective (group-based) and individual-based decision making. When individualism is low there is a need for group effort to achieve success while when it is high there is a need for individual requirements and achievements	Hofstede (2001)	67.34	71	14.35	27	89
EcoFreedom	A country's overall economic freedom score, given as an average of its 10 subcomponents, including business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption and labor freedom. This index ranges from 0 to 100, with a higher score indicating that a country is more economically free.	Heritage foundation (2013)	70.24	72.8	7.31	55.4	81

Instrumental variables

Intellectual property	Charges for the use of intellectual property are payments and receipts between residents and non-residents for the authorized use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs including trade secrets, and franchises) and for the use, through licensing agreements, of produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works, and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast). Data are in billion US dollars.	World Bank	6.47	5.59	6.77	0.371	42.1
Trade adjustment	The terms of trade effect equals capacity to import less exports of goods and services in constant prices. Data are in billion constant local currency.	ibid	-8.79	-11.7	22.3	-35.2	127

Gross capital formation	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.	ibid	20.03	19.46	3.43	12.80	26.48
Purchasing power parity	Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as US dollars would buy in the United States. This conversion factor is for GDP. For most economies PPP figures are extrapolated from the 2011 International Comparison Program (ICP) benchmark estimates or imputed using a statistical model based on the 2011 ICP. For 47 high- and upper middle-income economies conversion factors are provided by Eurostat and the Organisation for Economic Co-operation and Development (OECD).	ibid	2.05	0.81	2.70	0.61	9.04
Foreign direct investment	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP	ibid	2.26	1.34	5.31	-4.99	28.92
Claims on central government	Claims on central government (IFS line 52AN or 32AN) include loans to central government institutions net of deposits.	ibid	12.78	12.41	13.43	-16.22	35.92

2.2.3. Econometric specification

In order to determine which factors significantly impact the presence of minority directors on bank boards, we estimate the following equation:

$$Pct\_MinorityDir_{ij} = \alpha + \beta_1 * PowerControlling_{ij} + \beta_2 * Institutional_j$$

$$+\beta_3 * Opacity_i + \sum_{k=4}^{6} \beta_k * X_i + \varepsilon_{ij}$$

where subscripts *i* denotes the bank *i (i =1, 2, 3, ... 96); j* denotes the country *j (j= 1, 2, ..., 17); β_k (k= 1,.., 6)* are the parameters to be estimated; ε_{ij} is the idiosyncratic error term; $Pct\_MinorityDir_{ij}$ is the percentage of minority directors on the board of the bank *i* in 2013; $PowerControlling_{ij}$ measures the voting rights of controlling shareholders; $Institutional_j$ represents either the quality of recommendations on board composition (*RecomBComp*), the level of shareholder protection (*RADI)*, or the strength of the supervisory regime (*SupPow).* We include the institutional variables separately one by one due to high correlations (see matrix of correlation in Table A2.1 in the Appendix);

We also include as controll variables (X_i) the board size, bank size, the loan ratio, and the ROE. We measure board size (*BoardSize)* as the natural logarithm of the number of directors on the board, bank size (*Size)* as the logarithm of total assets of banks, and loan ratio (*Loan)* as the ratio of total loan to total assets of the bank. Following previous studies on the determinants of independent directors, we then expect a positive relation between board size (*BoardSize)* and the presence of minority directors on the board (Prevost et al., 2002; Boone et al., 2007; Fraile and Fradejas, 2014), and also a positive relation between bank size (*Size)* and the number of minority directors on the board (Boone et al., 2007; Guest, 2008; Fraile and Fradejas, 2014). We expect to find a positive relation between the loan ratio and the presence of minority directors on bank boards. In banks with a concentrated ownership structure, controlling shareholders may extract private benefits through loans on non-market terms to related parties. Then, the higher the loan ratio, the higher the risk of expropriation by controlling shareholders. The presence of minority directors might protect the interest of minority shareholders in these banks. Finally, we include the ROE as a measure of bank profitability. To mitigate the potential endogeneity problem between board composition and the ROE, we use one-year lagged of ROE.

As the dependent variable in this study is percentage, and 55.2% of banks in our sample have the percentage of minority directors at the lower threshold of 0% or the upper threshold of 100%, the OLS estimator might be inconsistent. Therefore, to mitigate this potential

problem, we employ a Tobit Model with both upper and lower thresholds to conduct our estimations.

The existing literature in corporate governance shows that board composition is endogenously determined within the ownership structure (Mak and Li, 2001). We therefore introduce instrumental variables to control for potential endogeneity problem between bank ownership structure and the presence of minority directors on bank boards. In this study, we have used for this a large set of variables related to general business conditions, drawn from the World Bank's World Development Indicators.[18] We find that these variables are correlated with the voting rights of controlling shareholders and uncorrelated with the presence of minority directors on the board (see Table 2.4 for a definition of instrumental variables). We use two-step regressions within the Tobit Model to take into account the potential endogeneity problem in this study. We also carry out endogeneity tests, applying the Wald Test to examine the null hypothesis of no endogeneity. The Wald Test results are reported at the bottom of the tables of results. We also carry out the test of the validity of our instrumental variables. We report the Anderson Rubin (AR) Test in the lower part of the tables of results. We also report the AR Test, which is a joint test where the null hypothesis is the coefficient on the endogenous regressor (beta) is equal to the hypothesized value for beta, and the instruments are exogenous. A well-specified model is the model in which the null hypothesis cannot be rejected (i.e. p-value>0.1)

After examining the correlation among our variables (see Table A2.1 in the Appendix), we orthogonalize the variables which have potential multicollinearity problems (except institutional variables) (see Table 2.4).

2.3. Results

Table 2.5 presents the impacts of voting power of controlling shareholders, bank internal characteristics and institutional characteristics on the presence of directors who are related to minority shareholders on bank boards. The test statistic of the Wald Test is significant, indicating that there is an endogeneity problem between the voting rights of controlling shareholders and the presence of minority directors on boards. We then report the results of two-step Tobit regressions.

The results show that the voting rights of controlling shareholders have a positive and significant impact on the presence of minority directors on bank boards. It means that the banks

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[18] Our set of instrument candidates consists, amongst others of: the terms of trade adjustment, gross capital formation (gross domestic investment), charges for the use of intellectual property.

in which the controlling shareholders have more decision-making power through their voting rights, are more likely to have a higher number of minority directors on their board. This finding is consistent with the "signaling hypothesis". When controlling shareholders have more voting rights, they might encourage the presence of minority directors on the board as a signal of non-expropriation from them. Controlling shareholders might expect to benefit from a higher market valuation (Barry et al., 2018).

We also find that the degree of opacity has a negative and significant impact on the presence of minority directors on bank boards. This result seems to indicate that controlling shareholders in banks with higher degrees of opacity might limit the presence of minority directors to facilitate their expropriation, in line with the "expropriation hypothesis".

Regarding the impact of the institutional environment, we find that banks in countries having high quality recommendations on board composition as well as high levels of shareholder protection are more likely to have minority directors on bank boards. These results support the hypothesis that the quality of recommendations on board composition and levels of shareholder protection are two factors that favor the presence of minority directors on bank boards. In countries having high quality recommendations on board composition, the Code of Best Practices often provides detailed recommendations about the presence of independent directors depending on ownership structure, and more particularly about the presence of minority directors. Consequently, it contributes to the increase of minority directors on bank boards. In countries with high levels of shareholder protection, there are specific requirements by law to protect the rights of minority shareholders, and then they have more rights to challenge banks' controlling parties. Therefore, minority shareholders are able to be more active in choosing directors to defend their interest.

We furthermore find a negative and significant relationship between the strength of supervisory regimes and the presence of minority directors on bank boards. This result indicates that in countries where banking authorities have strong powers to supervise banks' performance, the bank board of directors is less likely to have minority directors. In countries with strong supervisory system, banking supervisors are able to dismiss bank directors or mandate new board elections. The supervisory regime can therefore be a substitute to a bank's internal governance mechanisms to reduce agency conflicts between controlling and minority shareholders.

For control variables, we find a positive relationship between board size (*BoardSize)* and the percentage of minority directors on bank boards.

In summary, the voting power of controlling owners, the quality of recommendations on board composition, and the level of shareholder protection are factors that favor the presence of minority directors on board of controlled banks. The degree of opacity and the strength of supervisory regimes are factors having a negative impact on the presence of minority directors on bank boards.

Table 2.5. Factors having an impact on the presence of minority directors on bank boards

Dependent variable: Percentage of minority directors (Pct_MinorityDir)			
	(1)	(2)	(3)
PowerControlling	1.562***	0.669*	1.256**
	(2.67)	(1.70)	(2.12)
RecomBComp	4.356**		
	(2.46)		
RADI		24.99***	
		(4.41)	
SupPow			-8.097***
			(-3.00)
BoardSize	7.379	9.830*	11.79**
	(1.22)	(1.93)	(1.96)
Size	0.943	-2.921	-3.623
	(0.18)	(-0.61)	(-0.62)
Loan	3.207	-0.538	0.976
	(0.51)	(-0.10)	(0.15)
Opacity	-38.63***	-24.64***	-30.38***
	(-3.79)	(-3.23)	(-3.04)
Performance	-0.0172	-0.00726	-0.0199
	(-1.14)	(-0.55)	(-1.33)
Constant	-139.4***	-122.5***	2.253
	(-3.28)	(-3.39)	(0.06)
Number of observations	96	96	96
Instrumental variables	Intellectual property Trade adjustment Gross capital formation	Intellectual property Trade adjustment Gross capital formation	Intellectual property Trade adjustment Gross capital formation
Weak instrument test			
Chi2 statistic	3.89	1.61	2.78
p-value	0.274	0.657	0.427
Endogeneity test (Wald test)			
Chi2 statistic	4.19	3.61	4.64
p-value	0.040**	0.057*	0.031**

Note: The regressions in this table investigate the factors that impact of the presence of minority directors on the board. The dependent variable "Pct_MinorityDir" is the percentage of minority directors on the board. All other variables are as defined in Table 2.4. The table reports results using the two stage Tobit regression. The result of the tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

2.4. Further investigation and robustness checks

2.4.1. Further investigation

In our sample, there are 51 banks (53.12%) having no minority directors on their board. Therefore, in this section, we investigate the factors that might impact the presence or not of

minority directors on boards of banks with a concentrated ownership structure. To do this, we replace our dependent variable in the Equation (1) by the dummy variable *d_MinorityDir.* This dummy variable takes the value of 1 for banks having minority directors on their board, and 0 otherwise. Then we use Probit regressions instead of Tobit regressions in this section.

Following the previous section, we also use variables of the general business environment[19] taken from World Bank's World Development Indicators as instrumental variables as a control for a potential endogeneity problem between the presence of minority directors on bank boards and bank ownership structure. Then we use a two-step Probit regression to examine the factors that might impact the presence or not of minority directors on bank boards. After each regression, we also conduct Wald Tests with the null hypothesis of no endogeneity problem between board structure and ownership structure. We report the result of Wald Tests at bottom of Table 2.6. The test statistics of Wald Tests are significant, indicating that there is an endogeneity problem between voting rights of controlling shareholders and the probability of the presence of minority directors on the board. We then report the results of two-step Probit regressions.

Table 2.6 presents the factors that determine the presence or not of minority directors on bank boards. We first find that the degree of opacity has a negative and significant impact on the probability of having minority directors on bank boards, again in line with the "expropriation hypothesis". Regarding the impact of institutional variables, we find that higher levels of shareholder protection increase the probability of having minority directors, while stronger supervisory regimes decrease it, in line with our previous results. We do not find, however, that the voting power of controlling shareholders has a significant impact on the probability of having minority directors in bank boards. Surprisingly, the decision power of controlling shareholders seems to be more important to determine the number of minority directors than to decide to have such directors or not.

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[19] Our set of instrumental variables in this section consists, among others, of the claims on central government including loans to central government institutions net of deposits, foreign direct investment – net inflows, purchasing power parity.

Table 2.6. Factors having an impact on the probability of having minority directors on bank boards.

Dependent variable: d_Minority			
	(1)	(2)	(3)
PowerControlling	0.0369	0.0643*	0.0435
	(1.40)	(1.71)	(1.49)
RecomBComp	0.107		
	(1.46)		
RADI		1.112***	
		(2.61)	
SupPow			-0.284**
			(-2.28)
BoardSize	0.442*	0.725**	0.606**
	(1.80)	(2.46)	(2.46)
Size	0.123	-0.0721	-0.0635
	(0.55)	(-0.25)	(-0.26)
Loan	0.0965	0.203	0.0653
	(0.39)	(0.67)	(0.26)
Opacity	-1.177**	-1.695***	-1.189**
	(-2.55)	(-2.68)	(-2.51)
Performance	-0.000721	-0.000672	-0.000885
	(-1.11)	(-0.91)	(-1.36)
Constant	-2.929*	-7.070**	0.503
	(-1.81)	(-2.28)	(0.34)
Number of observations	96	96	96
Instrumental variables	Purchasing power parity	Purchasing power parity	Purchasing power parity
	Foreign direct investment	Foreign direct investment	Foreign direct investment
	Claims on central government	Claims on central government	Claims on central government
Weak instrument test Chi2 statistic	3.57	6.91	4.36
p-value	0.312	0.075	0.226
Endogeneity test (Wald test) Chi2 statistic	8.70	11.48	9.13
p-value	0.003***	0.000***	0.002***

Note: The regressions in this table investigate the factors that impact of the probability of having minority directors on the board. The dependent variable "d_Minority" is a dummy variable that takes the value of one if the bank has minority directors on the board, and zero for otherwise. All other variables are as defined in Table 2.4. The table reports results using the two stage Probit regression. The result of the tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels

2.4.2. Robustness checks

We conduct several robustness checks to verify the strength of our results.

An alternative measure of voting power for controlling shareholders.

Among controlling shareholders, the biggest ultimate owner who has the largest voting rights might have an important impact on board composition and more incentives to extract private benefits. However, the real voting power of the biggest ultimate owner is affected by the possibility of coalition between other controlling shareholders (Attig et al., 2008). Then we calculate the relative voting power of the biggest ultimate owner by estimating the "Banzhaf Power Index" (*uo_BPI)*. This index takes into account voting rights of the biggest ultimate owner and the probability of coalitions between other controlling shareholders to become decisive in a bank (see Appendix 3 for details). We use the algorithms for voting power analysis provided by Dennis Leech at the University of Warwick[20]. This index varies from 0 to 1; the higher the index, the higher relative voting power of the biggest ultimate owner. The results confirm the negative relationship we found previously between the voting power of the largest ultimate owner and the presence of minority directors on the board (see Table A2.2 the Appendix).

Alternative institutional environment variables.

We use two alternative institutional environment variables: the national culture and the economic environment. We first use the individualism index (*Individualism)* (Hofstede, 2001) to measure the distinction between a country's group-based and individual-based decision making. In a country with high levels of *Individualism* index, there is a loose relation to the social framework, and individuals might put their interest and the interest of their family first. In contrast, there is a tight relation to society in countries with a low level of *Individualism* index, and individuals in a group will take care of each other. We find that the *Individualism index* does not have a significant impact on the presence of minority directors on the board. Our other results remain unchanged (see Table A2.3 in the Appendix).

Regarding the economic environment, we use the Economic Freedom Index of The Heritage Foundation to take into account the degree of economic freedom of a country. This index comprises ten subcomponents of economic freedom, including business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial

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[20] See http://homepages.warwick.ac.uk/~ecaae/ipgenf.html.

freedom, property rights, freedom from corruption and labor freedom. This index ranges from 0 to 100. A higher score indicates that a country is more economically free. We find that the *EcoFreedom* index does not have a significant impact on the number of minority directors on bank boards. Our main results remain unchanged (see Table A2.3 in the Appendix).

Sub sample analysis

In our main results, we only considered minority directors having the same family name as minority shareholders when it is not a common family name in each country. In this section, we do not consider these directors as minority directors because of potential risk of misclassification. Our main conclusions remained unchanged (see Table A2.4 in the Appendix).

2.5. Conclusion

In this study, we examine the factors that could promote the presence of minority directors on boards of directors in banks with a concentrated ownership structure. We conduct an empirical analysis using manually collected data on boards of directors for a sample of listed European banks having at least one controlling shareholder.

We find controlling shareholders use their voting power to facilitate the presence of minority directors on the board as a signal of non-expropriation. Controlling shareholders might then benefit from a higher market valuation (Barry et al., 2018). At the opposite of this signaling behavior, our results show that banks with a higher degree of opacity have a smaller number of minority directors on their boards. This result indicates that these banks may limit the presence of minority directors to facilitate the diversion of resources, in line with the expropriation hypothesis.

We furthermore find that the institutional environment has a strong impact on the presence of minority directors on bank boards. Higher quality recommendations on board structure in Corporate Governance Codes and stronger shareholder protection are two factors that favor the presence of minority directors. On the contrary, our results show that the strength of supervisory power decreases the presence of minority directors on bank boards in banking governance. This result indicates that strong supervisory regimes are a substitute for the presence of minority directors, as minority shareholders count on supervisors to oversee banks' activities.

Barry et al. (2018) show that in banks with a concentrated ownership structure, the presence of minority directors increases bank market valuation without increasing bank risk-taking.

Therefore, the presence of minority directors is considered as a good governance mechanism or a signal of a "strong" board in banks with a concentrated ownership structure. Our study completes this paper by providing policy recommendations to favor the presence of minority directors on bank boards. One of our results is that the voting power of controlling shareholders contributes to increase the presence of minority directors on bank boards. However, it seems difficult to influence the ownership structure of banks in order to increase the percentage of minority directors. But our study shows that there are several factors that policy-makers can manipulate to promote the presence of minority directors on bank boards. Firstly, our findings show that an important factor to increase the number of minority directors is to reduce the opacity of banks. This can be done by forcing banks to display information on their activities and their ownership structure, in line with the recommendation of the Basel Committee. Secondly, our findings also suggest that policy-makers should ameliorate the quality of recommendations on board composition in Corporate Governance Codes. In particular, recommendations and requirements on board composition should be different for widely-held and controlled banks. European countries should follow the example of Spain and Italy by including requirements on the presence of minority directors on boards of directors, especially for firms with a concentrated ownership structure. Thirdly, our results show that another way to favor the presence of minority directors is to strengthen shareholder protection. High shareholder protection could make a clear legal procedure for minority shareholders to nominate minority directors.

Appendix

Appendix A

Appendix A2.1. Matrix of correlation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.Pct_MinorityDir	1									
2.PowerControlling	-0.320**	1								
3.BoardSize	0.0807	-0.0461	1							
4.Size	0.130	-0.0199	0	1						
5.Loan	-0.0820	0.0587	0.0534	-0.0746	1					
6.Opacity	-0.263**	0.463***	0	-1.05e-08	0.248*	1				
7.Performance	0.109	0.020	0.041	0.033	0.015	-0.096	1			
8.RecomBStr	0.250*	-0.0944	0.309**	0.0943	0.163	-0.0581	0.1321	1		
9.RADI	0.476***	-0.243*	-0.0716	0.186	-0.0211	-0.0251	-0.1188	0.168	1	
10.SupPow	-0.337***	0.241*	0.0136	-0.306**	-0.0565	0.197	-0.1724	-0.324**	-0.516***	1

This table shows the correlation matrix for all variables. All variables are as defined in Table 2.4. *, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

Table A2.2. Robustness tests using alternative measures of the relative voting power of the biggest controlling shareholders to proxy the voting power of controlling shareholders.

