

BOARD OF DIRECTORS STRUCTURE AND FIRM FINANCIAL PERFORMANCE: A QUALITATIVE COMPARATIVE ANALYSIS

Rebeca García-Ramos*, Belén Díaz Díaz

Abstract

Previous research about the effects of board structure and process on the firm financial performance is based on conflicting theoretical perspectives, and empirical results, mostly based on regression analysis, are inconclusive. Building from complexity theory and configurational analysis, this study offers clarity to inconclusive previous empirical results about the link among several board features and firm financial performance. From a sample of 295 non-financial firms from Southern Europe for the period 2001-2010, and by using fuzzy set qualitative comparative analysis, findings of this study show that firm financial performance depends on a complex configuration of several board features (board size, board independence, leadership structure and board activity) and several corporate characteristics (firm size, firm leverage and firm age). This paper has implications for academics. Despite different theoretical arguments and inconclusive results of the wide empirical literature addressing the effect of board characteristics on the firm performance, building from complexity theory this paper adds to our knowledge because it empirically explores under which circumstances different board features should contribute positively or negatively to firm performance. The results of this study have also implications for policy makers and practitioners by providing some useful hints to the controversial relationship between corporate governance and financial performance. In this sense, general corporate governance recommendations must be rethought.

Keywords

Corporate governance; board of directors; financial performance; qualitative comparative analysis; complexity theory.

1. Introduction

The debate about the efficiency of board of directors is one of the main topics in the literature about corporate governance (Uribe-Bohorqueza *et al.*, 2018). That efficiency depends, among other features, on the structure and functioning of the board, which affects corporate objectives and corporate results. Therefore, it is important to give attention to this dimension in order to deep our understanding about the governance of organizations.

Over last decades, several recommendations about the structure and functionality of the board of directors have been made and have been included into soft regulation (codes of corporate governance) (Aguilera & Cuervo-Cazurra, 2009; Aguilera *et al.*, 2016; Cuomo *et al.*, 2016). There are common prescriptions advocating medium sized boards, “more independent and more active boards, as well as an effective separation of the figures of the CEO and the Chairperson of the board” (García-Ramos & García Olalla, 2011: 229). Financial scandals and corporate failures “has exposed the lack of value and insight of much published work in corporate governance” (McNulty *et al.*, 2013: 184). Within academic literature, the relationship between the board of directors and the performance of the firm have been addressed from different theoretical approaches, such as the Agency Theory and the Resource Dependence Theory, among others. However, despite decades of research on corporate governance, empirical evidence about the effect of board structure on firm performance is far from conclusive (Andrés & Santamaría, 2018; Paniagua *et al.*, 2018) and several questions remain unanswered. How does the size of the board/ the presence of independent directors/ the leadership structure / board activity affect the firm performance? On the one hand, many companies are moving away from prescribed models of governance, and there is considerable heterogeneity in the structure adopted by boards. On the other hand, many other companies are adopting governance recommendation as a result of institutional pressure and not by efficiency criteria (Aguilera & Cuervo-Cazurra, 2004; Crespi-Cladera & Pascual-Fuster, 2014; García-Ramos *et al.*, 2017), without taking into account that “externally imposed regulation on board activity can be costly and can have unintended consequences, as Hermalin and Weisbach (2006) argue” (Brick & Chidambaran, 2010: 534). These last facts lead us to question if good governance recommendations should be homogeneous for all companies, that is to say, does one optimal board structure fit all listed organizations?

One of the reasons that could explain inconclusive results of previous research is that they are mainly based on one single theory, either the Agency Theory or the Resource Dependence Theory. According to the Agency Theory, smaller boards, higher board independence and non-duality between the CEO and the chairperson increases firm performance, while Resource Dependence Theory predicts the opposite. This research, based on the Complexity Theory goes further and considers that no single variable can explain firm performance but a combination of

them and, therefore, the arguments of both theories (Agency and Resource Dependence) can be validated depending on the variables that are included in each possible combination.

Another reason that could explain inconclusive results of previous research is the methodology used (Cuadrado-Ballesteros *et al.*, 2017). In this sense, the multiple regression analysis is one of the most common technique used by researchers to address the relationship between the board of directors and the firm performance. The reality described by multiple regression analysis is based on simple, linear, additive, unifinal and symmetric relationships (Fiss, 2007; Woodside, 2013). However, relationships observed in the real world are often more complex than regression models suggest. Those relationships are due to causality, which, from the configurational perspective, is complex (Misangyi *et al.*, 2017). “Reality usually includes more than one combination of conditions that lead to high values in an outcome condition (i.e., high values in a dependent variable); thus, reality usually indicates that any insightful combination of conditions has an asymmetrical relationship with an outcome condition and not a symmetrical relationship” (Woodside, 2013: 464). Given these concerns, “a new research method is necessary to provide valid findings” (Huang *et al.*, 2018: 171). As Ragin (2010) posits, by using Qualitative Comparative Analysis (QCA), which is an increasingly popular method in corporate governance research (García-Castro & Aguilera, 2014; Kraus *et al.*, 2016; Samara & Berbegal-Mirabent, 2018), it is possible to analyse causal complexity that characterize economic relationships in organizations.

Following recent calls to move beyond multiple regression analysis (Woodside, 2014) and to promote a greater use of qualitative methods in corporate governance research (Fiss, 2011; McNulty *et al.*, 2013), the aim of this paper is to empirically analyse different combinations of board and corporate features that may result in high levels of firm financial performance. To that end, we use QCA, which is based on complexity theory and considers complex causality (Ragin, 2008; Woodside, 2013; Misangyi *et al.*, 2017). Although qualitative studies on corporate governance have grown in number since the 1990s, they still remain a small fraction of the published papers (McNulty *et al.*, 2013).

In the development of our research questions, we applied fuzzy sets QCA (fsQCA). To the best of our Knowledge, this is the first paper that applies a configurational analysis framework by using fsQCA in the field of the relationship between the board of directors and the firm performance in the context of European firms. In particular, we analyse the effect of four board characteristics on the firm financial performance, those being: board size (number of directors sited on the board), board independence (proportion of independent directors over total number of directors on the board), leadership structure (whether the CEO is or not the same person as the chair of the board), and board activity (number of meeting per year by the board). We chose these four board features because they are four of the most studied board characteristics traditionally

linked to the firm performance by using regression analysis. In our empirical analysis, we follow Cuadrado-Ballesteros *et al.* (2017) methodology, who show, for a sample of US companies, that Corporate Social Responsibility (CSR) performance depends on a complex configuration of board and corporate attributes.

Our research is based on a sample of 294 non-financial Spanish and Italian listed firms during the period 2001-2010. This paper will focus on Southern European firms that operate under French civil law (Spain and Italy) where investor protection is low and where firms tend to have higher ownership concentration and a higher proportion of family controlling shareholders, as compared to the widely studied American and Anglo-Saxon markets. It is important to explore this context so as to model optimal board behaviour and determine the extent to which the relationship between corporate governance and performance depends on the identity of the main shareholder (family or non-family firms), a fact that has been forgotten in Governance Codes until now.

In fact, Governance Codes recommendations on board features consider board features as independent of each other and have been generalised to every legal system. They can be summarised as follows: 1) board size should be adequate to meet business requirements, but not so large as to be unwieldy; 2) independent directors should be present in a significant proportion in order to improve the quality of the Board of Directors; 3) the roles of chairman and chief executive should not be held by the same individual (CEO duality); 4) boards should meet often enough to discharge board duties effectively.

In a general context, OECD¹ and European² governance recommendations establish the need for company boards to have an adequate number of independent directors (without specifying the suitable percentage), and to disclose the different roles and responsibilities of the CEO and Chair (leadership structure). No recommendations are made regarding board size or board meetings. Focusing on Southern European countries, the Italian Governance Code³ is along these same recommendations. However, the Spanish Governance Code⁴ is the most specific on these topics. It recommends a board size between 5 and 15 members, having at least half the board being independent directors (one third in companies with controlling shareholders) and holding at least eight board meetings per year. Moreover, it states that, in those companies where the chairperson is also a company executive, a lead independent director should be appointed and additional powers should be given to him/her.

¹ [G20/OECD Principles of Corporate Governance](#), 5 September 2015. The first OECD Governance Code was presented in 1999.

² [EVCA Corporate Governance Guidelines](#) (June 2005) or [EFAMA Code for External Governance](#), 6 April 2011. The first European Governance Code was presented in 1995.

³ Italy [Codice di autodisciplina \('Codice'\)](#), 15 July 2015. The first Italian Governance Code was presented in 1999.

⁴ [Código de buen gobierno de las sociedades cotizadas](#) (February 2015, last updated in June 2020). The first Spanish Governance Code was presented in 1998.

These existing differences among recommendations in Governance Codes concerning the same Board features and the fact that they should be considered in conjunction (not in isolation) motivates this research, whose results will definitely contribute to rethink Codes.

The results of this research show that no single board nor corporate characteristic explain firm financial performance. Depending on the configuration of board and corporate features, larger or smaller boards, with more or less independent directors, which meet more or less often and with dual or non-dual leadership structures, can lead to either positive or negative firm financial performance. As different combinations of simple antecedent conditions related to board and corporate characteristics explain firm financial performance, findings confirm complex paths. More specifically, results give support to conjunction or complexity, since firm performance has not a single cause, but it results from the interdependence of several board and corporate features. Moreover, equifinality is also confirmed, since different combinations of board and corporate features lead to the same level of firm financial performance. In addition, asymmetry is also supported by the data in our sample, because an individual board/corporate characteristic may contribute both to high and low levels of firm performance and even may be unrelated to firm financial performance. In this vein, we report the existence of contrarian cases in our sample, mostly ignore by researchers in previous studies, “even though examining such cases is highly informative” (Woodside, 2014: 2496). Finally, causal asymmetry is confirmed, since those combinations of board/corporate characteristics leading to high firm financial performance are not exactly the opposite configurations to those leading to low levels of firm financial performance.

With this study we contribute to corporate governance research, a topic that, due to its connection to law, regulation, and policy reform, ranges across macro-national and pan-national institutions and is of major social, economic, and political significance on a global scale (McNulty *et al.*, 2013). Using QCA, this study aims to outline a new way to model firm performance in terms of governance and corporate effects. “The application of QCA’s theoretical and methodological approach enables researchers to conceptualize and embrace the facets of causal complexity— conjunction, equifinality, and asymmetry— to advance a neo-configurational perspective” (Misangyi *et al.*, 2017: 276), and to “more adequately theorize and empirically examine causal complexity” (Misangyi *et al.*, 2017: 257).

To achieve our aims, the remainder of the paper is structured as follows. In the second section, we review the literature on the relationship between the board of directors and the firm performance. In section three, we present the theoretical background and hypotheses development based on Complexity Theory. In the fourth section, we describe the research method. In section five and six respectively, we present our results and the discussion and main conclusions.

2. Literature Review

A large number of papers have addressed the effect of different board features on firm performance. However, results of empirical research are inconclusive regarding board size, board independence, leadership structure and board activity.

2.1. Board size

As previous literature posits, board size is an important board characteristic in order to achieve an optimal corporate governance structure (Paniagua *et al.*, 2018; Tulung & Ramdani, 2018). It “depends on the level of goal alignment between owners and managers” (Jaskiewicz & Klein, 2007: 1080). There are confronted views about the effect of board size on firm performance. From a theoretical point of view, according to the agency theory, when shareholders cannot effectively control managers, boards should have a relatively large size that primarily provides a monitoring role. From this view, the relationship between board size and firm performance is expected to be positive. According to resource dependence theory, that relationship is also expected to be positive. By incorporating the role of the board as a resource provider, an additional director brings more human and social capital to a company (Pfeffer, 1972) and increases board information and specific knowledge about the business, thus improving the quality of those strategic decisions that ultimately impact firm performance (Hillman & Dalziel, 2003). Dalton *et al.* (1999), having conducted a meta-analysis of 27 studies, found that larger boards were associated with higher levels of firm performance. More recent studies also support this hypothesis (Beiner *et al.*, 2006). However, although having a greater number of directors increases supervision, oversized boards can result in added costs derived from free-rider conflicts as well as from problems of control, coordination and flexibility in the decision making process (Lipton & Lorsch, 1992; Jensen, 1993; García-Ramos *et al.* 2017), which hamper the effectiveness of board monitoring and result in poorer firm performance. The size of the board is only explicitly addressed in the codes of Spain and the US, setting both a medium size board between 5 and 15 members (Andrés & Santamaría, 2018), whereas other countries recommend that board size should be adequate to meet business requirements, but not so large as to be unwieldy.

2.2. Board independence

Despite increasing interest from academics, practitioners and regulatory bodies, empirical research has failed to offer conclusive evidence about the effect of independent directors on the firm performance (Andrés & Santamaría, 2018; Masulis & Zang, 2019). Conflicting results can be found in the literature (Dalton *et al.*, 1998; Busenbark *et al.*, 2016; Krause *et al.*, 2017; Uribe *et al.*, 2018). Whereas some authors find a positive relationship (Baysinger & Butler, 1985; Pearce & Zahra, 1992; Jackling & Johl, 2009; Pombo & Gutiérrez, 2011; Dahya *et al.*, 2008; Aggarwal