Dependent variable : Pct_MinorityDir			
	(1)	(2)	(3)
Uo_BPI	1.527***	0.639	1.187*
	(2.78)	(1.26)	(1.91)
RecomBComp	4.807***		
	(2.77)		
RADI		24.97***	
		(4.03)	
SupPow			-9.878***
			(-3.05)
BoardSize	4.580	8.529	9.606
	(0.81)	(1.62)	(1.62)
Size	4.329	-1.280	-2.062
	(0.84)	(-0.25)	(-0.35)
Loan	7.996	1.502	4.383
	(1.20)	(0.24)	(0.62)
Opacity	-44.42***	-26.69**	-33.69***
	(-3.80)	(-2.45)	(-2.72)
Performance	-0.0276*	-0.0112	-0.0289*
	(-1.78)	(-0.79)	(-1.72)
Constant	-163.2***	-129.5**	8.173
	(-3.34)	(-2.57)	(0.21)
Number of observations	96	96	96
Instrumental variables	Intellectual property	Intellectual property	Intellectual property
	Trade adjustment	Trade adjustment	Trade adjustment
	Gross capital formation	Gross capital formation	Gross capital formation
Weak instrument test Chi2 statistic	3.66	1.65	2.63
p-value	0.301	0.648	0.452
Endogeneity test (Wald test) Chi2 statistic	2.47	3.92	3.46
p-value	0.115	0.047	0.062

Note: The regressions in this table investigate the factors that impact of the presence of minority directors on the board. In these regressions, we use relative voting power of the biggest controlling shareholder to proxy the voting power of controlling shareholders. All other variables are as defined in Table 2.4. The table reports results using the two stage Tobit regression. The result of the tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A2.3. Robustness tests using other institutional variables.

Dependent variable : Pct_MinorityDir		
	(1)	(2)
PowerControlling	1.298**	1.009***
	(2.33)	(2.69)
Individualism	0.0437	
	(0.09)	
EcoFreedom		1.307
		(1.57)
BoardSize	11.87**	14.17**
	(2.07)	(2.35)
Size	2.345	1.356
	(0.45)	(0.26)
Loan	3.646	3.133
	(0.60)	(0.54)
Opacity	-34.20***	-30.34***
	(-3.43)	(-3.88)
Performance	-0.0151	-0.0103
	(-1.02)	(-0.72)
Constant	-90.40**	-163.0**
	(-2.46)	(-2.36)
Number of observations	96	96
Instrumental variables	Intellectual property	Intellectual property
	Trade adjustment	Trade adjustment
	Gross capital formation	Gross capital formation
Weak instrument test		
Chi2 statistic	1.65	2.25
p-value	0.64	0.52
Endogeneity test (Wald test)		
Chi2 statistic	2.74*	2.89*
p-value	0.09	0.08

Note: The regressions in this table investigate the factors that impact of the presence of minority directors on the board. In these regressions, we use "Individualism" and "Economic Freedom" to proxy the institutional environment. All other variables are as defined in Table 2.4. The table reports results using the two stage Tobit regression. The result of the tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Table A2.4. Robustness tests using sub sample without minority directors having the same family name with minority shareholders.

Dependent variable : Pct_MinorityDir			
	(1)	(2)	(3)
PowerControlling	1.555***	0.667*	1.252**
	(2.70)	(1.72)	(2.15)
RecomBComp	4.303**		
	(2.45)		
RADI		24.88***	
		(4.45)	
SupPow			-8.019***
			(-3.01)
BoardSize	7.383	9.763*	11.74**
	(1.23)	(1.94)	(1.97)
Size	1.124	-2.745	-3.399
	(0.21)	(-0.58)	(-0.59)
Loan	3.234	-0.509	1.019
	(0.52)	(-0.10)	(0.16)
Opacity	-38.52***	-24.58***	-30.34***
	(-3.83)	(-3.27)	(-3.08)
Performance	-0.0169	-0.00703	-0.0196
	(-1.14)	(-0.54)	(-1.32)
Constant	-139.0***	-122.4***	1.258
	(-3.31)	(-3.44)	(0.03)
Number of observations	96	96	96
Instrumental variables	Intellectual property	Intellectual property	Intellectual property
	Trade adjustment	Trade adjustment	Trade adjustment
	Gross capital formation	Gross capital formation	Gross capital formation
Weak instrument test Chi2 statistic	3.93	1.59	2.79
p-value	0.270	0.661	0.424
Endogeneity test (Wald test) Chi2 statistic	4.10	3.56	4.57
p-value	0.042	0.059	0.032

Note: The regressions in this table investigate the factors that impact of the presence of minority directors on the board. In these regressions, we exclude minority directors according to the criterion of having the same family name with one of minority shareholders. All variables are as defined in Table 2.4. The table reports results using the two stage Tobit regression. The result of the tests of validity of instruments and endogeneity test are reported in the lower part of the table. The Z-statistics are in parentheses, with *, **, and *** denoting significance at 10%, 5% and 1% levels.

Appendix B

Appendix B2.1. Example of a control chain

```
                                    ┌──────────┐
                                    │  Bank A  │
                                    └────┬─────┘
        ┌──────────┬─────────────┬──────┼───────┬──────────┬──────────┐
   ┌─────────┐ ┌─────────┐ ┌─────────┐ ┌────────┐ ┌────────┐ ┌────────┐
   │B1 (20%) │ │B2 (30%) │ │B3 (20%) │ │B4(20%) │ │B5(5%)  │ │B5 (5%) │
   └────┬────┘ └────┬────┘ └────┬────┘ └────────┘ └────────┘ └────────┘
    ┌───┴────┐      │           │
┌────────┐ ┌─────────┐ ┌─────────┐ ┌─────────┐
│C1 (10%°│ │C2 (40%) │ │C3 (40%) │ │D1 (30%) │
└────────┘ └────┬────┘ └────┬────┘ └─────────┘
                │           │
           ┌─────────┐ ┌─────────┐
           │D1 (60%) │ │D3 (40%) │
           └────┬────┘ └─────────┘
                │
           ┌─────────┐
           │D2 (10%) │
           └─────────┘
```
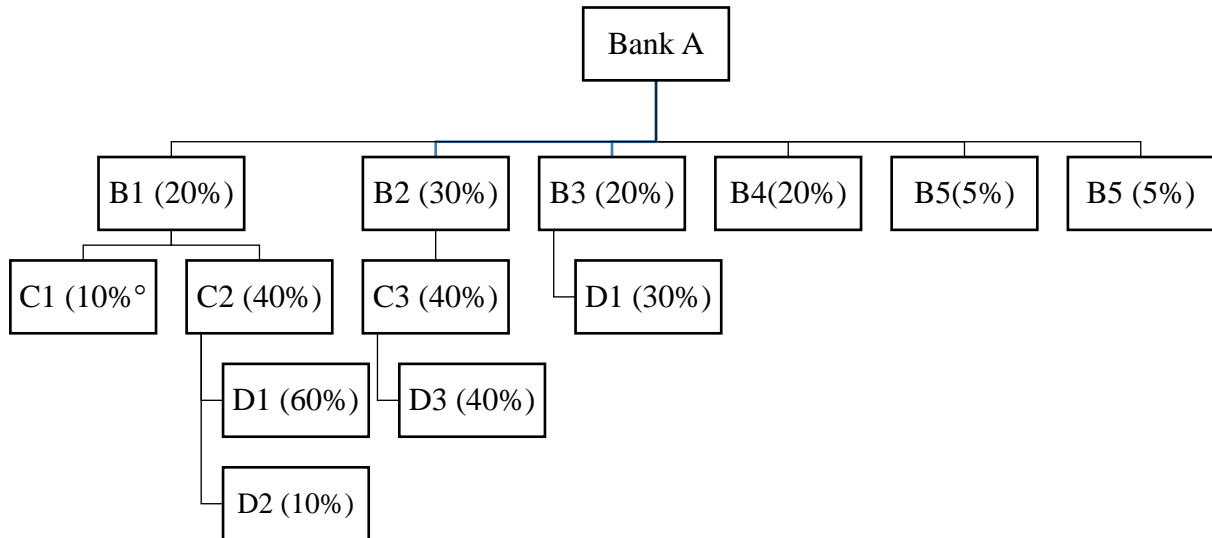
We have two minority shareholders: B5 and B6

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%.

Appendix B2.2. The Banzhaf Power Index (BPI)

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 of votes needed to pass a decision. The BPI for Player P is computed through five steps. We provide an example using the chain of control presented in Appendix B2.1. Voting rights of B4, D3, D1 are 20, 30 and 40, respectively. The quota is 51.

STEP 1: We determine all WINNING coalitions:

Winning Coalitions	Explanation
{D1, D3} {B4, D1}	Shareholder D1 and D3 together have enough control rights to win. 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: Critical players are determined for each winning coalition. We count the number of votes the coalition has without a particular Player, and if the coalition no longer has enough votes to win, then that Player is critical. In our example, the critical players are underlined:

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: We determine the number of times all players are critical: 5 (underlined above).

STEP 4: We determine the number of times Player P is critical: 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; BPI(D3) = 1/5 =0.2; BPI(B4) = 1/5 = 0.2.

CHAPTER 3

Board gender quotas: can women realistically boost firm performance?

3.1. Introduction

Gender imbalance on corporate boards remains an undeniable fact for a large number of companies worldwide, despite significant advances for women in education, labor force and political participation across the globe. Women only represented 11.9% of boards of directors in European companies in 2010, dropping to 9.9% in the Americas, 6.5% in the Asia-Pacific Region and 3.2% in the Middle East and North Africa (Corporate Women Directors International, 2010). Policy-makers have responded in many countries by imposing gender quotas for corporate boards partly for social justice, but also justifying this intervention by the positive economic effects expected from gender balance, in particular on firm profits.

The literature analysing the relationship between female directors and firm outcomes proposes numerous arguments to explain why the presence of women on boards should positively affect organisational outcomes. They include: (i) influence on decision making with women adopting more ethical, risk-averse and long-term oriented points of view (Rosener, 1990); (ii) women directors bringing resources and strategic input that male directors are not able to provide (Bilimoria, 2000); (iii) increased diversity of opinions in the boardroom (Francoeur et al. 2008); (iv) women directors improving monitoring of managers if they are more independent than their male counterparts, by not being part of "old boys' networks" (Higgs, 2003; Post and Byron, 2015; Adams, 2016); (v) signalling the stakeholders and the market that a company places a high value on women (Burgess and Tharenou, 2002; Kirsch, 2018). All these arguments support the "business case" argument that firms with more women on boards should perform better. Most policy-makers appeal to this "business case" argument to justify the imposition of quotas, ignoring counter-arguments of such affirmative action that might outweigh the expected positive effect of gender balance.

The desirability and efficacy of gender quotas is considered controversial. The first argument used to question the imposition of gender quotas refers to the contract theory of the firm, supposing that firms maximize profits prior to the imposition of quotas. As the introduction of a gender quota forces firms to modify their decision regarding the share of women on the board, it might reduce firms' profits if they were already at a point where profits were maximized (Pande and Ford, 2011; Gopalan and Watson, 2015). Another argument against quotas is based on studies explaining that under-representation of women on boards is not due to discrimination but the result of women's choices, mainly for fertility and motherhood reasons (Burke, 1994; Bertrand et al. 2010; Miller, 2011). In this context, if there are not enough women with the appropriate qualifications that will accept being appointed, gender quotas might promote less-qualified individuals who might perform poorly, and this could

result in firms' decreased profits (Ahern and Dittmar, 2012). Another critique of gender quotas is the risk of entrenchment of women directors if they feel secure in their position; they might then have less pressure than do their male counterparts to represent shareholders interest (Coate and Loury 1993; Matsa and Miller 2013). It is also plausible that gender diversity would exacerbate conflicts and make consensus more difficult to be attained, and this can result in more erratic outcomes (Arrow, 1951; Bernile et al., 2018). Business ethics arguments are furthermore used to question gender quotas, as quotas could be undemocratic (Dubbink, 2005) and discriminatory (Gopalan & Watson, 2015). Quotas are then justified as a rational "last response" to the problem of gender imbalance on corporate boards.

A large strand of the literature has analysed the relationship between women directors and firm performance outside the context of gender quotas (see Kirsch, 2018 and Adams, 2016 for a survey). There is no clear empirical evidence that women affect firm performance, with some studies finding that the presence of women directors has positive consequences on performance (e.g. Ryan and Haslam, 2005), while others find no differences in performance (e.g. Farrell and Hersch, 2005; Chapple and Humphrey, 2014) or even a negative impact of gender diversity (Adams and Ferreira, 2009; Lee and James, 2007). The existing literature that examines the impact of gender quotas on firms' profits is scarce to date and concerns the Norwegian case, as this was the first country to impose gender quotas in 2003. Ahern and Dittmar (2012) and Matsa and Miller (2013) reach similar conclusions that the introduction of gender quotas in Norway had a negative effect on firm outcomes, while Eckbo et al. (2018) find that there is no change in operating profitability following quota compliance after extending the sample period beyond the recent financial crisis.

While many countries have followed the example of Norway by implementing gender quota legislation, there is limited empirical research on gender quotas in the field of corporate governance, with a focus on Norwegian firms. Our paper aims to complement the existing literature by analysing the case of three other European countries that implemented gender quotas in 2011 (Belgium, France and Italy) in order to determine whether promoting women on boards through mandatory rules has an influence on firms' profitability, risk-taking behavior and strategic corporate decisions. While policy-makers expect positive effects from the imposition of gender quotas, they can also create unrealistic expectations for women. The potential benefit of an increased in board diversity on firm outcomes could be outweighed by the cost to be paid when inducing gender balance through mandatory rules. We will also analyse how gender quotas legislation impacts the composition of boards and membership

characteristics (age, education, experience, etc), and how these changes influence the way gender quotas impact firms' performance and corporate decisions.

We use gender quotas in Belgium, France and Italy as a natural experiment to identify the effect of women directors on firms' performance and corporate decisions. We perform a difference-in-differences analysis to account for both cross-sectional heterogeneity and time trends by comparing a panel of 265 firms subject to quotas with a control group of 442 European firms localized in countries with no quotas (Austria, Greece, Ireland, Luxembourg, Portugal and Switzerland), before and after the introduction of the quota. Our results show that gender quotas have a neutral impact on firm performance, risk, and corporate strategic policies. Our results further show that this neutral effect holds after taking into account changes in directors' age, education, nationality or experience.

The remainder of the paper is structured as follows. Section 3.2 offers a background on gender quotas and firm performance; Section 3.3 presents our sample and a descriptive analysis on changes on boards' compositions and board members' characteristics after gender quotas; Section 3.4 describes our empirical methodology and presents the results; Section 3.5 examines further issues and carries out several robustness checks, and Section 3.6 concludes the paper.

3.2. Background on gender quotas and firm performance

The number of countries that have established quotas as a mean for reducing the gender gap has increased since the initial implementation of a quota in Norway in 2003 (see Table 3.1). Some countries have quotas for firms listed on the stock market (Germany, Israel, Netherlands, Malaysia and Spain), others for state-owned firms only (Austria, Colombia, Finland, Greece, Ireland, Kenya, Panama, Slovenia, Taiwan, and the local government of Quebec), or for both listed firms and state-owned firms (Belgium, Denmark, France, Iceland, India, Italy, Greenland (Denmark), Norway, and UAE). The measures in these countries vary considerably with respect to the threshold (30 to 50%), deadlines for compliance (1 to 8 years) and sanctions (from no sanction to warnings, fines, the suspension of benefits for directors, the nullification of board elections, etc).

Table 3.1. Countries with gender quotas on board of directors

Country	Quota	PTFs	SOEs	Passage Date	Compliance Date	Sanctions
Israel	1 FBD	Yes	No	April 19, 1999	None	None
	50%	No	Yes	March 11,2007	2010	None
Greece	33%	No	Yes	2000	None	None
Colombia	30%	No	Yes	2000	None	None
Norway	40%	Yes	Yes	Dec 19, 2003	2006: SOEs; 2008: PTFs	Refuse to register board; dissolve company; fines until compliance
Slovenia	40%	No	Yes	2004		None
Finland	40%	No	Yes	April 15, 2005	June 1, 2005	None
Québec (Canada)	50%	No	Yes	Dec 1, 2006	Dec 14, 2011	None
Spain	40%	Yes	No	March 22, 2007	March 1, 2015: PTFs with 250+ employees	Lack of gender diversity will impact consideration for public subsidies and state contracts
	Own target	Yes	No	2014	None	None
Iceland	40%	Yes	Yes	March 4, 2010	Sep 1, 2013	Non
Kenya	33%	No	Yes	August 28,2010	None	None
France	40%	Yes	Yes	Jan 13,2011	Jan 1,2014: 20%; Jan 1, 2017: 40%	The appointment is null and void; Fees will not be paid to directors
Malaysia	30%	Yes	No	June 27,2011	2016: 250+ employees	None
Italy	33%	Yes	Yes	June 28,2011	Interim 20% by 2012; 2015	Fines; directors lose office
Belgium	33%	Yes	Yes	June 30,2011	2012: SOEs; 2018: PTFs	Void the appointment of any directors who do not conform to board quota targets; suspend director benefits
Netherlands	30%	Yes	No	June 6,2011	Jan 1,2016	Explain in annual report
Austria	35%	No	Yes	2011	Interim 25% by 2016; 2018: 35%	None
UAE	1 FBD	Yes	Yes	Dec,2012	Not specified	None
Denmark	Own target	Yes	Yes	Dec 12,2012	April 1,2013	Fines
India	1 FBD	Yes	Yes	August,2013	August 1, 2015	Fines
Greenland (Denmark)	50%	Yes	Yes	2013	Jan,2014	Not specified
Germany	30%	Yes	No	March,2015	2016: 110 biggest listed companies	Director sear must be left vacant
Panama	30%	No	Yes	2017	NA	NA
Taiwan	33%	No	Yes	NA	NA	NA

Notes. This table reports the list of countries that have established gender quotas. This table is updated from Terjesen, Aguilera, and Lorez (2016); PTFs: publicly traded firms; SOEs: state-owned enterprises; 1FBD: At least one female board director is required to be on the board.

Some countries refuse to implement mandatory rules to support board diversity and instead introduce voluntary-based measures through governance code amendments (Sweden,

Switzerland, Thailand, and the UK), or disclosure requirements (Australia, Denmark, New Zealand and the USA) (Adams, 2016; Terjesen, Aguilera, & Lorenz, 2015). In Europe, a voluntary process for companies was proposed in 2012 by the European Commission to reach the goal of 30% women board members by the year 2015 and 40% by 2020 (European Commission, 2012).

Cross-country studies show that legal mandates have been more potent than voluntary-based measures to increase women's representation on boards (European Commission, 2012). Voluntary initiatives do not generally allow a critical mass of women directors on boards to be achieved, as in the United States where the number of women has remained stagnant over the period 2012-2016 with on average 2.1 women per board (Egon Zehnder, 2016). The theoretical literature demonstrates that if the number of women on a board is too small, problems of tokenism arise (hypervisibility, stereotyping, exclusion), resulting in a negative impact on organizational outcomes (Kanter, 1977). Konrad, Kramer, and Erkut (2008) argue that the critical mass of women to have a positive effect on organizational outcomes is three directors (around 30%). Torchia et al. (2011), in line with this argument, find for a panel of Norwegian firms that women directors contribute to increase the level of firm innovation when the critical mass of at least three women directors is reached. This could explain the choice of policy-makers to impose gender quotas with a minimum threshold of 30%.