et al., 2008; Bruno & Claessens, 2010; Liu *et al.*, 2015), others conclude a non-significant relationship (Hermalin & Weisbach, 1991; Villalonga & Amit, 2006; Volonté, 2015) and even a negative relationship (Muth & Donaldson, 1998; Bebcuk & Cohen, 2005; Klein *et al.*, 2005; Shan & McIver, 2011) between these two variables. Based on the monitoring board role, a positive relationship between company performance and board independence is expected. From the agency theory perspective, independent outside directors face fewer potential conflicts of interest (Fama, 1980), so “they are more likely to support shareholder interests, exert control, monitor the execution of firm responsibilities (Huang, 2010)” (García-Ramos & García-Olalla, 2011: 223) and provide critical assessment of management's performance (Daily & Dalton, 2015). Executive directors, however, are characterized by their lack of independence from the Chief Executive Officer of the company (CEO) and by having own motivations (Dalton *et al.*, 1999). The resource dependence theory states that the appointment of independent outside director can also be of importance to the role of the board as resource provider, as they provide valuable linkages to important external resources (Hillman & Dalziel, 2003; Daily & Dalton, 2015). Comprehensive and complementary knowledge provide by outside directors, obtained through university training and external prior work experience, can be used by managers to formulate and implement business strategies. However, as McVey *et al.* (2005) and Ford (1992) point out, executive directors are also necessary for the board to effectively perform all their roles, because it is possible that independent directors do not have the necessary experience and knowledge of relevant matters of the firm and its stakeholders. Moreover, it would also be difficult for them to get this important knowledge about the business. As executive directors spend their working lives at the company they help to manage, their specific knowledge makes them able to provide resources efficiently and to favour the transmission of information between directors and managers (Carpenter & Westphal, 2001; Donaldson & Davis, 1994; Raheja, 2005). Thus, based on this resource provision function, both a positive or a negative relationship between company performance and board independence can be expected depending on the proportion of independent directors on the board. Despite confronting arguments for and against independent directors, and despite non-conclusive results of empirical literature, the appointment of independent directors on the board is a key issue in codes of good governance. In general they recommend independent directors to be present in a significant proportion in order to improve the quality of the board of directors.

2.3. Leadership structure

Another governance issue that has received increasing attention over last decades is the separation of the roles of CEO and board chairperson (Daily & Dalton, 2015; Chan *et al.*, 2018; Wang *et al.*, 2019). In general, good governance recommendations claims for an effective separation of the figures of the CEO and the chairperson of the board. This view is consistent with agency theory,

from which non-duality may represent an important control check and reflects a desire to limit the power of board leaders. From this perspective, if the same person performs both roles (CEO duality), the board of directors may be ineffective in identifying management opportunistic behaviour (Daily & Dalton, 1993; Jensen, 1993), and CEO entrenchment can increase. In this sense, “duality reflects lower board oversight and stronger CEO power, while non-duality reflects higher board oversight and weaker CEO power” (Krause *et al.*, 2017: 257). On the basis of these arguments, the relationship between CEO duality and firm performance is expected to be negative. However, from the resource based view, duality may have important advantages for the firm, in particular regarding the role of the board as resource provider. As Adams & Ferreira (2007) suggest, if the CEO is also the chairperson of the board, he/she will make his/her knowledge available to directors, allowing them to provide resources more effectively. Otherwise, splitting the CEO and board chair positions would lead to CEO-chair information asymmetries (Brickley *et al.*, 1997; Krause *et al.*, 2017). Based on these arguments, the relationship between CEO duality and firm performance is expected to be negative. Nevertheless, from an empirical point of view CEO duality has not been shown conclusively either to promote or to hinder firm performance (Andrés & Santamaría, 2018; Krause *et al.*, 2017; Busenbark *et al.*, 2016). There is evidence that CEO duality has a positive effect (Donaldson & Davis, 1994; Finkelstein & D’Aveni, 1994; Kota & Tomar, 2010), a negative effect (Coles *et al.* 2001; Rechner & Dalton, 1991; Daily & Dalton, 2015) and an insignificant effect (Baliga *et al.*, 1996; Brickley *et al.*, 1997; Jackling & Johl, 2009).

2.4. Board meetings

Economists and policy makers have debated whether board activity benefit or harm firms (Brick & Chindambaran, 2010). Academic literature has usually consider the frequency of board meetings as a measure of outside directors’ involvement and commitment to monitor top management, and has been used as a proxy for active boards, board diligence and board effectiveness (Min & Chizema, 2018). The frequency with which boards meet is considered as a key instrument for directors to collect information, make decisions and monitor the management (Chou *et al.*, 2013; Boivie *et al.*, 2016). Although its importance has been considered by many authors, empirical evidence of its relationship with firm performance is limited. As Vafeas (1999) suggests, we can expect both a positive and a negative relationship between board meetings and firm performance. On the one hand, the frequency of board meetings can be considered as a measure of board effectiveness in carrying out the tasks of monitoring and providing resources, and therefore as positively influencing company performance (Andrés *et al.*, 2005; Brick & Chindambaran, 2010; Lipton & Lorsch, 1992; Zattoni *et al.*, 2015; Boivie *et al.*, 2016). Meetings provide directors with an opportunity to exchange and discuss their views on how they want to supervise managers and handle strategic issues for the firm (Tuggle *et al.*, 2010). As Liu *et al.*

(2016: 379) pointed out, “because board meetings gather and present information from various sources (investors, managers, and other independent directors), this broad level of information enables independent directors to make more informed decisions”. However, board members cannot be expected to monitor a firm, address strategic issues or reach effective decisions if not given sufficient time in board meetings to discuss and analyse several alternatives (Huse, 2009). If outside directors do not use the limited time they spend together to engage in the meaningful exchange of ideas amongst themselves or with management, board meetings may not necessarily be useful (Lin *et al.*, 2014). As Jensen (1993) has pointed out, “routine tasks absorb much of a board’s meeting time and thus limit the opportunities for outside directors to exercise meaningful control over management” (Jackling & Johl, 2009: 496). Furthermore, taking into account the costs involved in terms of time, travel expenses and allowances paid to directors, very frequent meetings may not be beneficial (Lin *et al.*, 2014). Given these concerns, a higher meeting frequency is likely a response to poor company performance, and the relationship between the two variables may be negative. In general, codes of good governance recommend that boards meet often enough to discharge board duties effectively.

3. Theoretical background and hypotheses development

3.1. Complexity Theory:

Most research addressing the relationship between corporate governance characteristics and firm performance has used symmetrical tests, such as multiple regression models, ignoring the complexities that characterized real relations in the economy (Woodside, 2014). Organizations are “characterized by an assemblage or combination of parts whose relations make them interdependent (Scott, 1998: 83) and whose outcomes cannot be fully inferred from their constitutive parts analysed in isolation (Simon, 1996:184)” (Misangyi *et al.*, 2017: 258).

Under the configurational analysis perspective, complexity theory stresses that causality is complex and underline four main propositions to be tested when studying the antecedent conditions that may have an influence on a certain outcome.

The first proposition is “conjunction, which means that outcomes rarely have a single cause but rather result from the interdependence of multiple conditions” (Misangyi *et al.*, 2017: 256). In other words, “no single antecedent condition is a sufficient or necessary indicator of a high score in an outcome condition” (Wu *et al.*, 2014:1).