While gender quotas appear to be mainly motivated by economic arguments, the assertion that gender quotas have a positive impact on firm value or performance is highly contested. The "business case" argument that women can help to achieve the most economically satisfying outcome is based on the idea that male and female directors are different. There is a large amount of literature analysing gender differences in preferences for the general population (e.g. Bertrand, 2010). These studies provide evidence that women tend to be more averse to risk (see the surveys of Byrnes et al. 1999, and Croson and Gneezy, 2009), more long-term oriented (e.g. Silverman, 2003), more altruistic (e.g. Andreoni and Vesterlund, 2001), have less of a taste for competition (e.g. Niederle, 2014), and are more ethical in their decisions (e.g. Ambrose and Schminke, 1999) than are men. If such differences exist between preferences of women and men directors, then it is possible that increasing board diversity may impact boards' decision-making and then firms' outcomes. However, it may be a fact that particular gender differences exist in the general population, it is less obvious whether these differences apply to corporate directors (Adams, 2016; Sila et al. 2016; Kirsch, 2018). Deaves et al. (2009), who, when experiments are conducted on a group of economics, finance and business students, do not find differences between women and men preferences, and postulate that women may have

a lot in comment with men in comparable positions It is therefore possible that women directors are different in their preferences than women in the general population, presenting characteristics that have helped them to access top positions in the corporate world. Adams and Funk (2012) support this argument by showing that female directors in Sweden are more risk-loving, less security- and tradition-oriented, and more self-direction- and stimulation-oriented than male directors, while the opposite holds for women in the general population.

While female directors could be similar to male directors in terms of their preferences, the literature documents that they are different in their skills, age and experience. Female directors tend to have higher levels of education, with a higher percentage of female directors holding MBA and PhD degrees compared to their male peers, and they have substantially more international experience (Burgess and Tharenou, 2002; Singh et al. 2008). It also appears that women directors tend to be younger than their male colleagues (e.g. Adams & Ferreira, 2009; Adams & Funk, 2012; Ahern & Dittmar, 2012), and may bring new ideas and strategies (Burke, 1994; Ibrahim and Angelidis, 1994). Adams (2016) argues that some of these differences between female and male directors are likely to vanish over time; if the impact of gender diversity on firm outcomes derives only from these differences, it would be hard to observe a significant impact in the long run.

A sizeable literature has examined the relationship between female representation and performance outside the context of gender quotas with, so far, no consensus on their findings. Kirsch (2018) realized a mapping of journal articles on the gender composition of corporate boards until January 2017 and finds that 61 articles are concerned with the effects of board gender composition on firm financial performance. Some studies find that board gender diversity leads to better financial performance while others find a negative relationship or no effects (see surveys of Kirsch, 2018; Adams, 2016; Hermalin and Weisbach, 2003). There is a more limited number of studies on the impact of female board representation on firm risk-taking behavior (see the survey of Sila et al., 2016). Results are mixed with evidence of a negative impact of gender diversity on risk-taking (Wilson and Atanlar, 2011; Lenard, 2014; Chen et al., 2017), a positive impact (Berger et al., 2014 and Adams and Ragunathan, 2018 for financial institutions), or no effects (Sila et al., 2016).

The expected impact of the presence of women on corporate boards on firm outcomes is even less obvious when gender quotas are imposed to oblige firms to recruit a minimum number of female directors. As discussed above in the introduction, if mandatory quotas are associated with negative consequences for firm profits, this could outweigh any positive impact that could be associated with gender diversity. Matsa and Miller (2013) and Ahern and Dittmar

(2012) investigate how the implementation of a gender quota of at least 40% in 2003 impacted upon the performance of Norwegian firms over the period 2003-2009. Ahern and Dittmar (2012) find that the announcement of the quota caused negative market reactions, and Matsa and Miller (2013) report a decline in operating profit caused by an increase in labor costs and employment level. Bohren and Staubo (2016) confirm that the imposition of a gender quota in Norway reduced firm value through an increase in board independence. However, Nygaard (2011) shows that this effect depends on asymmetric information between independent members of the boards and the companies' managers. Eckbo et al. (2018), who extend their sample beyond the financial crisis of 2007-2008, further find that operating profitability did not decline after quota compliance.

Our aim is to complement this literature by analysing the impact of gender quotas on the performance of firms located in three European countries that implemented gender quotas in 2011. Our objective is to determine if negative economic outcomes are a necessary cost to be paid for achieving more gender-balanced representation in corporate boards, in line with the findings of Matsa and Miller (2013) and Ahern and Dittmar (2012), or if gender quotas have a neutral effect on firm outcomes as found by Eckbo et al. (2018). Rather than limiting our analysis to the effects of gender quotas on profits, we follow Matsa and Miller (2013) and also explore how risk-taking behavior and corporate decisions (labor cost, employment, etc) change when the number of female directors is exogenously increased. We also compare the characteristics of female and male directors, before and after the implementation of the gender quota, and examine if changes on board members' characteristics have an influence on the way gender quotas impact firm outcomes and strategic corporate decisions.

3.3. Data and summary statistics on boards of directors

3.3.1. Presentation of the sample

Our study focuses on a group of three Western European countries (Belgium, France, and Italy) that implemented a gender quota in 2011. We restrict our analysis to these countries because they introduced gender quota in the same year and display a similar level of economic development and business environment. We also restrict our sample to Western European countries that impose comparable gender quota legislation and penalties for non-compliance, and target listed firms (see Table 3.1 for details).[21]

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[21] Our selection criteria lead us to exclude Western European countries that implemented gender quotas in another year or with non-comparable quota legislation (the Netherlands with a legislation without sanctions; Austria and

We collect board of directors information for Belgian, French and Italian firms listed on the stock market from the BoardEx database over the period 2006 to 2017.[22] We follow the existing literature and exclude financial institutions as they are subject to specific regulation (see Hermalin and Weisbach, 1988; Farrell and Hersch, 2005; Matsa and Miller, 2013 or Bennouri et al., 2018)[23]. We furthermore do not include in our sample firms that are newly created over the period in order to compare the performance of the same group of firms before and after the imposition of the gender quotas. We then obtain data from BoardEx for 52 Belgian listed firms, 190 French listed firms, and 61 Italian listed firms for which we have all the information we need on their board members for the overall period.

Consolidated financial statements and market-based indicators are extracted from the database Bloomberg. We finally end up with a sample of 265 firms for which financial data are available for our main variables of interest (42 Belgian firms, 170 French firms, and 53 Italian firms). Financial variables are winsorized at the 1 percent tails, as it is common when working with accounting data.

3.3.2. How boards of directors change

A gender quota was implemented in Belgium, France and Italy in 2011, with differences in the threshold considered, the date of compliance and the type of sanction. In Belgium, the law requires state-owned and listed companies to have at least one third (33%) representation from each sex on their board. The date of compliance is 2017 for listed companies and 2019 for listed SMEs. In case of non-compliance, board members would lose financial and non-financial benefits until compliance with the law. In France the law requires listed companies to include 40% of women on their board by 2017, with an intermediate target of 20% by 2014. The penalty for non-compliant companies is the annulment of board appointments. In Italy, the law imposes a gender quota of 33% for listed companies and state-owned companies by 2015, with financial sanctions for non-compliant companies.

We examine in this section how the imposition of such gender quotas changes board composition and individual board members' characteristics of our sample of Belgian, French and Italian firms, using a large set of indicators defined in Table 3.2. Given the large demand

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Greece that impose gender quotas only for state-owned firms; Norway, Spain and Germany that introduced gender quotas in 2003, 2007 and 2015, respectively; see Table 3.1 for further details).

[22] BoardEx also provides information for a small number of non-listed firms. We focus our analysis on listed firms as they are less able to avoid quotas. The existing literature shows that non-listed firms are more prone to change their organizational form to avoid the law (Matsa and Miller, 2013; Bohren and Staubo, 2014). This choice also allows us to use market data to compute our measures of performance and risk.

[23] In section 3.5, we investigate a sample consisting solely of financial institutions.

shock imposed by the quota, we expect board composition and characteristics to be different along many dimensions.

Table 3.2. Variable definitions and data sources

Variables	Definition	Source
Evolution of female directors on boards		
Board size	Average number of board members	BoardEx
Female (%) -mean	Average percentage of female directors on boards	BoardEx
Female (%) –min	Minimum percentage of female directors on boards	BoardEx
Female (%) –max	Maximum percentage of female directors on boards	BoardEx
Female (%) – SD	Standard deviation of percentage of female directors on boards	BoardEx
% Firms having female less than quota	Percentage of firms with a percentage of female directors below the legal quota	BoardEx
Board members characteristics		
Age	Average age of directors	BoardEx
Foreign	Percentage of foreign directors over the total number of directors	BoardEx
Tenure	Average tenure of female directors	BoardEx
Time on Board	Average time on board of directors	BoardEx
Time in Company	Average time in company of directors, considering all board and non-board positions	BoardEx
Bachelor (%)	Percentage of directors having as highest diploma a bachelor over the total number of directors	BoardEx
Postgraduate (%)	Percentage of directors having a Master or a PhD degree over the total number of directors	BoardEx
Having board experience	Percentage of directors having experience on any board positions over the total number of directors	BoardEx
Number BOD to Date	Average number of board positions of directors up to date	BoardEx
Number current BOD (Occupation)	Average number of other current board positions of directors	BoardEx
Year on Quoted BOD	Average number of years on board positions of directors	BoardEx
CEO	Percentage of directors having experience as CEO over the total number of directors	BoardEx
Chairman	Percentage of directors having experience as Chairman over the total number of directors	BoardEx
Vice Chairman /Vice President	Percentage of directors having experience as Vice Chairman or Vice President over the total number of directors	BoardEx
Dependent variables		
Tobin Q	Book value of assets minus the book value of equity plus the market value of equity, divided by the book value of assets	Bloomberg
ROA	Ratio of net income over total assets	Bloomberg
Operating Profits	Ratio of earnings before interest and taxes (EBIT) over total assets	Bloomberg

Risk	Standard deviation of monthly stock return	Bloomberg
Revenue	Ratio of revenues over total assets	Bloomberg
Labor Cost	Ratio of labor cost over total assets	Bloomberg
Other Costs	Ratio of other costs over total assets	Bloomberg
Employment	Natural logarithm of number of workers in a firm	Bloomberg
Difference-in-differences variables		
Treated	Dummy variable that takes the value of one for firms in treated group (i.e. firms in Belgium, France, or Italy), and zero for firms in control group (i.e. firms in Austria, Greece, Ireland, Luxembourg, Portugal, Switzerland)	
Post	Dummy variable equals to one for the post-treatment period (2011-2013), and zero for the pre-treatment period (2008-2011)	
Control variables		
Board size	Natural logarithm of the number of directors on the board	BoardEx
Firm size	Natural logarithm of firm Total Assets	Bloomberg
Sales growth	Annual growth rate of total sales	Bloomberg
Leverage	Ratio of debt to total assets	Bloomberg
GDP (%)	GDP Growth rate	World Bank
Triple-difference variables		
dLowAge	Dummy variable taking the value of one if the average age of board members of a firm is below the median age of the group	BoardEx
dHighForeign	Dummy variable taking the value of one if the average percentage of foreign directors on the board of a firm is above the median percentage of foreign directors of the group	BoardEx
dHighEducation	Dummy variable taking the value of one if the average percentage of directors having post graduate degree on the board of a firm is above the median percentage of high qualified directors of the group	BoardEx
dLowExperience	Dummy variable taking the value of one if the average percentage of directors having experience as CEO or Chairman on the board of a firm is below the median percentage of high position experienced directors of the group	BoardEx
dComply	Dummy variable taking the value of one if a firm has a percentage of female directors respecting the gender quota at the date of compliance (2015 for Italian firms, 2017 for Belgian and French firms)	BoardEx
dDistCompliance	Dummy variable taking the value of one if a firm has no female director on its board in 2010 one year before the implementation of gender quota	BoardEx

Table 3.3 compares the board gender composition of firms before and after reform changes. Firms in the three countries were far from the minimum number of women imposed by the quota before the law, with on average around 11%, 12% and only 6% of female directors in 2010 in Belgium, France and Italy, respectively. As expected, the percentage of female

directors increases after the introduction of the quota. Interestingly, we find that the average board size remains mostly constant over the period in the three countries, indicating that firms replace male directors by female directors to comply with the law. We also observe from Table 3.3 that the percentage of female directors is on average below the legal quota at the date of compliance in Belgium (27%), France (38%) and Italy (25%); this could be explained by the relatively high number of firms that do not respect the quota (around 64% in Belgium in 2017, 39% in France in 2017, and 75.50% in Italy in 2015). However, we can see that in Italy the number of firms that do not comply with the law strongly decreases two years after the date of compliance (around 36%), suggesting that the sanctions potentially applied in 2016 and 2017 were effective to prompt a large number of firms to respect the quota.

Table 3.3. Statistics on the presence of women directors on boards by year (gender quota in 2011)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Panel A: Belgium (33% in 2017)												
Board size	9.38	9.31	9.43	9.38	9.29	9.36	9.26	9.21	9.21	9.22	9.53	9.31
Female (%) - mean	7	7.62	7.49	9.48	10.76	12.50	15.76	16.95	19.77	22.58	26.22	27.48
Female (%) – min	0	0	0	0	0	0	0	0	0	0	0	0
Female (%) – max	50	50	50	50	50	50	50	50	50	50	50	60
Female (%) - SD	13.08	12.40	12.53	13.15	13.34	12.88	12.88	12.40	13.29	12.57	12.10	12.98
% Firms having female less than quota	91.89	92.86	90.48	90.48	88.10	88.10	88.10	88.10	85.71	78.05	68.42	64.29
Number of firms	42	42	42	42	42	42	42	42	42	42	42	42
Panel B: France (20% in 2014 and 40% in 2017)												
Board size	10.81	10.46	10.62	10.61	10.84	10.97	10.87	10.76	11.02	10.94	11.30	11.16
Female (%) - mean	8.08	9.41	9.92	10.28	12.12	17.02	20.61	23.93	27.83	29.77	34.31	37.84
Female (%) – min	0	0	0	0	0	0	0	0	6.25	0	14.29	15.38
Female (%) – max	75	75	75	75	75	75	75	75	75	75	75	75
Female (%) - SD	10.50	10.48	10.73	10.49	11.06	10.35	10.37	10.10	9.03	9.22	9.39	9.92
% Firms having female less than quota	99.35	98.82	98.24	98.82	97.65	97.06	97.06	94.12	89.41	85.88	66.67	38.92
Number of firms	170	170	170	170	170	170	170	170	170	170	170	170
Panel C: Italy (33% in 2015)												
Board size	11.00	10.57	10.79	11.13	11.19	11.08	10.94	10.91	10.30	10.62	10.94	10.79
Female (%) -mean	4.45	4.55	4.45	4.85	5.45	6.25	9.60	15.36	21.12	25.39	29.25	31.30
Female (%) – min	0	0	0	0	0	0	0	0	0	0	11.11	11.11
Female (%) – max	28.57	33.33	28.57	28.57	28.57	28.57	28.57	44.44	57.14	55.56	50	50
Female (%) - SD	7.62	8.05	7.17	7.25	7.28	7.59	8.33	11.64	12	8.08	7.78	7.93
% Firms having female less than quota	100	98.11	100	100	100	100	100	94.34	83.02	75.47	48	35.85
Number of firms	53	53	53	53	53	53	53	53	53	53	53	53

Notes. Variables are defined in Table 3.2

We next analyze whether the compliance with gender quotas modifies other observable characteristics of firm board members, such as age, education and experience. As we find similar results for Belgian, French and Italian firms, we only report in Tables 3.4 to 3.6 the average statistics for all firms together (see Tables A3.1 to A3.3 in Appendix A for statistics by country). Table 3.4 shows, in line with the existing literature, that female directors are younger than their male colleagues, and this holds before and after the imposition of a gender quota. Female board members are on average about six years younger than males after the quota. As we might expect, the time on boards of female directors (around 5 years) is shorter than male directors (almost 9 years) after the introduction of gender quotas, indicating that new females are recruited with a shorter tenure than male directors. A larger number of female directors are also recruited outside the firms after the imposition of the quota, as outlined by the shorter time spent in the company, around 6 years against more than 10 years for male directors. We also observe that the number of foreign female directors increases significantly after the gender quota, to become superior to the number of foreign male directors.

Table 3.4. Statistics on general board characteristics

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Age	All	57.41	57.67	0.2605*
	Male	57.82	59.08	1.2673***
	Female	53.12	53.24	0.1187
	Difference-gender	-4.7***	-5.84***	
Foreign (%)	All	11.71	12.88	1.17***
	Male	11.93	12.10	0.16
	Female	9.34	15.17	5.83***
	Difference-gender	-2.59**	3.07***	
Tenure	All	5.16	5.63	0.4651***
	Male	5.08	6.20	1.1209***
	Female	6.08	4.04	-2.0369***
	Difference-gender	1***	-2.16***	
Time on Board	All	6.80	7.69	0.8964***
	Male	6.79	8.73	1.9385***
	Female	6.95	4.79	-2.1565***
	Difference-gender	0.16	-3.94***	
Time in Company	All	8.29	9.15	0.8531***
	Male	8.27	10.33	2.0507***
	Female	8.58	5.87	-2.7103***
	Difference-gender	0.31	-4.46***	

Notes. Variables are defined in Table 3.2.

Table 3.5 further presents information on education and board experience of directors. In Table 3.6, we split our board members into retained, exiting, and new members and report data on education and board experience for each group before and after quotas. Tables 3.5 and 3.6 show that female directors are more highly educated than their male colleagues after the quota. Interestingly, we also find that there are more men with higher education than before the law. These findings support the idea that gender quotas may encourage a better selection mechanism, mainly by increasing the level of education of the entire board. We also find that female directors have significantly less experience on boards, have significantly less CEO experience and are less likely to be chairman or vice-chairman compared to male directors, and these differences hold for both retained and new female directors. Surprisingly, we do not find that women serve on more boards after the introduction of quotas. These findings show that gender quotas give opportunities to a large number of women to serve on boards, and do not force firms to appoint the same few women with the risk to reduce the quality of corporate governance.

Table 3.5. Statistics on board members' education and experience

Education

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Bachelor (%)	All	37.26	35.41	-1.84**
	Male	38.56	37.42	-1.15*
	Female	23.83	28.90	5.06***
	Difference-gender	-14.73***	-8.52***	
PostGraduate (%)	All	36.68	41.55	4.87***
	Male	36.72	39.50	2.78***
	Female	36.29	47.49	11.20***
	Difference-gender	-0.43	7.99***	

Board experience

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Directors having experience on board (%)	All	99.09	93.83	-5.26**
	Male	99.27	96.24	-3.03**
	Female	96.65	84.36	-12.29**
	Difference-gender	-2.62***	-11.88***	
Number BOD to Date	All	11.16	10.00	-1.1585**
	Male	11.64	11.42	-0.2243
	Female	6.27	5.66	-0.6086**
	Difference-gender	-5.37***	-5.76***	

Number current BOD (Occupation)	All	4.94	4.39	-0.5556**
	Male	5.11	4.81	-0.3017*
	Female	3.29	3.10	-0.1923*
	Difference-gender	-1.82***	-1.71***	
Year on Quoted BOD	All	2.40	2.67	0.2747***
	Male	2.51	3.09	0.5780***
	Female	1.28	1.41	0.1292
	Difference-gender	-1.23***	-1.68***	
CEO (%)	All	12.59	11.90	-0.69**
	Male	12.94	12.92	-0.01
	Female	7.54	7.21	-0.33
	Difference-gender	-5.4***	-5.71***	
Chairman (%)	All	20.28	18.94	-1.34***
	Male	20.43	20.10	-0.32**
	Female	18.21	13.85	-4.36***
	Difference-gender	-2.22**	-6.25***	
Vice Chairman/Vice CEO (%)	All	11.42	10.23	-1.19**
	Male	11.52	10.93	-0.59**
	Female	9.89	7.14	-2.74***
	Difference-gender	-1.63***	-3.79***	

Notes. Variables are defined in Table 3.2; BOD = board of directors.

Table 3.6. Statistics on the education and experience of new, retained and exiting directors

Education

	Female			Male			Differences		
	New	Retained	Exiting	New	Retained	Exiting	New Female – New Male	New Female – Retained Male	New Female – Exiting Male
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(1) - (5)	(1) - (6)
Pre quota period: 2006-2010									
Bachelor (%)	21.42	24.77	15.57	39.01	40.03	38.97	-17.59*	-18.62**	-17.55*
Postgraduate (%)	54.30	34.67	44.00	43.27	37.40	37.95	11.04	16.90*	16.36*
Post quota period: 2011-2017									
Bachelor (%)	30.30	29.44	34.70	38.21	38.52	41.78	-7.92***	-8.22***	-11.49***
Postgraduate (%)	53.66	47.31	46.71	43.24	39.87	39.48	10.42***	13.79***	14.18***

Board experience

	Female			Male			Differences		
	New	Retained	Exiting	New	Retained	Exiting	New Female – New Male	New Female – Retained Male	New Female – Exiting Male
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(1) - (5)	(1) - (6)
Pre quota period: 2006-2010									
Having BOD experience (%)	89.56	94.50	100.00	96.89	98.27	100.00	-7.33*	-8.71**	-10.44**
CEO (%)	15.85	14.35	10.19	31.05	33.77	31.54	-15.21***	-17.92***	-15.69***
Chairman (%)	33.56	36.03	29.82	45.21	54.17	52.22	-11.65*	-20.61***	-18.67**
Post quota period: 2011-2017									
Having BOD experience (%)	63.84	79.37	100.00	78.66	92.24	100.00	-14.82	-28.40***	-36.16***
CEO (%)	10.06	11.39	14.40	22.64	31.84	32.55	-12.58***	-21.78***	-22.49***
Chairman (%)	15.03	23.51	21.95	32.11	49.77	50.60	-17.08***	-34.74***	-35.57***

Notes. Variables are defined in Table 3.2; BOD = board of directors.

Our analysis shows that gender quotas have altered, as expected, the gender composition of boards but also other board members' characteristics, such as age, nationality, education and board experience. We will explore, in the next section, if the impact of gender quotas on firm performance and corporate decisions is not driven by changes in these board members' characteristics.

3.4. How gender quotas affect firm outcomes and corporate decisions

3.4.1. Methodology

Identification of a control group

Our objective is to assess the effect of gender quotas legislation on firm performance and corporate decisions. We treat the reform as a natural experiment and identify changes in performance and corporate decisions for firms affected by the reform, and compare them with changes observed for firms not affected by the reform. To carry out this investigation, we use a methodology relying on difference-in-differences comparisons with matched samples of firms. In this regard, we need to identify a group of firms not exposed to gender quotas (non-treated firms), to which treated firms may be compared. For that, we choose firms from other Western European countries as they are geographically and culturally close to the group of

treated firms, they also have comparable business development and operate in analogous macroeconomic conditions. We remove countries that have enforced gender quota legislations or recommendations during the period of time (i.e. Denmark, Finland, Germany, Norway, The Netherlands, Spain, Sweden and The United Kingdom). This selection left us with six Western European countries having on average a low level of women on boards: Austria, Greece, Ireland, Luxembourg, Portugal and Switzerland.[24] Similarly to the treated group (265 Belgian, French and Italian listed firms), we only consider listed firms in the non-treated group. We further exclude listed state owned firms in Austria and Greece as these firms are subject to gender quotas. Information on boards of directors is collected from BoardEx and financial data from Bloomberg.

We conduct our difference-in-differences analysis over the period 2008-2013. This period embraces three years before the implementation of gender quota (*pre-treatment period*) and three years after, including 2011 (*treatment period*). As in Schepens (2016), we limit the treatment period to reduce the likelihood that our results will be affected by other effects than quotas. We end up with a balanced sample of 442 non-treated firms with non-missing information over the period 2008-2013 (53 in Austria, 174 in Greece, 22 in Ireland, 4 in Luxembourg, 36 in Portugal, and 153 in Switzerland). Figure A1.1 shows that there is a significant difference in the proportion of women on boards between firms in the treated and non-treated group after the introduction of gender quotas in 2011.

To ensure similarity between the two samples of firms, and control for potential structural differences, we carry out a propensity score matching procedure. If treated and non-treated firms exhibit different characteristics before the implementation of gender quotas, this can lead to a substantial bias of estimated treatment effects when using a difference-in-differences approach. To ensure similarity between the two samples of firms, we need to pair each treated firm with some comparable non-treated firms. Appendix B describes the propensity score matching the procedure we used to carry out this pairing.

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[24] Greece and Austria implemented a gender quota in 2000 and 2011, respectively, but only for state-owned firms. The percentage of female directors for listed firms was on average very low in 2011, with only 5.37% of women on boards in Greece and 5.48% in Austria. Finland also implemented a quota for state-owned firms in 2005, but we exclude it from the control group because the percentage of female directors of listed firms was relatively high in 2011 (23.42%).

Model specifications

We use the following specification initially to compare changes in profitability, risk taking behavior and strategic corporate decisions between treated and non-treated firms, before and after the imposition of quota:

$$Y_{i,t} = \alpha + \beta_1 * Treated_i * Post_t + \beta_2 * Post_t + \beta_3 * Treated_i + \beta_4 * X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where subscript *i* denotes firm, *t* denotes the time period (t = 2008 to 2013), and $\varepsilon_{i,t}$ is the idiosyncratic error term.

$Y_{i,t}$, the dependent variable, is a set of variables to measure firm performance, risk-taking behavior and strategic corporate decisions. We proxy firm economic performance by using the return on assets (*ROA*), computed as the ratio of net income over total assets. We capture firm financial performance by using Tobin's Q (*Tobin Q*), defined 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.[25] We also consider operating profits (*Operating Profits*), calculated as the ratio of earnings before interest and taxes over total assets. The level of risk is measured by the total market risk (*Risk*), defined as the standard deviation of monthly stock return. Corporate decisions are proxied by four variables measuring different dimensions of firm policies: the ratio of labor cost over total assets (*Labor cost*), the level of employment (*Employment*) calculated as the natural logarithm of number of workers in a firm, the ratio of other costs over total assets (*Other costs*), and the ratio of revenues over total assets (*Revenues*).

$Treated_i$ is a dummy variable that takes the value of one for treated firms (i.e. firms located in Belgium, France and Italy), and zero for non-treated firms (i.e. firms from Austria, Greece, Ireland, Luxembourg, Portugal and Switzerland). $Post_t$ is a dummy variable that equals one in the post-treatment period (2011-2013), and zero in the pre-treatment period (2008-2010). Our coefficient of interest in this regression is the coefficient of the interaction variable (β_1). It assesses the impact of the implementation of gender quotas on performance and corporate decisions of treated firms.

$X_{i,t}$ is a set of control variables, including the number of directors on boards (*Board size*), the firm size (*Firm size*), the growth of sales (*Sales growth*), the level of capital (*Leverage*),

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[25] Previous literature underlines the importance of using both accounting and market-based measures of performance, as market-based measures are influenced by investor perceptions on gender diversity (Kirsch, 2018; Bennouri et al., 2018).

and the growth of GDP (*GDP*). The detailed definition and calculation of these variables are given in the Table 3.2.

To go further on our investigations, we examine whether the impact of gender quotas is not driven by changes in board members' characteristics other than gender. To address this concern, we estimate a triple-differences by augmenting the Equation (1) as following:

$$Y_{i,t} = \alpha + \beta_1 * Treated_i * Post_t * Z_i + \beta_2 * Treated_i * Post_t + \beta_3 * Post_t +$$
$$\beta_4 * Treated_i + \beta_5 * Z_i + \beta_6 * X_{i,t} + \varepsilon_{i,t}$$

(2)

Z denotes alternative dummy variables that depict changes in board members' characteristics after gender quotas. The analysis of board members' characteristics conducted in Section 3.2. show that compliance with the gender quota forced firms to appoint a higher proportion of directors who are younger, come from foreign countries, have postgraduate degrees, and have less experienced on boards. We therefore consider the four following alternative dummy variables: (1) *dLowAge* takes the value of one if the average age of directors of a board is below the median value of the group; (2) *dHighForeign* takes the value of one if the average percentage of foreign directors of a board is above the median value of the group; (3) *dHighEducation* takes the value of one if the percentage of directors of a board having postgraduate degrees is above the median of the group; and (4) *dLowExperience* if the percentage of directors having experience as CEO or Chairman of a board is below the median of the group. We interact this dummy with dummies *Treated* and *Post*. Our coefficient of interest in this regression is the coefficient for the triple interaction variable (β_1) that shows how changes in board members' characteristics influence the way gender quotas impact firm outcomes.

3.4.2. Results

Results of Equations (1) are reported in Tables 3.7 and 3.8, using either OLS or firm fixed effects and standard errors clustered at either the firm level or the industry sector level. The dummy variable *Treated* cannot be included in regressions when fixed effects are considered.

We begin our analysis by examining whether the introduction of gender quotas has a significant impact on firm performance and risk. Table 3.7 presents the results of difference-in-differences regressions that compare corporate performance and risk of treated and non-treated firms. Our results show that none of the considered performance measures are significantly affected by the imposition of gender quotas. These results are consistent with the argument that while gender diversity could positively affect firm outcomes, this seems to be

Table 3.7. Impacts of gender quota on corporate performance and risk-taking (Equation 1; Difference-in-differences estimates)

	Tobin Q			ROA			Operating Profit			Risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treated*Post	-0.0258	-0.0308	-0.0308*	-0.00215	-0.00177	-0.00177	-0.00859	-0.00688	-0.00688	0.0150	0.00606	0.00606
	(-0.52)	(-0.73)	(-1.87)	(-0.42)	(-0.27)	(-0.19)	(-0.36)	(-1.22)	(-0.93)	(1.52)	(0.49)	(0.41)
Post	0.0606**	0.0793**	0.0793*	0.00101	-0.00520	-0.00520	0.00796	0.00188	0.00188	-0.108***	-0.0836***	-0.0836***
	(2.00)	(2.21)	(2.07)	(0.39)	(-0.86)	(-0.68)	(0.66)	(0.40)	(0.30)	(-21.72)	(-7.42)	(-6.30)
Treated	0.0638*			-0.0081**			-0.00857			-0.00259		
	(1.83)			(-2.23)			(-0.51)			(-0.37)		
Board size		-0.155*	-0.155**		-0.00944	-0.00944		0.0110	0.0110		-0.0257	-0.0257
		(-1.74)	(-2.26)		(-0.58)	(-0.63)		(0.43)	(0.45)		(-0.62)	(-0.57)
Firm size		-0.259*	-0.259*		0.0154	0.0154		-0.0104	-0.0104*		-0.109***	-0.109**
		(-1.72)	(-1.87)		(1.25)	(1.16)		(-1.05)	(-1.87)		(-3.58)	(-2.55)
Sales growth		0.0014**	0.0014**		0.0068***	0.0068***		0.00713**	0.00713**		-0.0002**	-0.0002*
		(2.22)	(2.40)		(9.11)	(8.34)		(2.30)	(2.35)		(-2.18)	(-1.91)
Leverage		0.707**	0.707*		-0.278***	-0.278***		-0.124***	-0.124***			
		(2.32)	(2.10)		(-4.32)	(-3.66)		(-3.64)	(-3.22)			
GDP		0.00477	0.00477		0.0039***	0.0039***		0.0039***	0.0039***		-0.0110***	-0.0110***
		(1.42)	(0.77)		(5.48)	(5.81)		(7.34)	(4.31)		(-9.70)	(-10.93)
Constant	1.203***	3.158***	3.158**	0.0351***	0.0906	0.0906	0.105***	0.191**	0.191*	0.446***	1.341***	1.341***
	(55.86)	(2.96)	(3.12)	(19.20)	(0.85)	(0.72)	(12.43)	(2.10)	(2.08)	(127.31)	(5.85)	(4.59)
Observations	4163	3045	3045	6336	5835	5835	6312	5933	5933	6336	6074	6074
R-squared	0.00217	0.0602	0.0602	0.00204	0.169	0.169	0.000253	0.0922	0.0922	0.0851	0.293	0.293
Firm FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Cluster level		Firm	Industry sector		Firm	Industry sector		Firm	Industry sector		Firm	Industry sector

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01.

Table 3.8. Impacts of gender quota on corporate strategy decisions (Equation 1; Difference-in-differences estimates)

Dependent variable	Revenues			Labor Cost			Other Cost			Employment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treated*Post	0.00914	-0.00493	-0.00493	0.00116	-0.00728*	-0.00728	-0.00528	-0.00678	-0.00678	-0.0664	-0.0205	-0.0205
	(0.26)	(-0.28)	(-0.19)	(0.12)	(-2.09)	(-1.73)	(-1.13)	(-1.15)	(-0.81)	(-0.55)	(-0.84)	(-0.76)
Post	0.00393	0.0169	0.0169	0.00427	0.0157***	0.0157**	0.00433*	0.00145	0.00145	0.0981	0.0146	0.0146
	(0.22)	(1.08)	(0.81)	(0.91)	(4.73)	(2.93)	(1.85)	(0.28)	(0.19)	(1.64)	(0.78)	(0.77)
Treated	-0.0449*			0.0218***			0.00108			0.251***		
	(-1.77)			(3.30)			(0.33)			(2.97)		
Board size		0.0445	0.0445		0.0130	0.0130		0.00946	0.00946		0.0560	0.0560
		(0.84)	(1.78)		(1.56)	(1.33)		(0.36)	(0.37)		(0.90)	(0.79)
Firm size		-0.217***	-0.217***		-0.0819**	-0.0819**		-0.00568	-0.00568		0.829***	0.829***
		(-4.28)	(-3.46)		(-3.02)	(-2.60)		(-0.37)	(-0.53)		(4.98)	(5.79)
Sales growth		0.0120**	0.0120**		-0.000055	-0.000058		0.0102***	0.0102**		0.000096	0.000096
		(2.41)	(2.34)		(-1.13)	(-1.20)		(3.19)	(2.84)		(0.16)	(0.15)
Leverage		-0.00748	-0.00748		-0.00748	-0.00748		-0.159***	-0.159**		0.510	0.510
		(-0.07)	(-0.06)		(-0.17)	(-0.19)		(-3.97)	(-3.15)		(1.08)	(1.14)
GDP		0.0110***	0.0110**		0.000601	0.000601		0.00369***	0.00369***		0.00330	0.00330
		(6.27)	(2.68)		(1.78)	(1.39)		(6.17)	(3.96)		(1.53)	(1.73)
Constant	0.923***	2.485***	2.485***	0.191***	0.818***	0.818**	0.0615***	0.177	0.177	8.377***	1.727	1.727
	(72.88)	(6.31)	(5.29)	(57.85)	(3.61)	(3.33)	(37.20)	(1.34)	(1.78)	(197.91)	(1.17)	(1.33)
Observations	6336	5855	5855	6312	6011	6011	6336	5970	5970	6336	5916	5916
R-squared	0.000835	0.105	0.105	0.00383	0.205	0.205	0.000620	0.106	0.106	0.00253	0.371	0.371
Firm FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Cluster level		Firm	Industry sector		Firm	Industry sector		Firm	Industry sector		Firm	Industry sector

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

outweighed by the cost of imposing mandatory rules to force firms to achieve gender balance. We further find that gender quotas do not significantly impact the risk-taking behavior of firms. These findings do not support the argument that women on boards are more risk-averse than men.

We furthermore analyse how corporate decision-making changes after the quota; results are reported in Table 3.8. Again, the results show that the imposition of gender quotas does not significantly affect employment, labor or other costs, and revenues. Our findings support the argument that the presence of women on boards does not affect corporate policy decisions, and therefore does not influence organizational outcomes, as highlighted in Table 3.7. These results suggest that women directors tend to be similar to men in their preferences.

We next examine whether the impact of gender quotas becomes significant when we consider the influence of changes in board members' characteristics other than gender. We report in Table 3.9 the regressions of Equation (2) using firm fixed effects and standard errors clustered at the firm level (we find similar results when using standard errors clustered at the sector level). Panels A, B, C and D report the results when allowing for differential effects for treated firms when they have, respectively, a higher proportion of younger board members, a higher proportion of foreign directors, a higher proportion of directors with postgraduate degrees, and a lower proportion of directors with more board experience. We find that none of these changes in board members' characteristics impacts the way gender quotas influence firm performance, risk and corporate decisions. Our results show that directors' age, education, nationality or experience are not channels for the quota's effect.

Overall, our empirical results show that the introduction of gender quotas does not impact firm outcomes and does not modify corporate strategic policies. Our findings are not therefore consistent with the previous work of Ahern and Dittmar (2012) and Matsa and Miller (2013) that gender quotas caused a decline in firm outcomes. We reverse this conclusion by supporting the argument that gender quotas have a neutral effect on firm performance, in line with the recent work of Eckbo et al. (2018).

Table 3.9. Impacts of changes in board characteristics on the influence of quotas on performance and corporate decisions (Equation (2), triple-difference)

Dependent variable	Tobin Q	ROA	Operating Profit	Risk	Revenues	Labor Cost	Other Cost	Employment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Relatively high proportion of younger directors								
Treated*Post*dLowAge	0.0457	-0.00396	0.00115	0.00864	-0.00214	0.00156	0.000228	-0.0127
	(0.81)	(-0.54)	(0.17)	(0.66)	(-0.08)	(0.27)	(0.03)	(-0.40)
Treated*Post	-0.0528	0.000153	-0.00745	0.00180	-0.00383	-0.00803*	-0.00690	-0.0143
	(-1.18)	(0.02)	(-1.09)	(0.13)	(-0.16)	(-1.66)	(-0.97)	(-0.55)
Post	0.0793**	-0.00520	0.00188	-0.0836***	0.0169	0.0157***	0.00145	0.0146
	(2.21)	(-0.86)	(0.40)	(-7.42)	(1.08)	(5.19)	(0.28)	(0.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0609	0.169	0.0923	0.293	0.105	0.205	0.106	0.371
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel B: Relatively high proportion of foreign directors								
Treated*Post*dHighForeign	0.0159	-0.00910	-0.00754	0.00860	0.00664	0.00255	-0.00717	-0.00731
	(0.36)	(-1.44)	(-1.21)	(0.68)	(0.27)	(0.46)	(-1.10)	(-0.19)
Treated*Post	-0.0392	0.00319	-0.00273	0.00130	-0.00858	-0.00865	-0.00283	-0.0166
	(-0.85)	(0.41)	(-0.40)	(0.09)	(-0.33)	(-1.57)	(-0.39)	(-0.45)
Post	0.0795**	-0.00523	0.00188	-0.0836***	0.0169	0.0157***	0.00145	0.0146
	(2.22)	(-0.86)	(0.40)	(-7.41)	(1.08)	(5.19)	(0.28)	(0.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0609	0.170	0.0938	0.293	0.105	0.205	0.108	0.371
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel C: Relatively high proportion of directors with postgraduate degrees								
Treated*Post*dHighEducation	-0.0177	0.00403	-0.00164	-0.00694	0.0187	0.00711	-0.00194	0.0669*
	(-0.41)	(0.55)	(-0.27)	(-0.56)	(0.76)	(1.26)	(-0.30)	(1.86)
Treated*Post	-0.0203	-0.00374	-0.00604	0.00980	-0.0148	-0.0111**	-0.00576	-0.0552
	(-0.43)	(-0.57)	(-0.93)	(0.71)	(-0.65)	(-2.21)	(-0.86)	(-1.56)
Post	0.0792**	-0.00521	0.00189	-0.0836***	0.0169	0.0157***	0.00145	0.0146
	(2.21)	(-0.86)	(0.40)	(-7.42)	(1.08)	(5.19)	(0.28)	(0.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0604	0.170	0.0923	0.293	0.105	0.205	0.108	0.372
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel D: Relatively low proportion of directors with CEO/Chairmain experience								
Treated*Post*dLowExperience	0.0417	0.00496	0.00928	0.0185	0.0255	0.00450	0.0103	-0.0273
	(0.79)	(0.60)	(1.43)	(1.29)	(1.40)	(0.94)	(1.46)	(-0.82)
Treated*Post	-0.0568	-0.00441	-0.0121*	-0.00442	-0.0204	-0.0101**	-0.0125*	-0.00689
	(-1.02)	(-0.55)	(-1.89)	(-0.28)	(-0.99)	(-2.10)	(-1.88)	(-0.21)
Post	0.0794**	-0.00518	0.00193	-0.0835***	0.0170	0.0157***	0.00149	0.0145
	(2.21)	(-0.85)	(0.41)	(-7.41)	(1.09)	(5.20)	(0.29)	(0.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0610	0.170	0.0929	0.293	0.106	0.205	0.107	0.371
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01.