The second proposition is “equifinality, which entails more than one pathway to a given outcome” (Misangyi *et al.*, 2017: 256). In other words, the idea that “a system can reach the same final state from different initial conditions and by a variety of different paths” (Katz & Kahn, 1978: 30; in Fiss, 2011). This proposition implies that “a few of many available complex configurations of

antecedent conditions are sufficient indicators of high scores in an outcome condition” (Wu *et al.*, 2014:1)

The third proposition is “asymmetry, that is, attributes found to be causally related in one configuration may be unrelated or even inversely related in another” (Misangyi *et al.*, 2017: 256). This proposition implies that “contrarian cases occur, that is, low scores in a single antecedent condition associates with both high and low scores for an outcome condition for different cases” (Wu *et al.*, 2014:1). “Contrarian cases are individuals [...] having an antecedent condition with a negative (positive) association with an outcome condition, while the majority of other cases show a positive (negative) antecedent– outcome main-effect relationship. Most studies using symmetric tests (e.g. MRA) fail to recognize or account for contrarian cases” (Hsiao *et al.*, 2015: 610). Thus, contrarian cases “represent relationships that are contrary to those indicated by regression models” (Cuadrado-Ballesteros *et al.*, 2017:3).

The fourth proposition is “causal asymmetry (Ragin, 2008), that is, the idea that the causes leading to the presence of an outcome of interest may be quite different from those leading to the absence of the outcome” (Fiss, 2011: 394). In other words, “accurate causal models for high scores for an outcome condition are not the mirror opposites of causal models for low scores for the same outcome condition” (Wu *et al.*, 2014:1). “This view stands in contrast to the common correlational understanding of causality, in which causal symmetry is assumed because correlations are by their very nature symmetric; for example, if one models the inverse of high performance, then the results of a correlational analysis are unchanged except for the sign of the coefficients” (Fiss, 2011: 394).

3.2. Complexity theory and firm performance:

Despite over last few decades a growing body of research has analysed the effect of board of directors on firm performance, empirical evidence is inconclusive. One of the reasons that could explain inconclusive results of previous research is due to the empirical approach adopted, mostly based on symmetric test, such as multiple regression analysis (Cuadrado-Ballesteros *et al.*, 2017). As Woodside *et al.* (2013: 464) explain, “symmetric relationship implies that high values of an antecedent condition (X) are both necessary and sufficient conditions for high values of an outcome (Y) to occur, and that low values of Y occur with low values of X. However, when relationships are asymmetric, high values of X are sufficient for high values of Y to occur but high values of X are not necessary for high values of Y to occur”.

The financial performance of firms is a complex economic reality that cannot be explained unilaterally by a single factor, but by the interaction of multiple variables. In addition, following Cuadrado-Ballesteros *et al.* (2017: 4), we propose that “the board of directors must be considered as a whole, as it is more than the sum of its parts, and decisions taken by the board do not depend

on individual attributes” (i.e., size, independence, leadership and activity), but on different combinations of these features. Moreover, the firm performance cannot be analysed without taking into consideration specific corporate characteristics of the company, such as its size, leverage and age.

Therefore, by using the logic of such theory, it is possible to conceptualize cases of firm performance as configurations of causal (board and corporate) attributes. From the Complexity Theory perspective, cases of firm performance can be conceptualized as combinations of governance and corporate characteristics of interest “rather than as a disaggregation of their attributes that are treated in isolation from each other as is done in conventional regression approaches (Ragin & Robinson, 2009)” (Misangyi *et al.*, 2017: 60). From this approach, different combinations of board features (such as board size, board independence, leadership structure and board activity) and corporate characteristics (such as firm size, firm leverage and firm age) could lead to a high (low) level of firm performance. By doing so, we aim to conceptualize and analyse the causal complexity underlying the firm performance phenomena (Fiss, 2011).

Based on arguments exposed above and consistently with key propositions from complexity theory, we propose the following hypotheses to be tested:

Hypothesis 1. Based on Conjunction or Complexity proposition: No single board/corporate characteristic is a sufficient or necessary indicator of a specific level of firm performance, but performance is explained from the interdependence of multiple board / corporate characteristics.

Hypothesis 2. Based on Equifinality proposition: Different combinations of board/corporate characteristics may lead to the same level of firm performance.

Hypothesis 3. Based on Asymmetry proposition: An individual board/corporate characteristic can contribute to both high and low levels of firm performance and even be unrelated to firm performance.

Hypothesis 4. Based on Causal asymmetry proposition: Combinations of board/corporate characteristics leading to high levels of firm performance are not the mirror opposite of those combinations leading to low levels of firm performance.

4. Research method

4.1. Data and Sample

Our sample is compounded of 295 European publicly traded firms from Spain and Italy during the period 2001-2010. We focused on these two countries because they both are framed within the French Civil Law, which implies that ownership concentration is high and protection to minority investors is low (La Porta *et al.*, 1999). In this sense, with the aim of having a final sample as homogenous as possible in terms of ownership structure, all the firms in our sample

have a concentrated ownership structure (Calabrò *et al.*, 2016) and an ultimate owner with at least 25% of property rights (García-Castro & Casasola-Martínez, 2011; Ampenberger *et al.* 2013; García-Ramos *et al.*, 2017). To that end, we follow the control chain methodology of La Porta *et al.* (1999), which allows us to identify the ultimate owner of a firm, that is, the shareholder who really has the control of the firm⁵. We use information provided by the supplier Bureau Van Dyck on ownership structures, and on public information on significant shareholders available from stock market regulators and/or company websites.

We exclude financial firms of our analysis because they are very different to non-financial firms (La Porta *et al.*, 1999; Cuadrado-Ballesteros *et al.*, 2017; García-Ramos *et al.*, 2017). We have an unbalanced panel of 2.383 observations.

4.2. Variables

In order to construct the variables to be used in the empirical analysis, we use several sources of information. First, information on boards of directors and management was collected from the firms' reports on corporate governance, which are provided by the Spanish and Italian regulators of stock markets (Spain: Spanish National Commission of Stock Market (Comisión Nacional del Mercado de Valores); Italy: Italian National Commission for Companies and the Stock Exchange (Commissione Nazionale per le Società e la Borsa)). Second, for market and financial data we used the Amadeus Database, the firms' financial reports and the data from the stock exchanges in the two countries under analysis.

Outcome:

The outcome measure is the financial performance of firms, proxied by Tobin's Q. "We approximated this variable by using each firm's market to book value ratio (Q), which we calculated as the book value of total assets minus the book value of common equity plus the market value of common equity divided by the book value of total assets" (García-Ramos *et al.*, 2017: 138).

We have opted to use Tobin's Q rather than other performance variables such as ROA because, as Hofer (1983, p. 44) stated, "... it seems clear that different fields of study will and should use different measures of organizational performance because of the difference in their research questions". Tobin's Q is a market based measure of performance. Therefore, as we are addressing our research within the context of listed firms, we consider Tobin's Q to be the most suitable measure of firm financial performance. Moreover, Tobin's Q is the most used dependent variable in research on board effectiveness and, in a broader sense, in research on the effectiveness of corporate governance mechanisms for both financial and non-financial firms (e.g., Aggarwal *et*

⁵ The control chain methodology of La Porta *et al.* (1999) is based on analyzing the complete tree of the ownership structure of the companies until reaching the last link, in which the last owner is located, that is, the shareholder who really has the control of the firm.

al., 2019; Anderson & Reeb, 2004; Andrés et al., 2005; Baliga et al., 1996; Cheng, 2008; Jackling & Johl, 2009; Kota & Tomar, 2010).

Causal conditions:

We use 7 causal conditions (antecedent conditions) to explain firm performance.

First, the selection of board's characteristics is done according to previous literature (Andrés et al., 2005; Cheng, 2008; Jackling & Johl, 2009; Kota & Tomar, 2010; García-Ramos et al., 2019):

- Board size: The total number of directors on the board of each company.
- Board independence: The number of independent directors⁶ divided by the total number of directors on the board of each company.
- Leadership structure: A dummy variable that takes a value of 1 when the CEO and the chairperson of the board are the same person and a value of 0 otherwise.
- Board activity: The number of meetings held each year by the board of each company.

Second, corporate characteristics have also been selected consistent with prior studies of corporate governance and performance (García-Ramos & García-Olalla, 2014):

- Firm size: The natural logarithm of the value of total assets. Previous studies have found that organisational size is related to organisational performance for various reasons, including diversification, economies of scale and access to less expensive funding, among others, which suggests that size should be taken into account when explaining firm performance (Andrés *et al.*, 2005; Cheng, 2008; Huang, 2010; Kota & Tomar, 2010).
- Firm leverage: The ratio of total debt to total assets. This antecedent condition was included because firm debt provided a mechanism for curbing agency costs (Andrés *et al.*, 2005; Cheng, 2008; Jackling & Johl, 2009).
- Firm age: The number of years since the firm's founding. This antecedent condition was included to consider company life cycle and growth prospects (Forbes & Milliken, 1999; Anderson & Reeb, 2003; Miller *et al.*, 2007).

4.3. Methodology

In order to address our research questions, to explore whether high/low levels of firm performance can be achieved through the different combination of several board/corporate contingencies, we use Charles Ragin's (1987, 2000, 2008) QCA methodology, which is a mix qualitative and quantitative method. This methodology relies on complexity theory tenets of contingency

⁶ Independent directors considered in the study meet the following requirements: "1) not to be a member, or an immediate family member of a member, of the management of the company; 2) not to be an employee of the company or a company in the group; 3) not to receive compensation from the company or its group other than directorship fees; 4) not to have material business relations with the company or its group; 5) not to have been an employee of the external auditor of the company or of a company in the group; 6) not to exceed the maximum tenure as a board member; and 7) not to be or represent a significant shareholder" (OECD, 2019). Therefore, proprietary outside directors have not been classified as independent directors in this study.

conditions and focuses on asymmetric relationships. It allows to overcome several disadvantages associated with the most common methodology used by researchers, multiple regression analysis (Cuadrado-Ballesteros *et al.*, 2017), which do not take into account complexity that exists in the real world and which is also present in the data sets used by researchers (Woodside, 2017). Firstly, multiple regression analysis is a symmetric test that evaluates the effect of an independent or explicative variable on a dependent variable. This regression approach assumes that the effects of explicative variables on the independent variable are both sufficient and necessary conditions to explain its behaviour. “However, most real life events and associations are asymmetrical (Ragin, 2008), and the same cause can produce different effects in specific circumstances” (Cuadrado-Ballesteros *et al.*, 2017: 529). In this context, when using QCA researchers do not need to specify a causal model that better explain the behaviour of the independent variable for their data sets. What they need to do is “to determine the number and character of the different causal models that exist among comparable cases (Ragin 1987: 167)” (in Rihoux & Marx, 2013: 168). Secondly, multicollinearity is usually present when a high number of variables are included in the regression model. This implies that it is possible that, despite the model explains a considerable part of the variance in the dependent variable, the net effect of all independent variables included in the model is not significant; and even that the effect of an independent variable on the dependent one turns from significant to non-significant depending on which other variables are included in the model (Woodside, 2013). Thirdly, whereas equifinality hardly plays a role in multiple regression analysis, it is the core concept in QCA, which assumes that the same level of an outcome can be achieved through a few paths (Vis, 2012). However, regression analysis considers the effect of an explicative variable on a dependent variable in isolation, that is, how the independent variable changes when the explicative variable changes, being constant the values of all the rest of variables on the causal model. In Fiss (2007: 2007) own words, “the classic linear regression model treats variables as competing in explaining variation in outcomes rather than showing how variables combine to create outcomes. Moreover, contrarian cases analyses, which are ignore by researchers when using symmetric tests, confirm that cases having low X with high Y and high X with low Y occur even when the relationship between X and Y reported by a traditional regression analysis is positive or negative and the significance of that relationship is high (Woodside, 2017).

QCA is a set theoretic method based on Boolean algebra that “(a) treats cases as set theoretic configurations, (b) uses calibration to measure cases’ set memberships in the attributes and outcomes of theoretical interest, (c) assesses causality through the necessity and/or sufficiency of attributes for outcomes of interest, and (d) incorporates counterfactual analysis given the limited diversity inherent in social phenomena” (Misangyi *et al.*, 2017: 260).

In order to perform QCA to test our hypotheses, we use the software program fsQCA (Ragin *et al.*, 2006; Ragin, 2006). Its main concepts are as follows (Schneider & Grofman, 2006): “fsQCA focuses on complex causality or multiple interacting conditions that create system outcomes; different conditions can lead to the same outcome (equifinality); analysed data are qualitative in nature and data expresses membership of cases in sets; the conceptualization of relations between conditions and outcomes is as a set relation (not a covariation); and the interpretation of results is in terms of necessary and sufficient conditions” (Tomasino, 2015: 2). “Necessity means that an antecedent condition must exit for an outcome to occur, and sufficiency means that an antecedent condition can bring about an outcome (Ragin, 2008)” (in Kasper-Brauer & Leischnig, 2016: 5288). Thus, we address our four hypotheses in order to identify the different combinations of board and corporate characteristics that make possible that the firm achieves high/low levels of firm financial performance, and to analyse whether they represent necessary or sufficient conditions for that purpose.

In Figure 1, a Venn diagram representing the conceptual framework of this study is presented. Arrow 1 connects four board features (size, independence, leadership structure and activity) with the outcome firm performance; with 4 board characteristics, 15 combinations are possible. Arrow 2 connects three corporate characteristics (size, leverage, and age) with the outcome firm performance; with three corporate characteristics, 7 configurations are possible. Arrow 3 connects combinations of board and corporate characteristics and the outcome; with seven attributes (four board characteristics and three corporate characteristics), 127 configurations are possible.

The next step is to express variables into sets according to their degree of membership because “compared with the conventional variable, a fuzzy set is more empirically grounded and more precise” (Ragin, 2000: 6). For dichotomous variables (leadership structure), each case can either be a membership (1) or a non-membership (0). For continuous variables (board size, independence and activity, and corporate size, leverage and age), calibration is required in order to develop membership measures. We follow Ragin (2000)⁷ to calibrate continuous variables. In doing so, we transform the original scores into membership scores, which “allows for more fine-grained assessment of set membership” (Rihoux & Marx, 2013: 169). Scores are ranging from 1 (full membership) to 0 (full non-membership), with the cross-over point (0.5) where there is maximum ambiguity.