3.5. Further investigations and robustness checks

3.5.1. Further issues

We now examine several additional factors that could also have an impact on how firm outcomes are influenced by gender quotas.

Compliance with the deadline

The statistical analysis conducted in Section 3.3.2 revealed that a number of firms do not respect the quota at the date of compliance (see Table 3.3). We examine whether the neutral effect of gender quotas on firm outcomes is driven by the large number of firms that do not comply with the law, with some firms still having a low percentage of female directors at the date of compliance (see Table 3.3). We create the dummy variable *dComply* taking the value of one if a firm has a percentage of female directors respecting the gender quota at the date of compliance (2015 for Italy, 2017 for Belgium and France). We estimate an expanded version of our triple-difference model (Equation (2)), using firm fixed effects and standard errors clustered at the firm level. Results are reported in Table 3.10 (Panel A); our results are unchanged and confirm that gender quotas do not significantly impact firm outcomes and corporate decisions.

Distance from compliance

We follow Matsa and Miller (2013) and examine whether firms furthest from compliance in 2011 display a significant impact of gender quotas on their outcomes, as they were required to add a greater number of women to their boards before the deadline. In our sample, 45% of firms in Belgium and 52% in Italy had no women on their boards the year before the quota, while it is only around 28% of firms in France. We create the dummy variable *dDistCompliance* that takes the value of one if a firm has no female director on its board the year before the implementation of the gender quota. Again, we estimate a triple-difference model to examine whether treated firms with no women on their boards before the law was adopted exhibited significant effects of gender quotas. Results, reported in Table 3.10 (Panel B), indicate that gender quotas do not influence firm outcomes and corporate decisions, independently of their distance from compliance.

Table 3.10. Impacts of compliance to the law (triple-differences estimates)

	Tobin Q	ROA	Operating Profit	Risk	Revenues	Labor Cost	Other Cost	Employment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Firms complying with the quota at the deadline								
Treated*post*dComply	-0.0163	-0.00497	-0.00372	0.0274*	0.0392	0.00535	-0.00156	0.0396
	(-0.29)	(-0.59)	(-0.47)	(1.85)	(1.20)	(0.72)	(-0.20)	(0.73)
Treated*post	-0.0195	0.00168	-0.00429	-0.0130	-0.0322	-0.0110	-0.00570	-0.0481
	(-0.33)	(0.18)	(-0.51)	(-0.78)	(-0.96)	(-1.52)	(-0.67)	(-0.90)
Post	0.0792**	-0.00523	0.00186	-0.0835***	0.0171	0.0157***	0.00144	0.0149
	(2.21)	(-0.86)	(0.39)	(-7.41)	(1.10)	(5.21)	(0.28)	(0.80)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0603	0.169	0.0923	0.293	0.106	0.205	0.106	0.371
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel B: Distance from compliance								
Treated*post*dDistCompliance	0.0298	-0.0154*	-0.00273	0.00595	0.00662	-0.00211	-0.00380	0.00166
	(0.58)	(-1.85)	(-0.36)	(0.43)	(0.24)	(-0.32)	(-0.50)	(0.04)
Treated*post	-0.0501	0.00818	-0.00512	0.00221	-0.00921	-0.00592	-0.00433	-0.0216
	(-1.05)	(0.88)	(-0.64)	(0.14)	(-0.32)	(-0.93)	(-0.52)	(-0.52)
Post	0.0794**	-0.00525	0.00188	-0.0836***	0.0169	0.0157***	0.00144	0.0146
	(2.21)	(-0.87)	(0.39)	(-7.41)	(1.08)	(5.19)	(0.28)	(0.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3045	5835	5933	6074	5855	6011	5970	5916
R-squared	0.0604	0.171	0.0923	0.293	0.105	0.205	0.106	0.371
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Impact of gender quotas on banks

We removed banks from our sample as they are subject to specific regulations. We further examine whether the imposition of a gender quota has a different impact on banks compared to non-financial firms. We were able to collect data on boards and financial statements for a sample of 54 treated banks, all listed on the stock market (11 in Belgium, 14 in France, and 29 in Italy). We end up with a sample of 70 non-treated banks (11 in Austria, 10 in Greece, 4 in Ireland, 1 in Luxembourg, 8 in Portugal, and 36 in Switzerland). A statistical analysis shows that we observe similar characteristics in the evolution of board composition of banks and non-financial firms after the introduction of gender quotas. We carry out a propensity score matching procedure between treated and non-treated banks, and rerun Equations (1) and (2). Results are reported in Tables 3.11 and 3.12; we find similar results to the analysis conducted on non-financial firms, with gender quotas having a neutral effect on bank performance, risk-taking and strategic corporate decisions. Specificities of banks do not therefore interfere in the way gender quotas impact (or here do not impact) firm outcomes.

3.5.2. Robustness checks

We carry out several additional robustness checks on our empirical results.

Alternative dependent variables

We use alternative dependent variables to verify the robustness of our results. For the economic performance, we use the return on equity (ROE) as an alternative measure of profitability. We also use the Sharpe ratio as an alternative measure of firm risk. We rerun the matching procedure if necessary and then estimate Equations (1) and (2). We find that gender quotas do not have any impact on either the ROE or the Sharpe ratio (see Tables A3.4 and A3.5 in Appendix A). Our results are therefore unchanged, with a neutral effect of gender quotas independently of the measure of performance and risk used.

Alternative treatment period

If firms have anticipated the introduction of gender quotas, they might have begun recruiting women the year before the quota. We test the robustness of our results by including 2010 in the treatment period (2010-2012), with a pre-treatment period going from 2007 to 2009. We rerun the matching procedure when necessary. Results are displayed in Tables A3.6 (Equation (1)) and A3.7 (Equation (2)). Our results again remain unchanged; gender quota legislation does not affect outcomes and corporate decisions of firms.

Table 3.11. Impact of gender quotas on banks (Equation 1; Difference-in-differences estimates)

	Tobin Q (1)	ROA (2)	Operating Profit (3)	Risk (4)	Revenues (5)	Labor Cost (6)	Other Cost (7)	Employment (8)
Treated*Post	-0.0124	0.00555	0.00393	0.0639*	-0.0104	-0.00243	0.00173	0.0623
	(-0.45)	(0.76)	(0.17)	(1.68)	(-0.96)	(-0.44)	(0.26)	(0.74)
Post	-0.00760	-0.00477	-0.00332	-0.101***	0.0000357	0.00409*	0.00304	-0.100***
	(-0.31)	(-0.72)	(-0.41)	(-3.96)	(0.00)	(1.71)	(0.93)	(-2.68)
Treated								
Board size	-0.0398	-0.0177	0.194	-0.0344	-0.0320	-0.0274	0.0102	0.0200
	(-0.81)	(-0.98)	(1.03)	(-0.36)	(-1.52)	(-0.67)	(0.57)	(0.15)
Firm size	0.106	0.0289*	-0.0116	-0.000193	-0.0904**	-0.0273***	0.00758	0.407***
	(0.93)	(1.78)	(-0.43)	(-0.00)	(-2.53)	(-2.73)	(0.33)	(2.92)
Sales growth	0.00969	0.00577**	0.0126***	0.0107	0.0243***	0.00372***	0.00899***	-0.00594
	(1.61)	(2.38)	(3.15)	(0.99)	(4.57)	(3.24)	(5.13)	(-0.44)
Leverage	-0.302	-0.0508	-0.0293		0.269	0.0680	-0.140**	-0.0633
	(-0.72)	(-0.22)	(-0.44)		(1.45)	(1.23)	(-2.31)	(-0.13)
GDP	0.00118	0.00329	0.000979	-0.0155***	0.00146	0.000246	-0.000231	0.00236
	(0.32)	(1.00)	(0.28)	(-5.95)	(0.96)	(0.63)	(-0.29)	(0.66)
Constant	0.347	-0.198	-0.228	0.538	0.931**	0.331***	0.0223	3.792***
	(0.41)	(-0.71)	(-1.22)	(1.11)	(2.41)	(3.32)	(0.09)	(2.86)
Observations	529	945	369	1105	529	417	999	1029
R-squared	0.0279	0.0440	0.101	0.212	0.199	0.0291	0.0520	0.0935
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.12. Impact of gender quotas on banks (Equation (2), triple-difference)

Dependent variable	Tobin Q	ROA	Operating Profit	Risk	Revenues	Labor Cost	Other Cost	Employment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Relatively high proportion of younger directors								
Treated*Post*dLowAge	-0.0264	-0.00883	-0.0303	0.106	-0.0148	0.00742	-0.00969	-0.125
	(-1.00)	(-0.64)	(-0.65)	(1.55)	(-0.97)	(0.80)	(-0.95)	(-0.78)
Treated*Post	0.00218	0.0107	0.0161	0.00665	0.00474	-0.00336	0.00740	0.132
	(0.08)	(0.86)	(0.50)	(0.12)	(0.34)	(-0.38)	(0.69)	(1.05)
Post	-0.00765	-0.00468	-0.00333	-0.101***	-0.0118	0.00393	0.00304	-0.100***
	(-0.31)	(-0.71)	(-0.41)	(-3.96)	(-1.54)	(1.35)	(0.93)	(-2.66)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	529	945	369	1105	1025	785	999	1029
R-squared	0.0290	0.0471	0.110	0.222	0.292	0.0717	0.0580	0.0986
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel B: Relatively high proportion of foreign directors								
Treated*Post*dHighForeign	0.0113	-0.00383	-0.0254	-0.0256	0.0267*	0.00766	-0.00266	-0.150
	(0.34)	(-0.27)	(-0.56)	(-0.38)	(1.89)	(0.73)	(-0.23)	(-1.23)
Treated*Post	-0.0170	0.00764	0.0140	0.0770*	-0.0168	-0.00354	0.00329	0.144*
	(-0.53)	(0.64)	(0.67)	(1.91)	(-1.38)	(-0.36)	(0.34)	(1.83)
Post	-0.00773	-0.00478	-0.00312	-0.101***	-0.0120	0.00381	0.00305	-0.0997***
	(-0.32)	(-0.72)	(-0.38)	(-3.95)	(-1.56)	(1.31)	(0.93)	(-2.68)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	529	945	369	1105	1025	785	999	1029
R-squared	0.0289	0.0441	0.103	0.212	0.296	0.0706	0.0524	0.101
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel C: Relatively high proportion of directors with postgraduate degrees								
Treated*Post*dHighEducation	0.00499	0.00792	0.0403	-0.0801	-0.00491	-0.0130	-0.00321	0.0727
	(0.16)	(0.69)	(0.81)	(-1.25)	(-0.32)	(-1.45)	(-0.39)	(0.58)
Treated*Post	-0.0132	0.000800	-0.0342	0.0101	-0.00112	0.00618	0.00229	0.0295
	(-0.40)	(0.12)	(-0.75)	(1.12)	(-0.10)	(1.19)	(0.26)	(0.22)
Post	-0.00768	-0.00489	-0.00309	-0.100***	-0.0119	0.00389	0.00306	-0.101***
	(-0.32)	(-0.73)	(-0.37)	(-3.95)	(-1.55)	(1.35)	(0.94)	(-2.68)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	529	945	369	1105	1025	785	999	1029
R-squared	0.0289	0.0457	0.119	0.216	0.290	0.0736	0.0545	0.0954
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel D: Relatively low proportion of directors with CEO/Chairmain experience								
Treated*Post*dLowExperience	-0.0180	-0.000272	-0.0407	0.0116	-0.0421	0.000182	-0.00341	-0.0375
	(-0.65)	(-0.02)	(-0.92)	(0.29)	(-1.21)	(0.01)	(-0.23)	(-0.78)
Treated*Post	-0.00254	0.00649	0.0263	0.0581	0.0173	0.000408	0.00316	0.0985
	(-0.09)	(0.69)	(1.18)	(1.39)	(1.62)	(0.06)	(0.45)	(1.44)
Post	-0.00765	-0.00483	-0.00338	-0.101***	-0.0119	0.00388	0.00304	-0.101***
	(-0.32)	(-0.72)	(-0.42)	(-3.95)	(-1.55)	(1.33)	(0.93)	(-2.71)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	529	945	369	1105	1025	785	999	1029
R-squared	0.0283	0.0447	0.105	0.212	0.308	0.0697	0.0525	0.106
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

3.6. Conclusion

Governments in many countries have adopted or are considering using mandatory rules to force firms to increase gender diversity on corporate boards. We exploit in this paper a natural experiment in Belgium, France and Italy to identify the impact of gender quotas on firm outcomes and strategic corporate decisions.

We first conduct a statistical analysis to examine how boards' composition and board members' characteristics are affected by the imposition of a gender quota. As expected, we find that quotas are associated with a strong increase in female directors, however below the required threshold in a large number of firms at the date of compliance. Our statistics further show that board members' characteristics significantly change after gender quotas, with higher education levels of all members, lower age, lower board experience and higher international exposure.

We next use a difference-in-differences approach to explore how firm performance and corporate decisions change when the number of female directors is exogenously increased. Our results show that the introduction of gender quotas does not significantly impact firm performance and risk, and does not modify corporate strategic policies. Our results for the Belgium, France and Italy cases challenge what we have learnt from Ahern and Dittmar (2012) and Matsa and Miller (2013) on the Norwegian case, that gender quotas caused a decline in firm outcomes. Our findings are consistent with gender quotas inducing a neutral effect on firm performance and corporate decisions, in line with the recent study of Eckbo et al. (2018) on Norwegian firms. Our results further show that directors' age, education, nationality or experience are not channels for the quota's effect.

Overall, our study suggests that gender balance on corporate boards could be achieved by mandatory quotas without regulators expecting negative effects for firm performance. However, our study does not support the "business case" argument appealed by policy-makers to justify the imposition of gender quotas, as we do not find that the presence of more women on boards is associated with an increase in firm performance. Policy-makers can create unrealistic expectations for women by ignoring the fact that the side effects of mandatory rules could outweigh the expected benefit of an increase in board diversity on firm outcomes. Our study also shows that a large number of firms do not respect the quota at the date of compliance, suggesting that stronger sanctions should be imposed to prompt firms to comply with the law.

Our empirical strategy does not allow us to analyze the long-term effects of gender quotas. Future research should look at the potential long-term effects as we might expect side effects

of mandatory rules to decrease in the long run. Such analysis will however require the use of another approach than difference-in-differences analysis, with the risk to be exposed to the problem of joint endogeneity between board composition and firm performance.

Appendix

Appendix A

Table A3.1. Statistics on general board characteristics by country

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Panel A : Belgium				
Age	All	56.17	56.73	0.5611**
	Male	56.56	57.78	1.2225***
	Female	52.01	52.15	0.1465
	Difference-gender	-4.54***	-5.66***	
Foreign (%)	All	18.62	20.42	1.80***
	Male	18.68	19.30	0.61
	Female	18.21	24.63	6.42***
	Difference-gender	-0.47	5.33***	
Tenure	All	4.99	5.10	0.1108
	Male	4.98	5.41	0.4325*
	Female	5.03	4.07	-0.9602**
	Difference-gender	0.05	-1.34***	
Time on Board	All	7.31	8.06	0.7500***
	Male	7.40	8.86	1.4615***
	Female	6.49	5.03	-1.4628***
	Difference-gender	-0.91**	-3.83***	
Time in Company	All	8.38	8.84	0.4624**
	Male	8.56	9.79	1.2298***
	Female	6.72	5.25	-1.4656***
	Difference-gender	-1.84***	-4.54***	
Panel B : France				
Age	All	57.56	57.86	0.3005**
	Male	58.02	59.39	1.3675***
	Female	53.48	53.73	0.2525
	Difference-gender	-4.54***	-5.66***	
Foreign (%)	All	13.20	14.25	1.05***
	Male	13.66	13.23	-0.43
	Female	9.09	16.78	7.69***
	Difference-gender	-4.57***	3.55***	
Tenure	All	5.54	5.99	0.4533***
	Male	5.45	6.70	1.2448***
	Female	6.38	4.24	-2.1344***
	Difference-gender	0.93**	-2.46***	
Time on Board	All	7.20	8.05	0.8493***
	Male	7.22	9.30	2.0807***
	Female	7.11	4.91	-2.1959***
	Difference-gender	-0.11	-4.39***	
Time in Company	All	8.97	9.83	0.8582***
	Male	9.00	11.29	2.2935***
	Female	8.84	6.18	-2.6588***
	Difference-gender	-0.16	-5.11***	

Panel C: Italy				
Age	All	57.87	57.73	-0.1346
	Male	58.13	59.13	0.9986***
	Female	52.33	51.94	-0.39
	Difference-gender	-5.8***	-7.19***	
Foreign (%)	All	4.06	5.45	1.39***
	Male	4.22	5.68	1.46***
	Female	0.86	4.45	3.59***
	Difference-gender	-3.36***	-1.23**	
Tenure	All	4.16	4.87	0.7139***
	Male	4.10	5.34	1.2415***
	Female	5.40	3.27	-2.1345***
	Difference-gender	1.3***	-2.07***	
Time on Board	All	5.32	6.32	1.0004***
	Male	5.23	6.99	1.7669***
	Female	7.10	4.26	-2.8460***
	Difference-gender	1.87***	-2.73***	
Time in Company	All	6.29	7.25	0.9574***
	Male	6.11	7.99	1.8803***
	Female	9.99	5.23	-4.7632***
	Difference-gender	3.88***	-2.76***	

Notes. Variables are defined in Table 3.2.