⁷ Ragin (2000):

- “Fully in” the set (membership = 1): full membership.
- “Almost fully in” (membership = 0.90): almost full membership.
- “Crossover point” (membership = 0.5): neither “more in” nor “more out” of the set.
- “Barely more out than in” the set (membership = 0.45).
- “Fully out” of the set (membership = 0): full non-membership.

For the QCA analysis (sufficient and necessary conditions) we have clarified in the manuscript that low levels are referring to both quintiles 1 and 2, and high levels to quintiles 4 and 5.

Based on these membership scores, subsets relations can be analysed. Goodness of fit of the solutions explaining outcome scores are provided by the consistency and the coverage indexes. First, “the consistency index gauges the degree to which the cases share a simple or complex condition in displaying the outcome in question—consistency is analogous to a correlation in statistical analysis” (Wu *et al.*, 2014:1658). However, “unlike correlation analysis, consistency is a test for sufficiency and not a test for sufficiency and necessity” (Woodside, 2013: 464). Second, “the coverage index in fsQCA assesses the degree to which a simple and complex causal condition (recipe) accounts for instances of an outcome condition—coverage is analogous to a R2 in statistical analysis” (Wu *et al.*, 2014:1658). “When there are several paths to the same outcome, the coverage of any given causal combination may be small. Thus, coverage gauges empirical relevance or importance” (Ragin, 2006: 2). According to Ragin (2008), in fsQCA, a model is informative when consistency is above 0.74 and coverage is between 0.25 and 0.65 (Woodside, 2013).

5. Analysis and results

Correlations and contrarian cases

Table 1 displays descriptive statistics and bivariate correlations of variables under analysis for the period 2001–2010. Tobin’s Q (firm performance) presents a mean value of 1.43 with a standard deviation of 0.99 (this high volatility is due to the large difference between the maximum and minimum values, 15.29 and 0.10 respectively).

On the one hand, Tobin’s Q is significantly correlated to other variables. However, as all correlations coefficients are small, asymmetrical relationships are suggested (Woodside, 2013).

On the other hand, board and corporate characteristics correlations are lower than 0.6. As these correlations are also low, we can conclude that each causal condition (board and corporate variables) can be considered as a single and independent feature (Wu *et al.*, 2014: 1656) (Cuadrado Ballesteros *et al.*, 2017: 531). Therefore, the combinations of these 7 attributes when predicting firm performance will not be biased by the relationship among them.

Table 2 shows cross tabulations⁸ between each antecedent condition (both governance and corporate features) and the output variable, based on estimated quintiles. As Hsiao *et al.* (2015: 610) explain, “taking a complexity turn to theory-method includes recognizing that data sets of reasonable sizes ($n > 100$) include contrarian cases and that advancing theory needs to include explanations and descriptions of such cases”. According to the analysis performed, and in contrast

⁸ As previously explained, to calibrate continuous variables we transform the original scores into membership scores. Then, when we have all our variables expressed as categorical variables, we apply cross tabulation with SPSS (Statistical Package for the Social Sciences), which is a joint frequency distribution of cases for two or more categorical variables. In particular, we obtained the joint frequency distribution of our antecedent conditions with the output variable. In our crosstab, the categories of the output variable determine the columns, and the categories of the antecedent conditions determine the rows of the table. The cells of the table contain the number of times that a particular combination of categories occurred.

to results offered by traditional regression analysis, contrarian cases are confirmed in our sample. That is, “low scores in a single antecedent condition associates with both high and low scores for an outcome condition for different cases” (Wu *et al.*, 2014: 1647). For instance, although consistent with the traditional positive association between board size and firm performance most cases in our sample (693 observations) show high board size (quintiles 4 and 5) and high firm performance (quintiles 4 and 5), there are also cases (247 observations) with high board size (quintiles 4 and 5) and low firm performance (quintiles 1 and 2), and cases (312) with low board size (quintiles 1 and 2) and high firm performance (quintiles 4 and 5). Moreover, although consistent with good corporate governance, most of cases (717 observations) show high levels of board independence (quintiles 4 and 5) and high firm performance (quintiles 4 and 5), our sample also shows cases (220 observations) with low levels of board independence (quintiles 1 and 2) and high firm performance (quintiles 4 and 5), as well as cases (305 observations) with high levels of board independence (quintiles 4 and 5) and low firm performance (quintiles 1 and 2). Contrarian cases are also present for board activity. Thus, although most cases (655 observations) show high frequency of board meetings (quintiles 4 and 5) and high firm performance, there are also cases (295) with high frequency of board meetings (quintiles 4 and 5) and low firm performance (quintiles 1 and 2), and cases (205) with low frequency of board meetings (quintiles 1 and 2) and high levels of firm performance (quintiles 4 and 5). As far as leadership structure is concerned (since it is a dummy variable, only two categories exist), results are even more surprising. Although consistent with the traditional good governance recommendation many cases (549 observations) exhibit non CEO duality and high firm performance (quintiles 4 and 5), most cases in our sample (566 observations) show non dual leadership structures and low levels of firm performance. In addition, there are also cases (381) with CEO duality and high levels of firm performance. Similar contrarian cases can be observed for corporate variables under analysis.

Board and Corporate Characteristics Predicting Firm Performance: sufficient and necessary conditions

We first perform the analysis of the necessary conditions to produce the outcome (firm performance). Table 3 shows the consistency and coverage values for all the antecedent conditions (board and corporate characteristics). In accordance with Scheider & Wagemann (2010) and Samara & Berbegal-Mirabent (2018), none of the variables is a necessary condition to achieve high levels of firm performance, because all the consistency values are below 0.74 Ragin (2008).

Second, we perform an analysis of sufficiency. Table 4 shows the consistency and coverage scores for all antecedent conditions (board and corporate characteristics) predicting high levels of firm performance. Following Ragin (2008) recommendation, we apply a consistency level of 0.74. As

findings on Table 4 suggest, there is not an individual board or corporate feature that explains high levels of firm financial performance. On the contrary, the same level of firm financial performance can be achieved through different complex combinations of board and corporate features. All of them represent sufficient conditions for high levels of firm performance. However, since there are more than one combination leading to the same level of firm performance, none of those configurations are necessary. In particular, there are 22 combinations of board and corporate characteristics strongly related to high levels of firm performance. On the overall, they have fit validity: the solution coverage is 0.46, which is consistent with the recommended levels between 0.25 and 0.65 to be informative (Woodside, 2013), and the solution consistency is 0.77, which is also consistent with the recommended level above 0.74 to be informative (Woodside, 2013).

In each configuration, there are variables that contribute positively to high levels of firm financial performance and variables that contribute negatively (~) to high levels of firm financial performance. As far as the first configuration on Table 4 is concerned (Board size * CEO duality * ~Board meetings * Firm size), it indicates that some companies that have a big size, which have a large board, in which the CEO is also the Chairperson of the board, and in which boards meet with low frequency, will have a high level of firm performance. The consistency index of this configuration is 0.802849 and its unique coverage index of 0.028004.