Table A3.2. Statistics on board members' education and experience by country

Education

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Panel A: Belgium				
Bachelor (%)	All	28.56	23.20	-5.35***
	Male	30.12	24.45	-5.67***
	Female	12.10	18.25	6.15***
	Difference-gender	-18.02***	-6.2***	
PostGraduate (%)	All	55.36	61.02	5.67***
	Male	54.54	59.49	4.94***
	Female	63.73	66.93	3.20
	Difference-gender	9.19***	7.44***	
Panel B: France				
Bachelor (%)	All	34.47	34.26	-0.20
	Male	35.95	36.17	0.22
	Female	21.51	28.65	7.14***
	Difference-gender	-14.44***	-7.52***	
PostGraduate (%)	All	34.91	39.03	4.13***
	Male	34.94	36.53	1.59***
	Female	34.54	45.56	11.02***
	Difference-gender	-0.4	9.03***	
Panel C: Italy				
Bachelor (%)	All	50.94	47.13	-3.82*
	Male	50.87	49.51	-1.36
	Female	52.03	40.58	-11.45*
	Difference-gender	1.16	-8.93**	
PostGraduate (%)	All	30.69	37.29	6.60***
	Male	31.40	35.35	3.95***
	Female	16.85	41.28	24.43***
	Difference-gender	-14.55***	5.93	

Experience

		Pre quota period (2006-2010)	Post quota period (2011-2017)	Difference-period
Panel A: Belgium				
Directors having experience on board (%)	All	98.80	93.68	-5.13**
	Male	98.97	95.28	-3.70**
	Female	96.42	86.74	-9.68*
	Difference-gender	-2.55***	-8.54**	
Number BOD to Date	All	8.15	7.98	-0.1662
	Male	8.34	8.59	0.2485
	Female	6.27	5.65	-0.6230*
	Difference-gender	-2.07***	-2.94***	
Number current BOD (Occupation)	All	3.91	3.93	0.0150
	Male	4.03	4.21	0.1856***
	Female	2.75	2.83	0.0779
	Difference-gender	-1.28***	-1.38***	
Year on Quoted BOD	All	3.10	3.34	0.2383***
	Male	3.18	3.68	0.4989***
	Female	2.31	2.06	-0.2575
	Difference-gender	-0.87***	-1.62***	
CEO (%)	All	17.02	16.63	-0.40*
	Male	17.65	17.82	0.18
	Female	8.21	10.45	2.24***
	Difference-gender	-9.44***	-7.37***	
Chairman (%)	All	16.83	15.76	-1.07***
	Male	17.36	16.76	-0.60**
	Female	9.50	10.33	0.83**
	Difference-gender	-7.86***	-6.43***	
Vice Chairman/Vice CEO (%)	All	8.62	7.84	-0.78
	Male	8.73	8.01	-0.72
	Female	7.18	7.13	-0.05
	Difference-gender	-1.55***	-0.88	
Panel B : France				
Directors having experience on board (%)	All	99.10	93.56	-5.55**
	Male	99.34	96.37	-2.97**
	Female	96.22	83.26	-12.96**
	Difference-gender	-3.12***	-13.11***	
Number BOD to Date	All	12.57	11.03	-1.5329**
	Male	13.27	12.94	-0.3311
	Female	6.52	5.94	-0.5842**
	Difference-gender	-6.75***	-7***	
Number current BOD (Occupation)	All	5.46	4.70	-0.7534**
	Male	5.70	5.26	-0.4364**
	Female	3.37	3.19	-0.1855
	Difference-gender	-2.33***	-2.07***	
Year on Quoted BOD	All	2.32	2.62	0.3001***
	Male	2.47	3.09	0.6229***
	Female	1.04	1.36	0.3215*
	Difference-gender	-1.43***	-1.73***	

CEO (%)	All	11.52	10.80	-0.72**
	Male	11.82	11.73	-0.09
	Female	7.71	6.92	-0.78**
	Difference-gender	-4.11***	-4.81***	
Chairman (%)	All	21.28	19.83	-1.45**
	Male	21.41	21.17	-0.23
	Female	19.86	14.55	-5.31***
	Difference-gender	-1.55*	-6.62***	
Vice Chairman/Vice CEO (%)	All	11.52	10.35	-1.17**
	Male	11.65	11.22	-0.43*
	Female	9.91	6.87	-3.04***
	Difference-gender	-1.74***	-4.35***	
Panel C: Italy				
Directors having experience on board (%)	All	99.22	94.83	4.40*
	Male	99.21	96.47	2.74*
	Female	98.15	87.04	11.11
	Difference-gender	-1.06	-9.43***	
Number BOD to Date	All	9.39	8.53	-0.8656**
	Male	9.58	9.45	-0.1331
	Female	5.73	4.77	-0.9671***
	Difference-gender	-3.85***	-4.68***	
Number current BOD (Occupation)	All	4.22	3.86	-0.3552**
	Male	4.25	4.07	-0.1880*
	Female	3.51	3.02	-0.4806***
	Difference-gender	-0.74***	-1.05***	
Year on Quoted BOD	All	2.24	2.44	0.1998**
	Male	2.29	2.76	0.4710***
	Female	1.24	1.19	-0.0473
	Difference-gender	-1.05***	-1.57***	
CEO (%)	All	13.10	12.33	-0.78*
	Male	13.37	13.39	0.02
	Female	5.45	5.70	0.25
	Difference-gender	-7.92***	-7.69***	
Chairman (%)	All	19.33	18.14	-1.19***
	Male	19.38	19.01	-0.37
	Female	18.16	13.11	-5.04***
	Difference-gender	-1.22	-5.9***	
Vice Chairman/Vice CEO (%)	All	12.87	11.41	-1.46***
	Male	12.84	11.90	-0.94***
	Female	13.58	8.38	-5.20***
	Difference-gender	0.74	-3.52***	

Notes. Variables are defined in Table 3.2; BOD = board of directors.

Table A3.3. Statistics by country on the education and experience of new, retained and exiting directors

Education

	Female			Male			Differences		
	New	Retained	Exiting	New	Retained	Exiting	New Female – New Male	New Female – Retained Male	New Female – Exiting Male
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(1) - (5)	(1) - (6)
Panel A: Belgium									
Pre quota period: 2006-2010									
Bachelor (%)	12.50	13.35	0.00	20.72	30.30	26.64	-8.22	-17.80	-14.14
Postgraduate (%)	83.33	59.96	91.67	67.19	55.60	59.42	16.15	27.73	23.91
Post quota period: 2011-2017									
Bachelor (%)	16.44	18.69	20.36	23.11	24.66	29.32	-6.67	-8.22	-12.87*
Postgraduate (%)	71.38	65.75	70.42	60.08	59.90	57.16	11.30*	11.49***	14.22**
Panel B: France									
Pre quota period: 2006-2010									
Bachelor (%)	21.97	22.75	13.72	37.95	38.51	37.16	-15.98*	-16.54*	-15.19*
Postgraduate (%)	51.49	31.85	38.77	42.34	35.19	38.01	9.15	16.30	13.48
Post quota period: 2011-2017									
Bachelor (%)	31.99	28.77	32.75	45.46	37.29	37.71	-5.31**	-5.72***	-8.07***
Postgraduate (%)	50.92	45.85	45.46	40.05	40.39	37.19	10.53***	13.73***	14.08***
Panel C: Italy									
Pre quota period: 2006-2010									
Bachelor (%)	33.33	53.68	41.67	46.91	51.65	48.43	-13.58	-18.31	-15.09
Postgraduate (%)	29.17	17.83	45.83	38.63	31.52	29.55	-9.46	-2.35	-0.39
Post quota period: 2011-2017									
Bachelor (%)	35.87	45.46	54.29	46.97	50.93	50.19	-11.10*	-15.06**	-14.33**
Postgraduate (%)	52.22	36.24	33.88	40.39	33.93	37.48	11.83***	18.29***	14.74***

Experience

	Female			Male			Differences		
	New	Retained	Exiting	New	Retained	Exiting	New Female – New Male	New Female – Retained Male	New Female – Exiting Male
	(1)	(2)	(3)	(4)	(5)	(6)	(1) - (4)	(1) - (5)	(1) - (6)
Panel A: Belgium									
Pre quota period: 2006-2010									
Having BOD experience	95.83	94.29	100.00	94.76	97.67	100.00	1.07	-1.84	-4.17
CEO	17.86	14.08	41.67	46.37	43.56	36.90	-28.52**	-25.70**	-19.04*
Chairman	30.36	16.46	8.33	38.54	43.00	46.67	-8.18	-12.64	-16.31
Post quota period: 2011-2017									
Having BOD experience	62.37	81.78	100.00	75.86	90.22	100.00	-13.49	-27.85**	-37.63***
CEO	14.12	18.21	12.26	29.09	41.88	49.43	-14.98**	-27.76***	-35.32***
Chairman	18.10	17.14	17.98	26.99	38.82	48.49	-8.89*	-20.72***	-30.39***
Panel B: France									
Pre quota period: 2006-2010									
Having BOD experience	88.03	93.69	100.00	96.54	98.50	100.00	-8.51*	-10.46**	-11.97**
CEO	16.54	15.04	12.48	29.61	31.15	31.12	-13.07**	-14.61**	-14.58**
Chairman	32.41	40.38	35.60	45.60	57.85	55.28	-13.19*	-25.44***	-22.87***
Post quota period: 2011-2017									
Having BOD experience	61.15	77.98	100.00	76.30	92.48	100.00	-15.15	-31.33***	-38.85***
CEO	9.45	10.96	11.77	18.90	29.37	29.91	-9.45***	-19.92***	-20.46***
Chairman	15.49	25.20	20.52	31.94	53.45	51.72	-16.46***	-37.97***	-36.23***
Panel C: Italy									
Pre quota period: 2006-2010									
Having BOD experience	83.33	100.00	100.00	98.80	97.97	100.00	-15.47	-14.64	-16.67
CEO	8.33	8.92	8.33	29.01	35.49	31.95	-20.68*	-27.16**	-23.62**
Chairman	12.50	39.97	20.83	44.61	52.04	47.43	-32.11*	-39.54**	-34.93**
Post quota period: 2011-2017									
Having BOD experience	73.25	84.62	100.00	84.21	92.90	100.00	-10.96	-19.66**	-26.75***
CEO	9.50	8.13	24.85	25.43	32.70	33.12	-15.93***	-23.20***	-23.62***
Chairman	16.45	21.57	17.31	33.15	47.06	47.54	-16.70***	-30.61***	-31.09***

Notes. Variables are defined in Table 3.2; BOD = board of directors. All numbers are calculated in percentage.

Table A3.4. Robustness test: alternative dependent variables (Equation (1); Difference-in-differences estimates)

	ROE			Sharpe ratio		
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*Post	-0.0196	-0.0117	-0.0117	-0.254	0.451*	0.451
	(-0.94)	(-0.45)	(-0.29)	(-1.48)	(1.92)	(1.17)
Post	0.0166	0.00486	0.00486	0.584***	0.0901	0.0901
	(1.60)	(0.21)	(0.28)	(4.87)	(0.43)	(0.27)
Treated	-0.00160			-0.104		
	(-0.11)			(-0.86)		
Board size		-0.0916	-0.0916		-0.212	-0.212
		(-1.12)	(-1.39)		(-0.65)	(-1.13)
Firm size		-0.104	-0.104		0.316*	0.316*
		(-0.95)	(-1.56)		(1.96)	(2.17)
Sales growth		0.0134***	0.0134**		0.00536	0.00536
		(3.41)	(3.06)		(0.16)	(0.14)
Leverage		0.109	0.109			
		(0.50)	(0.44)			
GDP		0.0113***	0.0113***		-0.245***	-0.245***
		(3.45)	(4.18)		(-8.04)	(-4.61)
Constant	0.0646***	1.052	1.052	0.107	-2.053	-2.053*
	(8.81)	(1.11)	(1.71)	(1.26)	(-1.59)	(-1.93)
Observations	6336	5811	5811	3249	2166	2166
R-squared	0.000601	0.0264	0.0264	0.0117	0.109	0.109
Firm FE	No	Yes	Yes	No	Yes	Yes
Cluster level		Firm	Industry sector		Firm	Industry sector

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.5. Robustness test: alternative dependent variables (Equation (2); triple-differences estimates)

Dummy board characteristics	dLowAge		dHigheForeign		dHighEducation		dLowExperience	
Dependent variable	ROE	Sharpe ratio	ROE	Sharpe ratio	ROE	Sharpe ratio	ROE	Sharpe ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treated*Post*dBC	0.0180	-0.0260	-0.00885	0.103	0.0234	-0.0237	0.0315	-0.0236
	(0.45)	(-0.21)	(-0.25)	(1.03)	(0.58)	(-0.22)	(0.92)	(-0.20)
Treated*Post	-0.0208	0.447*	-0.00662	0.401*	-0.0247	0.469*	-0.0322	0.463*
	(-0.76)	(1.85)	(-0.21)	(1.66)	(-0.96)	(1.95)	(-0.95)	(1.88)
Post	0.00479	0.0831	0.00494	0.0832	0.00485	0.0830	0.00498	0.0831
	(0.21)	(0.39)	(0.22)	(0.39)	(0.21)	(0.39)	(0.22)	(0.39)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5811	2166	5811	2166	5811	2166	5811	2166
R-squared	0.0286	0.119	0.0269	0.119	0.0267	0.119	0.0276	0.120
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. "dBC = Dummy Board Characteristics"

Table A3.6: Robustness test: alternative treatment period including the year before the quota (Equation (1); Difference-in-differences estimates)

	Tobin Q (1)	ROA (2)	Operating Profit (3)	Risk (4)	Revenues (5)	Labor Cost (6)	Other Cost (7)	Employment (8)
Treated*Post	-0.0141	0.000197	-0.00643	-0.00515	0.00794	0.00304	-0.00704	0.0312
	(-0.34)	(0.03)	(-1.18)	(-0.42)	(0.46)	(0.65)	(-1.37)	(0.99)
Post	0.00106	-0.00945	-0.00867	-0.131***	-0.0489***	0.000511	-0.00606	-0.0492
	(0.03)	(-1.61)	(-1.63)	(-10.37)	(-2.62)	(0.11)	(-1.23)	(-1.59)
Board size	-0.121	-0.0193	-0.0206	0.00265	0.0110	0.0184*	-0.00888	0.0832
	(-1.18)	(-1.22)	(-1.45)	(0.07)	(0.25)	(1.72)	(-0.58)	(0.96)
Firm size	-0.281	0.0169	0.00758	-0.0944***	-0.163***	-0.0701***	0.00745	0.893***
	(-1.62)	(0.93)	(0.53)	(-3.31)	(-3.67)	(-4.12)	(0.60)	(4.30)
Sales growth	0.0013**	0.000756*	0.0111**	0.00333	0.0148*	-0.0000245	0.0105***	0.000335
	(2.51)	(1.95)	(2.48)	(0.36)	(1.72)	(-0.07)	(3.58)	(0.24)
Leverage	0.794**	-0.297***	-0.187***		0.0746	0.0579*	-0.176***	0.670
	(2.23)	(-5.06)	(-3.82)		(0.75)	(1.88)	(-4.19)	(1.04)
GDP	0.00354	0.00523***	0.00623***	0.00473**	0.0184***	0.000213	0.00555***	0.0092**
	(1.09)	(6.24)	(6.47)	(2.27)	(7.00)	(0.37)	(6.45)	(2.23)
Constant	3.199**	0.117	0.162	1.201***	2.097***	0.684***	0.131	1.077
	(2.52)	(0.87)	(1.44)	(6.08)	(6.23)	(5.56)	(1.35)	(0.59)
Observations	2531	4987	5002	5115	5026	5084	4999	4956
R-squared	0.0621	0.151	0.157	0.389	0.117	0.121	0.147	0.275
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.7. Robustness test: alternative treatment period including the year before the quota (Equation (2); triple-differences estimates)

Dependent variable	Tobin Q	ROA	Operating Profit	Risk	Revenues	Labor Cost	Other Cost	Employment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Relatively high proportion of younger directors								
Treated*Post*dLowAge	0.0473	0.00481	0.00688	-0.000881	-0.000486	0.00439	0.00583	-0.0142
	(0.91)	(0.65)	(0.98)	(-0.07)	(-0.02)	(0.85)	(0.82)	(-0.48)
Treated*Post	-0.0722	-0.00215	-0.00972	-0.00459	0.00823	0.000869	-0.00982	0.0376
	(-1.47)	(-0.32)	(-1.51)	(-0.35)	(0.39)	(0.18)	(-1.55)	(1.09)
Post	0.141***	-0.00945	-0.00868	-0.131***	-0.0489***	0.000505	-0.00607	-0.0492
	(3.28)	(-1.61)	(-1.63)	(-10.37)	(-2.62)	(0.11)	(-1.23)	(-1.59)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2531	4987	5002	5115	5026	5084	4999	4956
R-squared	0.0868	0.151	0.158	0.390	0.117	0.122	0.147	0.276
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel B: Relatively high proportion of foreign directors								
Treated*Post*dHighForeign	0.0106	-0.00188	-0.0128*	0.00689	-0.00138	-0.00223	-0.0136*	0.00508
	(0.19)	(-1.17)	(-1.72)	(0.51)	(-0.06)	(-0.45)	(-1.76)	(0.15)
Treated*Post	-0.0537	0.0106	0.000850	-0.00925	0.00839	0.00421	0.000691	0.0287
	(-0.97)	(1.32)	(0.12)	(-0.64)	(0.35)	(0.75)	(0.10)	(0.71)
Post	0.141***	-0.00950	-0.00868	-0.131***	-0.0489***	0.000495	-0.00608	-0.0492
	(3.29)	(-1.62)	(-1.64)	(-10.36)	(-2.63)	(0.11)	(-1.24)	(-1.58)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2531	4987	5002	5115	5026	5084	4999	4956
R-squared	0.0854	0.153	0.160	0.390	0.117	0.121	0.150	0.276
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel C: Relatively high proportion of directors with postgraduate degrees								
Treated*Post*dHighEducation	-0.00538	0.0129	0.00660	-0.0156	0.0390*	0.00443	0.00679	0.0328
	(-0.11)	(1.62)	(0.92)	(-1.24)	(1.67)	(0.84)	(0.94)	(1.00)
Treated*Post	-0.0458	-0.00648	-0.00988	0.00303	-0.0122	0.000736	-0.0106*	0.0143
	(-1.00)	(-1.04)	(-1.53)	(0.22)	(-0.56)	(0.14)	(-1.72)	(0.36)
Post	0.141***	-0.00949	-0.00870	-0.131***	-0.0490***	0.000496	-0.00609	-0.0493
	(3.28)	(-1.62)	(-1.64)	(-10.36)	(-2.63)	(0.11)	(-1.24)	(-1.59)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2531	4987	5002	5115	5026	5084	4999	4956
R-squared	0.0852	0.152	0.158	0.390	0.118	0.122	0.147	0.276
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Panel D: Relatively low proportion of directors with CEO/Chairmain experience								
Treated*Post*dLowExperience	0.0105	-0.00275	0.00486	0.0141	0.0206	0.00287	0.00624	-0.00161
	(1.00)	(-0.31)	(0.66)	(0.95)	(1.06)	(0.58)	(0.86)	(-0.04)
Treated*Post	-0.0112	0.00181	-0.00948	-0.0142	-0.00568	0.00121	-0.0109	0.0306
	(-1.18)	(0.21)	(-1.36)	(-0.88)	(-0.26)	(0.22)	(-1.64)	(0.71)
Post	0.142***	-0.00946	-0.00866	-0.131***	-0.0489***	0.000512	-0.00604	-0.0494
	(3.29)	(-1.61)	(-1.63)	(-10.37)	(-2.63)	(0.11)	(-1.23)	(-1.59)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2531	4987	5002	5115	5026	5084	4999	4956
R-squared	0.0878	0.151	0.158	0.390	0.118	0.121	0.147	0.276
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster level	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Note. *Variables are defined in Table 3.2; t* statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A3.1. Percentage of female directors in treated and non-treated groups
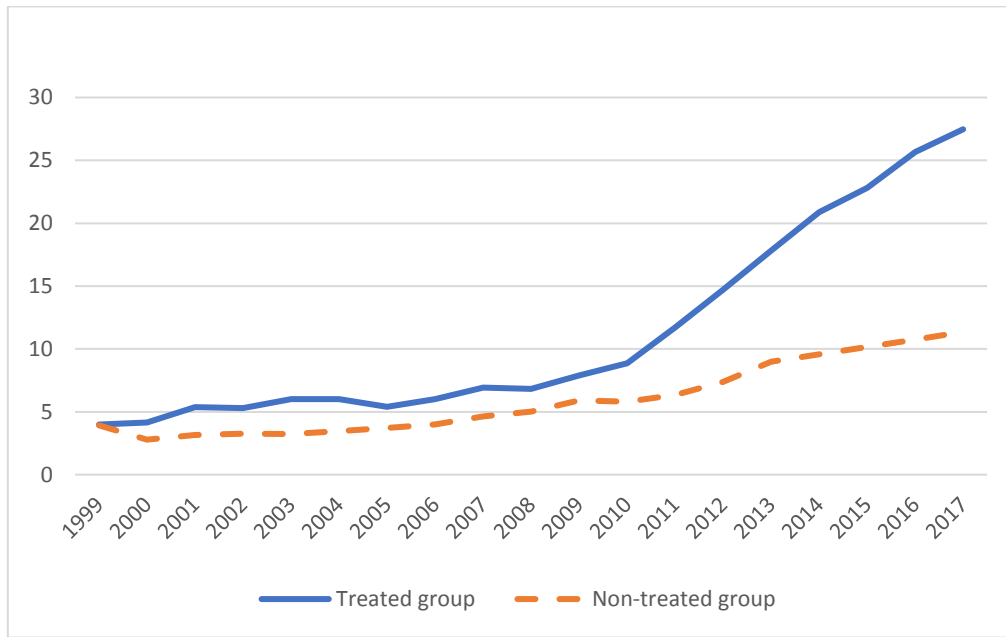
Appendix B: The matching procedure

The validity of the difference-in-differences analysis requires that control firms have similar characteristics than treated firms during the pre-treatment period. This implies that our dependent variables must follow a parallel trend over time for the two group of treated and non-treated firms. If it is not the case, our estimates might be biased by structural differences between these two groups of firms.

We therefore test for each dependent variable (*ROA*, *Tobin* Q, *Operating Profits*, *Risk*, *Labor Cost*, *Employment*, *Other costs* and *Revenues*) if there is a significant parallel trend between treated and control firms over the pre-treatment period, using mean tests and graphics (see Tables B3.1 to B3.8 and figures B3.1 to B3.8 below). Our analysis shows that only one variable satisfies the parallel trend assumption, *Tobin Q*. For this variable, we can therefore directly run the difference-in-differences specifications. For the other variables, we need to carry out a propensity score matching procedure to identify a subsample of matched firms extracted from the group of 442 non-treated firms. We implement a nearest neighbor matching procedure as proposed by Rosenbaum and Rubin (1983) and applied by Roberts and White (2012), Schepens (2016) or Bennouri et al. (2018). We first estimate the following Probit model for the year of the quota:

$$Treated_{i,2011} = \alpha + \beta_1 * MV_{i,2008} + \beta_2 * MV_{i,2009} + \beta_3 * MV_{i,2010} + \beta_4 *$$
$$Growth\_MV_{i,2009} + \beta_5 * Growth\_MV_{i,2010} + \beta_6 * GrowthMV_{i,2011} + \beta_7 * X_{i,2011} \quad (i)$$
$$+ \varepsilon_{i,2011}$$

where subscript *i* denotes firm and $\varepsilon_{i,2011}$ is the idiosyncratic error term; *Treated* is a dummy variable taking the value of one for treated firms, and zero otherwise; *MV* denotes the alternative outcomes variables (*ROA*, *Operating Profits*, *Risk*, *Labor Cost*, *Employment*, *Other costs* and *Revenue)* for which we consider the lagged value for 2008 ($MV_{i,2008}$), 2009 ($MV_{i,2009}$) and 2010 ($MV_{i,2010}$). *GrowthMV* is the annual growth rate of the alternative outcomes variables computed for the pre-treatment period. We include a set of control variables (*X*) to account for industries and countries characteristics: the firm size, the industry sector, and the GDP growth rate.

Probit regressions are used to determine a propensity score for each treated and non-treated firm. We use this score to perform a nearest neighbor matching by pairing each treated firm with the three closest firms in the control group. We use matching with replacement that allows a non-treated firm to be matched with several treated firms.

B3.1. Parallel trend assumption for Tobin Q

Table B3.1. Mean tests for Tobin Q for the pre-treatment period (before 2011)

	Treated group (1)			Control group (0)			Mean test	
	N	mean	std	N	mean	std	Diff in mean	p-value
Tobin Q	828	1.266	0.688	1269	1.203	0.717	-0.062	0.408
Tobin Q 2010	276	1.338	0.731	423	1.271	0.782	-0.067	0.254
Tobin Q 2009	276	1.305	0.725	423	1.239	0.784	-0.659	0.263
Tobin Q 2008	276	1.154	0.588	423	1.099	0.551	-0.054	0.216

Note: This table reports the mean tests for the variable Tobin Q during the pre-treatment period (2008-2010). It reports the number of observations (N), the mean and the standard deviation (std) of the treated and non-treated group. The last column shows that P-values are greater than 0.1, indicating that the means of Tobin Q of the two groups are not significantly different during the pre-treatment period.

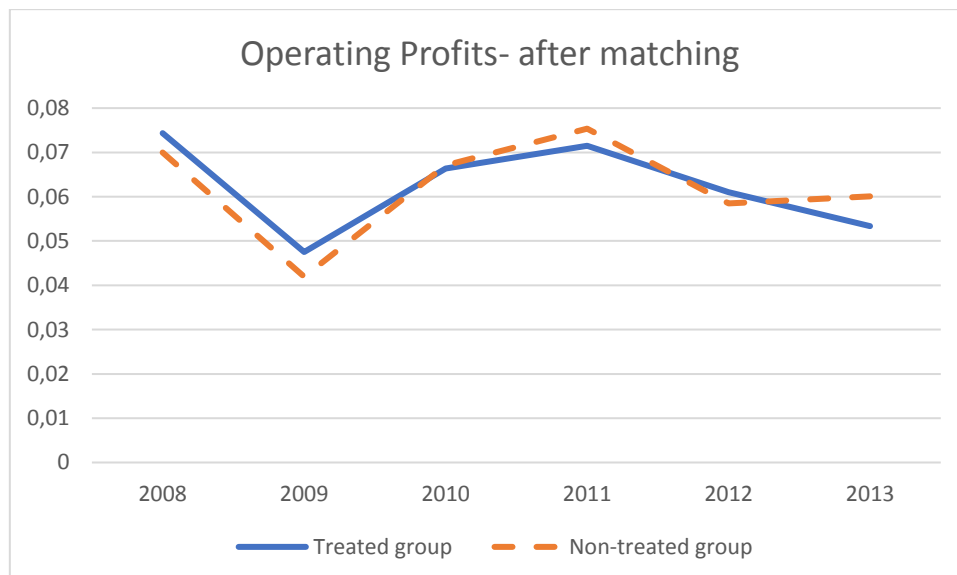**Figure B3.1. Evolution of Tobin Q for treated and non-treated group**
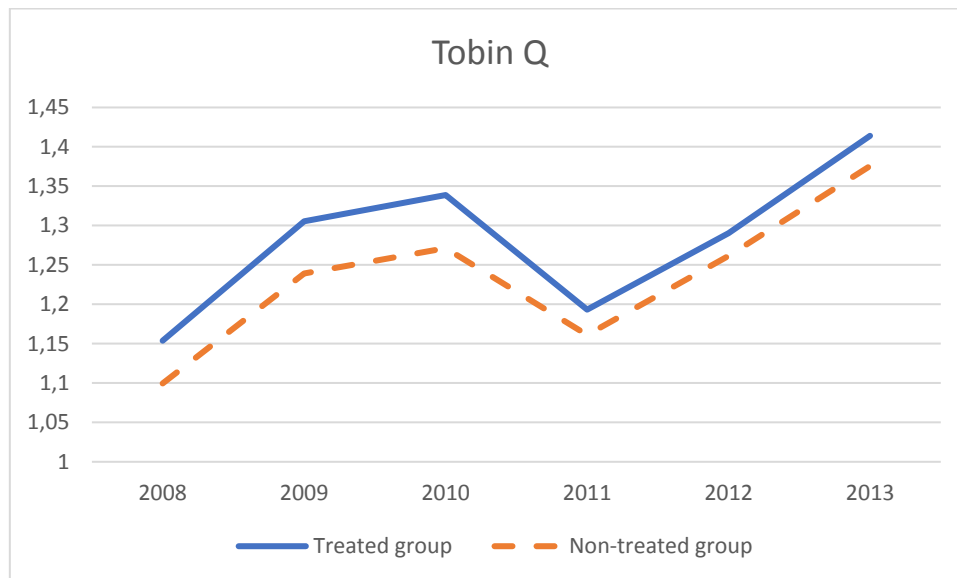
Note: This figure depicts the evolution of the average of Tobin Q for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their Tobin Q during the pre-treatment period.

B3.2. Parallel trend assumption for ROA

Table B3.2. Propensity score matching diagnostics on ROA

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
ROA	Unmatched	828	0.026	1269	0.004	43.5		5.31	0.000
	Matched	828	0.026	2484	0.033	-8.0	81.6	1.775	0.076
ROA 2010	Unmatched	276	0.035	423	0.008	31.3		3.97	0.000
	Matched	276	0.035	828	0.046	-12.1	61.4	-1.49	0.136
ROA 2009	Unmatched	276	0.013	423	-0.001	14.1		1.80	0.072
	Matched	276	0.013	828	0.155	-3.0	78.8	-0.73	0.713
ROA 2008	Unmatched	276	0.031	423	0.005	22.5		2.84	0.005
	Matched	276	0.031	828	0.038	-5.7	74.7	-0.75	0.453

Note: This table reports the mean test and matching diagnostics on the variable ROA during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for ROA before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of ROA of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of ROA after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of ROA of two groups after matching procedure.
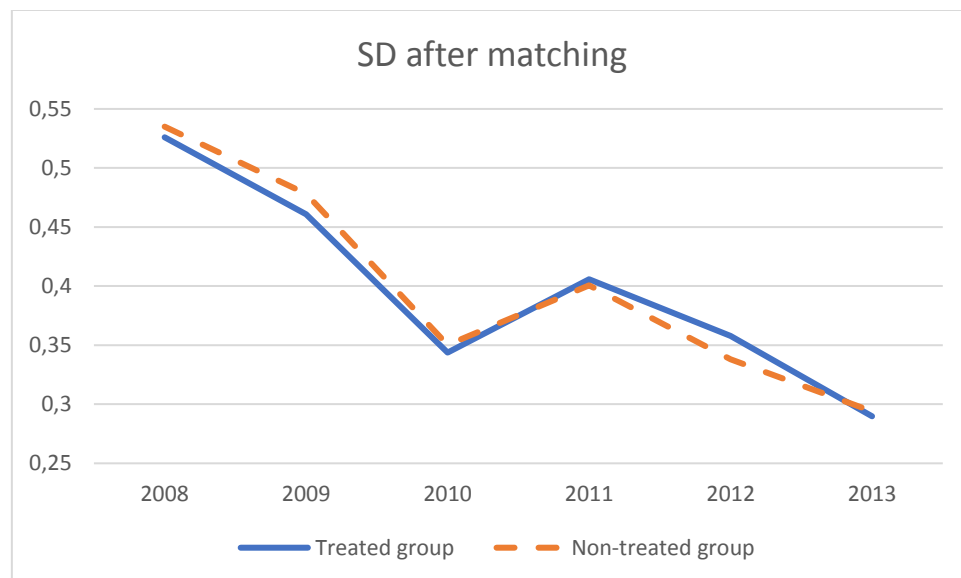
Figure B3.2. Evolution of ROA for treated and non-treated group after matching procedure
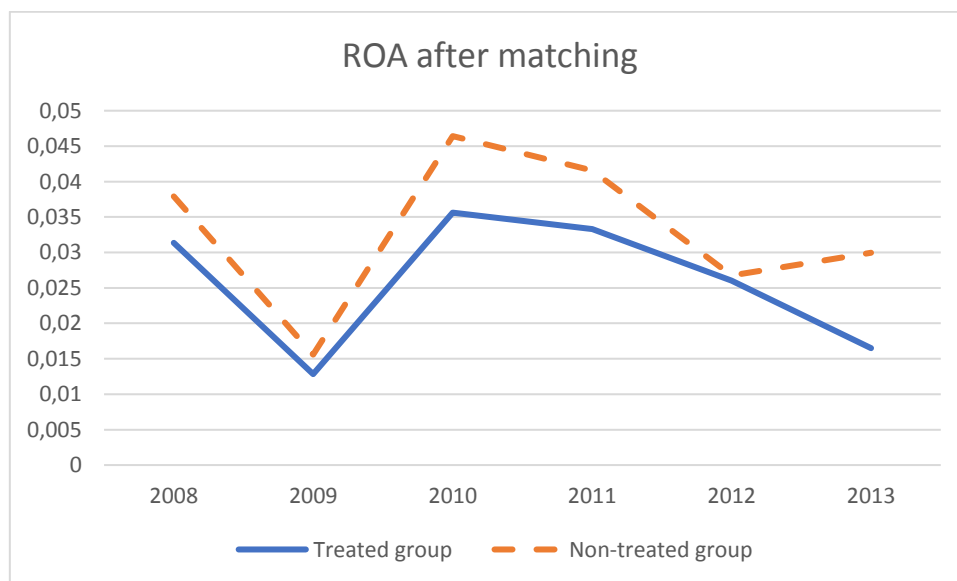
Note: This figure depicts the evolution of the average of ROA for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their ROA during the pre-treatment period after the matching procedure.
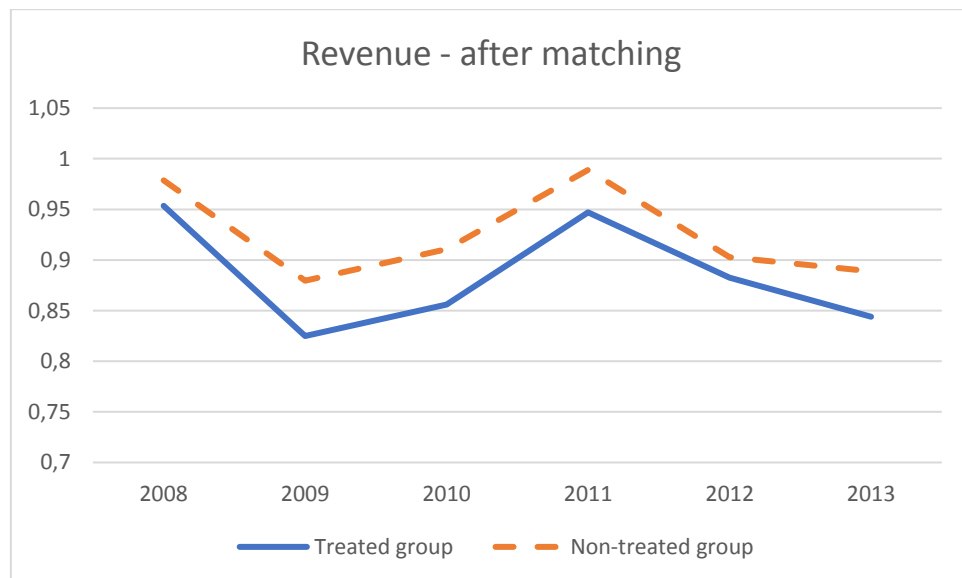
B3.3. Parallel trend assumption for operating profits

Table B3.3. Propensity score matching diagnostics on *Operating profits*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
OperProfit	Unmatched	792	0.062	1341	0.0316	51.8		-7.774	0.000
	Matched	792	0.062	2376	0.0596	-4.4	91.6	-0.63	0.530
OperProfit 2010	Unmatched	264	0.066	451	0.0314	41.9		-5.313	0.000
	Matched	264	0.066	792	0.0671	-0.9	97.8	-0.12	0.902
OperProfit 2009	Unmatched	264	0.047	446	0.0221	30.1		-3.760	0.000
	Matched	264	0.047	792	0.0419	6.6	78.2	0.80	0.423
OperProfit 2008	Unmatched	264	0.074	444	0.0413	34.4		-4.483	0.000
	Matched	264	0.074	792	0.0699	4.9	85.8	0.63	0.530

Note: This table reports the mean test and matching diagnostics on the variable *Operating profits* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *Operating profits* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *Operating profits* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *Operating Profits* after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of *Operating Profits* of two groups after matching procedure.

Figure B3.3. Evolution of *Operating profits* for treated and non-treated group after matching procedure

Note: This figure depicts the evolution of the average of *Operating profits* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *Operating profits* during the pre-treatment period after the matching procedure.

B3.4. Parallel trend assumption for firm risk (SD)

Table B3.4. Propensity score matching diagnostics on *SD*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
SD	Unmatched	828	0.044	1228	0.475	-33.8		-4.11	0.000
	Matched	828	0.044	2484	0.454	2.7	91.9	0.43	0.670
SD 2010	Unmatched	276	0.343	411	0.436	-56.0		-6.79	0.000
	Matched	276	0.343	828	0.350	-3.9	93.0	-0.62	0.536
SD 2009	Unmatched	276	0.461	411	0.487	-14.1		-1.76	0.080
	Matched	276	0.461	828	0.478	-9.0	36.6	-1.09	0.277
SD 2008	Unmatched	276	0.526	406	0.503	13.5		1.68	0.093
	Matched	276	0.526	828	0.534	-5.3	60.7	-0.60	0.548

Note: This table reports the mean test and matching diagnostics on the variable *SD* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *SD* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *SD* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *SD* after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of *SD* of two groups after matching procedure.

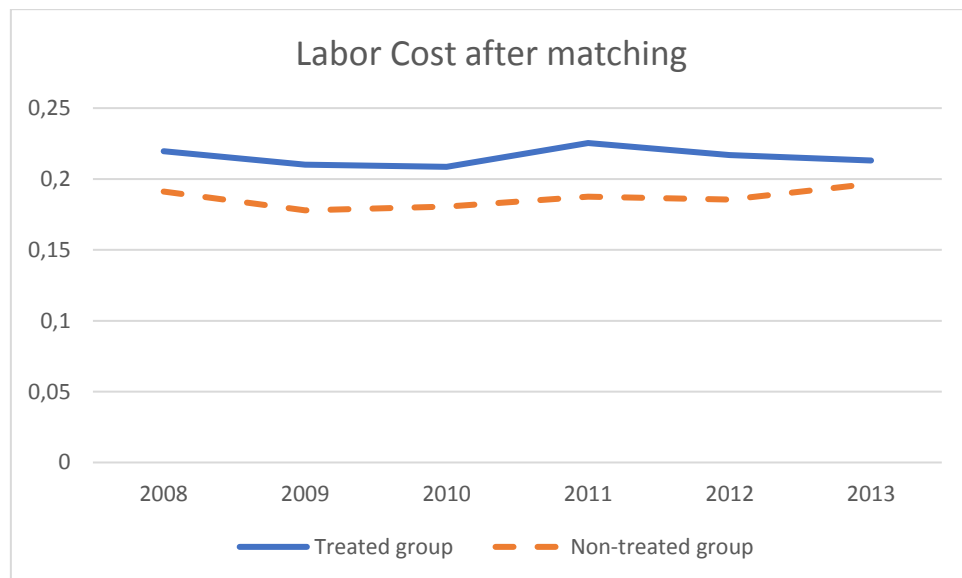**Figure B3.4. Evolution of *SD* for treated and non-treated group after matching procedure**

Note: This figure depicts the evolution of the average of *SD* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *SD* during the pre-treatment period after the matching procedure.

B3.5. Parallel trend assumption for Revenue

Table B3.5. Propensity score matching diagnostics on *Revenue*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
Revenue	Unmatched	792	0.878	1332	0.793	19.4		-3.16	0.001
	Matched	792	0.878	2376	0.922	-6.7	65.7	-0.76	0.450
Revenue 2010	Unmatched	264	0.855	448	0.735	18.7		-2.75	0.006
	Matched	264	0.855	792	0.910	-9.9	46.8	-1.09	0.277
Revenue 2009	Unmatched	264	0.824	443	0.752	12		-1.65	0.098
	Matched	264	0.824	792	0.879	-10.0	16.1	-1.16	0.247
Revenue 2008	Unmatched	264	0.953	441	0.892	6.8		-1.19	0.232
	Matched	264	0.953	792	0.978	-4.0	41.7	-0.47	0.636

Note: This table reports the mean test and matching diagnostics on the variable *Revenue* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *Revenue* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *Revenue* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *Revenue* after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of *Revenue* of two groups after matching procedure.