According to our results, the effect of each individual board/corporate characteristics on the firm performance is sometimes positive, sometimes negative, and sometimes non present. Therefore, each individual board/corporate characteristic may have a positive effect on firm financial performance, or a negative effect, or even a non significant effect. Table 5 summarizes the percentage of configurations in which each individual board characteristic is present. It can be seen that none of our variables appear in all 22 total combinations, so there are not any necessary condition for high levels of firm performance. For instance, on the one hand, board size is the board characteristic that more appears in configurations predicting high levels of firm performance (18 of 22 total configurations). In 14 configurations the impact of board size on firm performance is positive and in 4 configurations its impact is negative. On the other hand, independent directors is the board characteristics that less appears (15 of 22 total configurations). In 9 configurations its impact is positive and in 6 configurations it is negative.

Our findings support complexity, according to hypothesis 1, because the different configurations obtained mean that there are not any individual governance/corporate feature indicating a high level of firm financial performance, but the effect of each feature on the firm financial performance is dependent on other governance/corporate attributes. Equifinality is also supported by the data in our sample, according to our hypothesis 2. In this sense, different combinations of board/corporate characteristics lead to the same level of firm financial performance.

To test hypotheses 3 and 4 (assimetry and causal assimetry tenets), the same methodology is applied using low levels of firm performance as the outcome. As Table 6 shows, complexity and equifinality propositions are again supported, because complex configurations of several board/corporate features explain low levels of firm financial performance. . In particular, there are 10 configurations predicting low levels of firm performance. According to hypothesis 3, asymmetry proposition is supported, because if we compare these results with results for high levels of firm performance, it is easy to observe that the same board/corporate feature is contributing to high levels of firm financial performance and also to low levels of firm financial performance. Moreover, and based on complexity theory, causes explaining low levels of firm financial performance are not the ‘mirror opposite’ of those explaining high levels of firm financial performance, supporting the causal asymmetry proposed in hypothesis 4. Finally, Table 7 summarizes the percentage of configurations predicting low levels of firm performance in which each individual board characteristic is present. For instance, board size and CEO duality are always present, although their contribution to low levels of firm performance is both positive (3 of 10 configurations and 6 of 10 configurations, respectively) and negative (7 of 10 configurations and 4 of 10 configurations, respectively).

6. Discussion, conclusions and implications

Based on fsQCA, this study has empirically explore, for a sample of 294 non-financial Spanish and Italian listed firms during the period 2001-2010, how the effect of several board and corporate features on the firm performance depends on the combination of those board and corporate characteristics. In doing so, we have followed recent calls to move beyond multiple regression analysis (Woodside, 2014) and to promote a greater use of qualitative methods in corporate governance research (Fiss, 2011; McNulty, Zattoni & Douglas, 2013). Building from complexity theory, we have used this research method in order to provide valid findings about the controversial relationship between board of directos and firm performance. In this sense, our results show that no single board nor corporate characteristic explain firm performance. Depending on the combination of corporate and governance features, the size of the board of directors, the presence of independent directors on the board, the dual leadership structure and the frequency of board meetings can lead to either positive or negative firm performance.

These results allow us establishing some conclusions.

Firstly, board size, board independence, leadership structure and board activity are significant antecedents of the contribution of the board to the firm financial performance. However, considered individually, they are not relevant. Secondly, board size, board independence, non dual leadership structure and board activity are not sufficient conditions to achieve high levels of firm financial performance. What is more, they are not necessary attributes to achieve high levels of firm financial performance. Moreover, depending on a complex combination of those board

features, they can also lead to low levels of firm financial performance. Overall, our findings suggest that there are several combinations of board and corporate features leading to high levels of firm financial performance. In this sense, an important methodological contribution of this paper is that by using fsQCA it is possible to observe relationships between the antecedent conditions (board/corporate features) and the outcome (firm performance) that are not reported by traditional regression analysis. In doing so, it allows researchers to advance in the knowledge of the relationship between corporate governance and firm performance. Of a total of 127 possible combinations of the 4 board features and the 3 corporate features, 22 configurations are reported to be consistent in our sample.

Despite different theoretical arguments and inconclusive results of the wide empirical literature addressing the effect of board characteristics on the firm performance, this paper adds to our knowledge because it empirically explores under which circumstances different board features should contribute positively or negatively to firm performance.

From a theoretical point of view, findings of this study validates the arguments of both the Agency and the Resource Dependence theories to explain the contribution of board features to firm performance. In this sense, smaller boards, more independent boards and non dual leadership structures are not always leading to high levels of firm financial performance, as it is expected according to Agency Theory. Moreover, and giving support to the Resource Dependence Theory, larger boards, boards with less independent directors (and more executive directors), as well as boards with CEO duality, can achieve high levels of firm financial performance. Therefore, as both theoretical approaches are applicable for the results obtained from different configurations, they should be considered as complementary rather than confronting. Whereas the agency theory strengthens the board's role as a monitor, the resource dependence theory focuses on the role of directors as resource providers, and views their business knowledge and expertise as a resource.

The results of this study has also implications for policy makers and practitioners by providing some useful hints to the controversial relationship between corporate governance and financial performance (Paniagua *et al.*, 2018). In this sense, general corporate governance recommendations must be rethought. Perhaps, it would be advisable to generate more and more specific regulations (Andrés & Santamaría, 2018), that is, codes of good practices that contemplate key variables of the company such as its size, leverage, if it is listed or unlisted, its sector of activity, as well as an integrated consideration of all governance variables. For instance, before recommending the appointment of independent directors on the board or non-dual leadership structures, regulators should make careful consideration of other corporate and governance contingencies. In this study, in order to achieve high levels of firm performance, only 2 of the 22 different configurations gives support to the presence of independent directors in boards with non-dual leadership structures. Moreover, only 5 configurations gives support to the

presence of independent directors in large boards, and only 3 configurations gives support to the presence of independent directors in boards that meet frequently. Regarding corporate characteristics, 4 of the 22 configurations support independent directors in large firms, 3 configurations support the appointment of independent directors in firms with high levels of leverage, and 4 configurations support their appointment in young firms. These results are consistent with recent studies that “have questioned the usefulness of independence as a primary director characteristic” (Masulis & Zang, 2019: 227). In this same vein, “Boivie *et al.* (2016) suggest that the effectiveness of board independence is overstated because barriers, such as outside job demands and norms of deference, prevent independent directors from being effective monitors” (Neville *et al.*, 2019: 2539). Practitioners should pay attention to the governance and corporate structure of the firm before deciding the appointment of independent directors on the board.

Future extensions of this research can also contribute to the development of a theory able to provide effective recommendations for practitioners after understanding the complexity of corporate governance variables relationships which could be different across countries or in different periods of time. We propose to analyze differences between family and non-family businesses in our sample, as well as differences between the pre and the post crisis period. Moreover, it may be interesting to make a comparison between the two countries under study, as well as extending the analysis to other European countries.