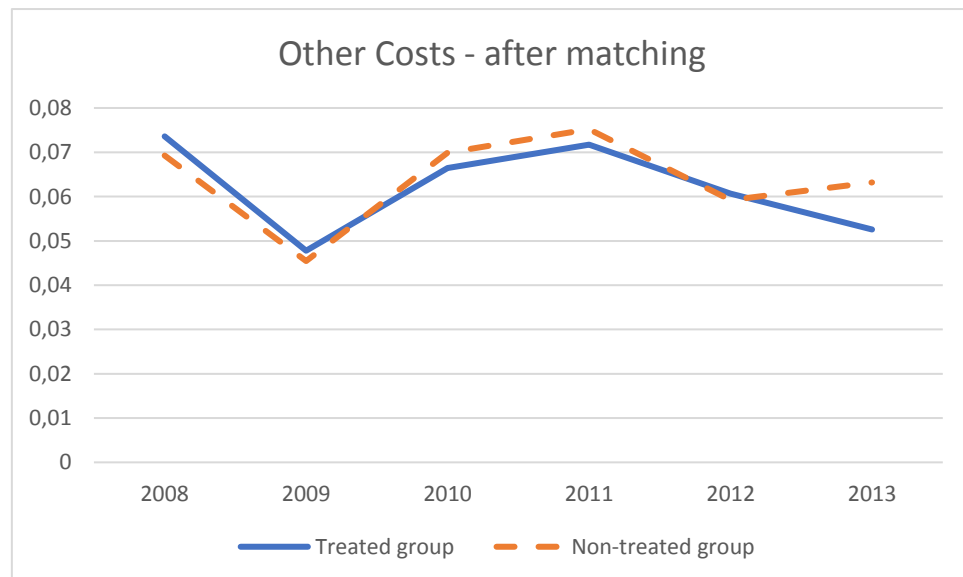**Figure B3.5. Evolution of *Revenue* for treated and non-treated group after matching procedure**

Note: This figure depicts the evolution of the average of *Revenue* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *Revenue* during the pre-treatment period after the matching procedure.

B3.6. Parallel trend assumption for Labor Cost

Table B3.6. Propensity score matching diagnostics on *Labor Cost*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
Labor	Unmatched	825	0.212	1024	0.176	12.6		-4.33	0.000
	Matched	825	0.212	2475	0.206	4.0	68.0	-0.86	0.385
Labor 2010	Unmatched	275	0.208	369	0.167	17.1		-2.97	0.003
	Matched	275	0.208	825	0.200	4.3	75.1	0.51	0.612
Labor 2009	Unmatched	275	0.210	334	0.172	18.3		-2.54	0.011
	Matched	275	0.210	825	0.203	3.8	79.4	0.46	0.647
Labor 2008	Unmatched	275	0.219	321	0.189	15.8		-1.94	0.05
	Matched	275	0.219	825	0.217	1.4	91.0	0.18	0.861

Note: This table reports the mean test and matching diagnostics on the variable *Labor Cost* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *Labor Cost* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *Labor Cost* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *Labor Cost* after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of *Labor Cost* of two groups after matching procedure.

Figure B3.6. Evolution of *Labor Cost* for treated and non-treated group after matching procedure

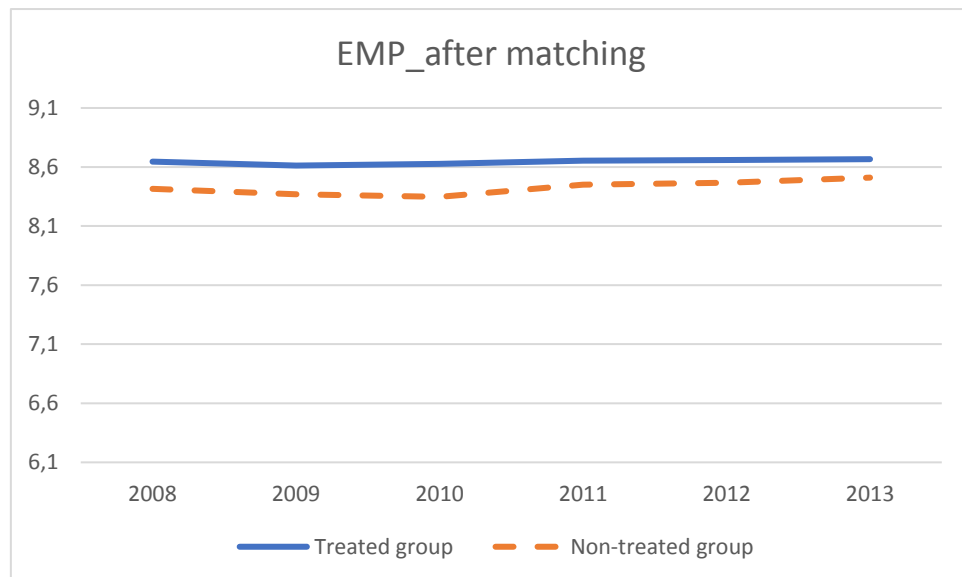
Note: This figure depicts the evolution of the average of *Labor Cost* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *Labor Cost* during the pre-treatment period after the matching procedure.

B3.7. Parallel trend assumption for Other Costs

Table B3.7. Propensity score matching diagnostics on *Other Costs*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
OtherCosts	Unmatched	792	0.062	1344	0.029	49.6		-7.519	0.000
	Matched	792	0.062	2376	0.075	-3.5	92.9	-0.53	0.600
OtherCost 2010	Unmatched	264	0.066	452	0.030	40.2		-5.110	0.000
	Matched	264	0.066	792	0.069	-3.9	90.3	-0.53	0.593
OtherCost 2009	Unmatched	264	0.047	447	0.021	30.0		-3.765	0.000
	Matched	264	0.047	792	0.045	2.7	91.1	0.33	0.744
OtherCost 2008	Unmatched	264	0.073	445	0.037	32.5		-4.239	0.000
	Matched	264	0.073	792	0.069	4.2	87.0	0.57	0.569

Note: This table reports the mean test and matching diagnostics on the variable *Other Costss* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *Other Costss* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *Other Costs* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *Other Costs* after the matching procedure (more than 70%). The p-values in "matched" lines show that there is no significant difference between the means of *Other Costs* of two groups after matching procedure.

Figure B3.7. Evolution of *Other Costs* for treated and non-treated group after matching procedure

Note: This figure depicts the evolution of the average of *Other Costs* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *Other Costs* during the pre-treatment period after the matching procedure.

B3.8. Parallel trend assumption for Employment

Table B3.8: Propensity score matching diagnostics on *Employment*

		Treated group (1)		Control group (0)		Bias		Mean test	
		N	mean	N	mean	%	% reduction	t-stat	p-value
Employment	Unmatched	792	8.628	1313	6.634	98.9		-21.73	0.000
	Matched	792	8.628	2376	8.450	9.8	90.1	1.15	0.252
Employment 2010	Unmatched	264	8.627	442	6.594	98.8		-12.54	0.000
	Matched	264	8.627	792	8.347	13.6	86.3	1.54	0.124
Employment 2009	Unmatched	264	8.612	437	6.630	98.3		-12.43	0.000
	Matched	264	8.612	792	8.368	12.1	87.7	1.39	0.164
Employment 2008	Unmatched	264	8.646	434	6.677	99.4		-12.64	0.000
	Matched	264	8.646	792	8.416	11.6	88.3	1.35	0.178

Note: This table reports the mean test and matching diagnostics on the variable *Employment* during the pre-treatment period (2008-2010). The "unmatched" lines report the mean test results for *Employment* before matching procedure. The values of p-value in the last column in the "unmatched" lines illustrate that, without matching procedure, the means of *Employment* of the treated and the non-treated group are significantly different. The "matched" lines report the results of matching procedure. The column "Bias (%)" shows the percentage of difference of the sample means in the treated and non-treated group. The "Bias" is calculated as a percentage of the square root of the average of the sample variances in the treated and control groups (Rosenbaum and Rubin, 1985). The column "% reduction" reports the percentage change of the bias after matching. A positive value implies that the averages are lying closer to each other after matching (Schepens, 2016). The statistic results show a large reduction in the bias of *Employment* after the matching procedure (more than 80%). The p-values in "matched" lines show that there is no significant difference between the means of *Employment* of two groups after matching procedure.

Figure B3.8. Evolution of *Employment* for treated and non-treated group after matching procedure

Note: This figure depicts the evolution of the average of *Employment* for treated and non-treated group from 2008 to 2013. The figure shows that both groups have a similar trend in their *Employment* during the pre-treatment period after the matching procedure.

GENERAL CONCLUSION

The role of boards of directors, as one of the more important internal corporate governance mechanisms has been the topic of much attention lately. Boards of directors sometimes get credit when things go right, but they are ineluctably to blame when things go wrong. This was the case with the Enron, Worldcom and Parmalat scandals, where the directors were held liable for the fraud that occurred. Consequently, corporate governance and the role of boards of directors are issues of fundamental importance in economics and have been at the center of the policy debate concerning governance reform. Understanding the role of boards of directors is important both for the comprehension of corporate behavior and with respect to setting policy to regulate corporate activities. The objective of this thesis is to contribute to this debate by providing some answers to the question of what makes a board effective in carrying out its monitoring and advisory functions. We focus our analysis on the recommendations of Corporate Governance Codes to include independent directors and to have gender balance to increase the effectiveness of boards in achieving their main functions.

We first examine in Chapter 1 whether board structures that include directors who are related to minority shareholders can be an effective corporate governance mechanism to limit expropriation by controlling shareholders, without exacerbating risk. We focus our empirical analysis on banking firms as they have been severely criticized for their role in the recent financial crisis. Notably, the weak governance of banks is frequently identified as a major cause of the crisis. In this context, we investigate whether the presence of minority directors on the board of banks having a concentrated ownership structure allows to attain the twin objectives of not only enhancing the welfare of shareholders but also of depositors and regulators. For this, we analyse the impact of the presence of directors related to minority shareholders, compared to "independent" directors who are not related to either minority or controlling shareholders, on stock market valuation and bank default risk. We use a manually-collected data set on banks' ultimate control and relatedness of board directors to shareholders for a sample of listed European banks.

Our results show that the presence of minority directors increases market valuation and decreases bank risk. We further find that the presence of "independent" directors does not have any impact on either market valuation or risk-taking. These results suggest that the presence of "independent" directors on boards does not credibly signal a strong board likely to restrain controlling shareholders from expropriation. Allowing minority shareholders to appoint directors therefore seems a more effective way of reducing agency conflicts among bank stakeholders. We furthermore explore two possible channels through which the presence of

minority directors could affect market valuation and risk. Firstly, we find that minority directors reduce related party transactions, indicating that they could reduce the risk of expropriation from controlling shareholders and then generate value to increase bank market valuation. Secondly, our findings show the role of minority directors related to "active" institutional shareholders as a channel to explain the increase in market valuation and the decrease in risk we observed. These results show the importance of including minority directors related to "active" institutional investors when aiming credibly to commit to non-expropriation of minority shareholders while at the same time reducing risk taking incentives. We further find that the inclusion of minority directors is more likely to be successful if bank-level governance is accompanied by a strict supervisory regime. On the contrary, our results also show that effective monitoring of minority directors is less essential in countries with higher levels of minority shareholder protection.

The second chapter is built on the results of the first chapter that the presence of minority directors is considered an effective corporate governance mechanism in banks with concentrated ownership structure. Its objective is to determine the factors, at bank and at country level, that could favor the presence of minority directors on bank boards.

Using the same manually-collected data set as chapter 1, we find that the voting rights of controlling shareholders increase the presence of minority directors on bank boards. Controlling shareholders might favor the presence of minority directors as a signal of non-expropriation behavior to achieve a higher market valuation. On the contrary, our results show that banks with a higher degree of opacity have a smaller number of minority directors on their boards. This result indicates that in banks having a high degree of opacity, controlling shareholders might limit the presence of minority directors if they aim to divert corporate resources and therefore expropriate minority shareholders. Regarding the influence of the institutional environment, we find that higher quality of recommendations on board composition in Corporate Governance Codes and stronger shareholder protection are associated with a higher number of minority directors on bank boards. Codes of Best Practice having high quality recommendations on board composition often provide detailed recommendations on board composition based on ownership structure, and more particularly recommendations about the presence of minority directors on boards. Moreover, high levels of shareholder protection might implement specific requirements to facilitate the nomination of minority directors on boards.

We furthermore find that stronger supervisory regimes contribute to decrease the presence of minority directors, acting as a substitute for minority directors on bank boards.

Finally, in the third chapter, we investigate the impact of gender quotas on firm performance and corporate decisions using Belgium, France and Italy as a natural experiment. More precisely, we investigate whether the increase of female directors imposed by a mandatory gender quota has a negative impact on firm outcomes, in line with the findings of Matsa and Miller (2013) and Ahern and Dittmar (2012), or has a neutral effect as in Eckbo et al. (2018). We furthermore examine whether the changes in board composition after gender quotas might be channels of the impacts of gender quota on firms' outcome.

Our statistical analysis shows that, as expected, the percentage of female directors significantly increases after the implementation of the gender quota. However, a high number of firms do not respect the quota at the date of compliance. Board members' characteristics significantly change after the implementation of gender quotas. Board members have lower average age and lower experience on boards, but they have higher educational levels and higher international exposure. The results of our empirical analysis provide evidence that gender quotas do not have a significant impact on both firm outcomes and corporate decisions. Our results further show that this neutral effect holds after taking into account changes in directors' age, education, nationality or experience.

The empirical results of this dissertation have several policy implications. First, our findings support the decision of policy-makers to use mandatory rules to force firms to achieve gender balance on corporate boards. While we do not find gender diversity to be associated with an increase in firm performance as expected by policy-makers, we do not confirm that the imposition of gender quotas exposes firms to a decrease in performance. Our results suggest that policy-makers create unrealistic expectations for women to boost firm performance, at least in the short- term when the negative side effects of mandatory rules are potentially strongest. Moreover, as we find that a large number of firms do not comply with the quota at the date of compliance, policy-makers should strengthen sanctions to prompt firms to comply with the law.

Our work also has particular policy implications for banking firms. First, our findings suggest that policy-makers should amend Codes of Best Practice for Corporate Governance by making recommendations which are different for financial and non-financial firms. The purpose of corporate governance of banks should have the twin objectives of reducing agency conflicts between not only shareholders and insiders as for non-financial firms, but also between shareholders and depositors, debtholder and regulators. Secondly, policy-makers should also take into account the ownership structure in their Corporate Governance Codes. Some regulators (such as Sarbanes–Oxley Act of 2002 and the NYSE and Nasdaq exchange listing rules) propose a "one-size-fits-all" approach for board composition. However, the different agency conflicts in firms with dispersed or concentrated ownership structure reduces the effectiveness of common corporate governance recommendations. Most Corporate Governance Codes emphasize the role of independent directors who are defined as independent from managers and companies. Such independent directors might be effective in reducing the agency conflicts between managers and shareholders in firms with a dispersed ownership structure, but our findings show that they do not seem to be an effective solution to reduce agency conflicts between controlling and minority shareholders in firms having a concentrated ownership structure. Our work suggests therefore that policy-makers should differentiate recommendations/requirements depending on ownership structure and make specific recommendations for firms with concentrated ownership structure on Corporate Governance Codes. Our work shows that bank authorities should recommend that banks with a concentrated ownership structure should include a minimum of minority directors on their board, in particular if they are related to "active" institutional investors as they might be more willing to challenge controlling shareholders' decisions and limit any expropriation behavior. A final important implication of our work is that regulation and governance cannot and should not be viewed in isolation. Attempts to raise directors' ability soundly and effectively to monitor controlling shareholders are more likely to be successful if bank-level governance is accompanied by a strict supervisory regime.

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Abstract

This thesis aims to provide some answers to the question of what makes a board effective in carrying out its monitoring and advising functions. In Chapter 1, we examine whether board structures that include directors that are related to minority shareholders can be an effective corporate governance mechanism to limit expropriation by controlling shareholders, without exacerbating risk. We focus our empirical analysis of this chapter on banks with a concentrated ownership structure. We find that the inclusion of such minority directors does indeed increase the effectiveness of bank boards, as it results in higher market valuations, without increasing risk. Chapter 2 complements the first chapter to determine the factors, at the bank and at the country level, that could favor the presence of minority directors on bank boards. We find that: (i) the voting rights of controlling shareholders, the quality of recommendations for boards of directors in Corporate Governance Codes and higher shareholder protection are factors that promote the presence of minority directors on bank boards; (ii) the degree of opacity and stronger supervisory regimes reduce the presence of minority directors on bank boards. Our work suggests that bank authorities should recommend banks with concentrated ownership structure to include a minimum of minority directors in their board. In Chapter 3, we investigate the impact of gender quotas on firm performance and corporate decisions using Belgium, France and Italy as a natural experiment. Our statistical analysis shows that the percentage of female directors significantly increases, and board members characteristics significantly change after the implementation of the gender quota. The results of our empirical analysis show evidence that gender quotas do not have a significant impact on both firm outcomes and corporate decisions. Our findings support the decision of policy-makers to use mandatory rules to force firm to achieve gender balance on corporate boards. Our results suggest that policy-makers create unrealistic expectations for women to boost firm performance, at least in the short-run when negative side effects of mandatory rules are potentially strongest.

Keywords: Corporate governance; board of directors; minority directors; gender quotas; market valuation; bank risk; firm performance.

Résumé

L'objectif de cette thèse est d'étudier quelle composition du conseil d'administration permet d'assurer l'efficacité de ses fonctions de surveillance et de conseil. Dans le chapitre 1, nous étudions si la présence d'administrateurs qui sont liés à des actionnaires minoritaires peut constituer un mécanisme efficace de gouvernance d'entreprise pour limiter l'expropriation par les actionnaires majoritaires, sans exacerber les risques. L'étude empirique de ce chapitre est réalisée sur un échantillon de banques avec un actionnariat concentré. Les résultats indiquent que la présence d'administrateurs minoritaires permet d'augmenter l'efficacité du conseil d'administration des banques dans la mesure où elle entraîne une valorisation de marché plus élevée, sans augmentation du risque. Le chapitre 2 complète le premier chapitre afin de déterminer les facteurs, tant au niveau de la banque que du pays, qui peuvent favoriser la présence d'administrateurs minoritaires dans les conseils de banque. Les résultats montrent que: (i) l'importance des droits de vote des actionnaires majoritaires, la qualité des recommandations envers le conseil d'administration dans les codes de gouvernance d'entreprise et le niveau de protection des actionnaires sont des facteurs qui favorisent la présence d'administrateurs minoritaires au sein des conseils des banques; (ii) des régimes de surveillance stricts et une forte opacité réduisent la présence d'administrateurs minoritaires dans les conseils d'administration des banques. Nos travaux suggèrent que les autorités bancaires devraient recommander aux banques avec un actionnariat concentré d'inclure un minimum d'administrateurs minoritaires dans leur conseil d'administration. Dans le chapitre 3, nous examinons l'impact de l'imposition d'un quota minimum de membres de chaque sexe sur la performance des entreprises et leurs décisions, en prenant le cas de la Belgique, la France et l'Italie comme expérience naturelle. Notre analyse statistique montre que le pourcentage de femmes augmente de manière significative et que les caractéristiques des membres du conseil d'administration changent considérablement après la mise en place du quota. Les résultats empiriques montrent que les quotas n'ont pas d'impact significatif sur la performance des entreprises et leurs décisions. Nos résultats appuient la mise en place d'un quota afin d'assurer une représentation équilibrée des hommes et des femmes au sein des conseils d'administration des entreprises. Ils montrent cependant que les régulateurs créent des attentes irréalistes quant à la capacité des femmes à améliorer les performances des entreprises, du moins à court terme lorsque les effets négatifs de l'imposition d'un quota sont potentiellement les plus importants.

Mot clés: Gouvernance d'entreprise; conseil d'administration; directeurs minoritaires ; quotas par sexe; valorisation de marché; risque bancaire; performance d'entreprise.

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