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Figure 1. Venn diagram

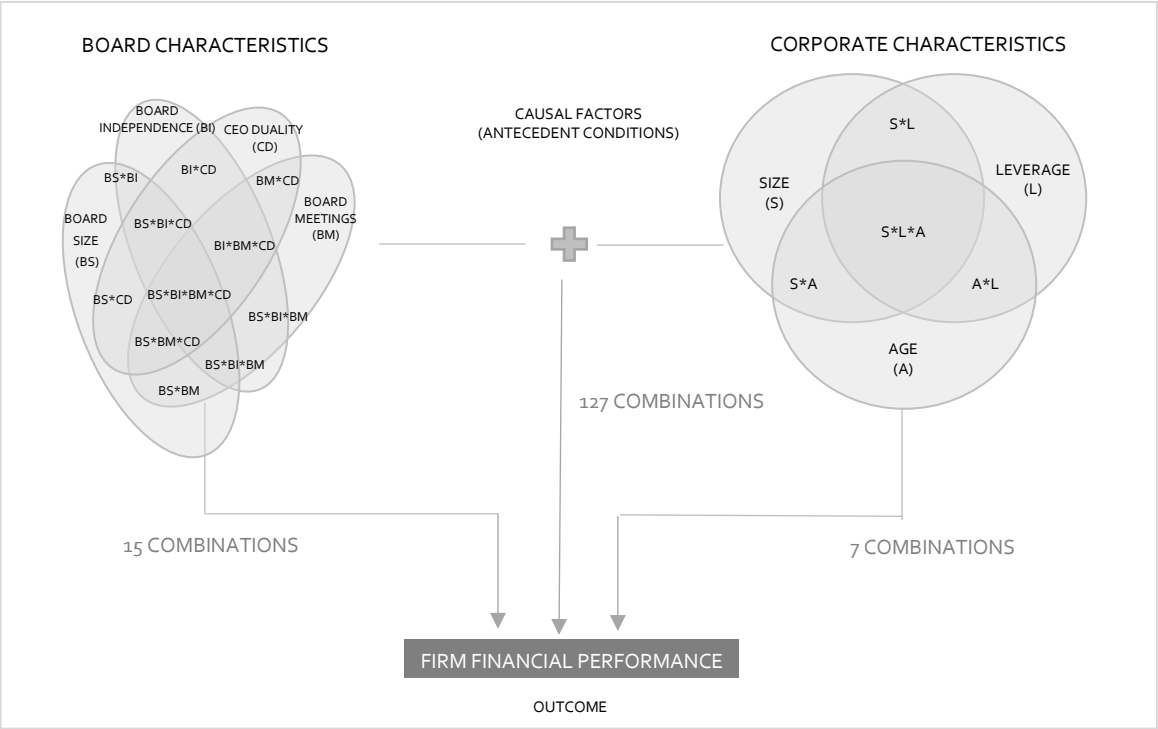


Table 1. Descriptive statistics and bivariate correlations.

	N	Mean	Max	Min	Sts. Dev.	1	2	3	4	5	6	7	8
1. F-Performance	2383	1,4316	15,29	0,10	0,9923	1							
2. F-Size	2383	13,0139	18,43	6,15	1,8923	-0,027 ***	1						
3. Leverage	2383	0,5928	0,98	0	0,2175	-0,035 †	0,273 ***	1					
4. F-Age	2383	40,4809	156	1	32,8050	-0,123 ***	0,150 ***	-0,020	1				
5. B-Size	2366	9,3593	22	1	3,5815	0,066 **	0,581 ***	0,124 ***	0,112 ***	1			
6. Independent	2095	0,3225	1	0	0,1865	0,061 **	0,259 ***	0,081 ***	-0,118 ***	0,093 ***	1		
7. B-Activity	1884	8,7723	30	0	3,7425	0,008	0,245 ***	0,292 ***	-0,065 **	0,101 ***	0,129 ***	1	
8. Duality	2287	0,4115	1	0	0,4921	-0,018	-0,029	0,019	0,008	-0,046 *	-0,017	-0,011	1

*** 99,9% confidence level. ** 99% confidence level. * 95% confidence level. † 90% confidence level.

Table 2. Cross tabulation between board/corporate features and firm performance.

5 quintiles Firm Performance							
5 quintiles Size		1	2	3	4	5	Total
Observations	1	110	70	50	62	96	386
(Percentage)		28,50%	18,13%	12,95%	16,06%	24,87%	100,00%
	2	79	84	86	76	68	393
		20,10%	21,37%	21,88%	19,34%	17,30%	100,00%
	3	81	75	71	86	66	379
		21,37%	19,79%	18,73%	22,69%	17,41%	100,00%
	4	57	75	85	77	93	388
		14,69%	19,33%	21,91%	19,85%	23,97%	100,00%
	5	61	95	90	79	511	837
		7,29%	11,35%	10,75%	9,44%	61,05%	100,00%
	Total	388	399	382	380	834	2383
		16,28%	16,74%	16,03%	15,95%	35,00%	100,00%
5 quintiles Firm Performance							
5 quintiles Leverage		1	2	3	4	5	Total
Observations	1	130	41	31	64	119	385
(Percentage)		33,77%	10,65%	8,05%	16,62%	30,91%	100,00%
	2	112	67	73	78	87	417
		26,86%	16,07%	17,51%	18,71%	20,86%	100,00%
	3	76	92	79	75	62	384
		19,79%	23,96%	20,57%	19,53%	16,15%	100,00%
	4	59	95	100	89	53	396
		14,90%	23,99%	25,25%	22,47%	13,38%	100,00%
	5	10	104	100	73	514	801
		1,25%	12,98%	12,48%	9,11%	64,17%	100,00%
	Total	387	399	383	379	835	2383
		16,24%	16,74%	16,07%	15,90%	35,04%	100,00%
5 quintiles Firm Performance							
5 quintiles Age		1	2	3	4	5	Total
Observations	1	36	71	81	100	113	401
(Percentage)		8,98%	17,71%	20,20%	24,94%	28,18%	100,00%
	2	69	78	66	87	95	395
		17,47%	19,75%	16,71%	22,03%	24,05%	100,00%
	3	94	75	77	85	75	406
		23,15%	18,47%	18,97%	20,94%	18,47%	100,00%
	4	84	71	76	62	86	379
		22,16%	18,73%	20,05%	16,36%	22,69%	100,00%
	5	105	104	83	45	465	802
		13,09%	12,97%	10,35%	5,61%	57,98%	100,00%
	Total	388	399	383	379	834	2383
		16,28%	16,74%	16,07%	15,90%	35,00%	100,00%
5 quintiles Firm Performance							
5 quintiles B-Size		1	2	3	4	5	Total
Observations	1	183	126	119	107	115	650
(Percentage)		28,15%	19,38%	18,31%	16,46%	17,69%	100,00%

	2	36	43	27	51	39	196
		18,37%	21,94%	13,78%	26,02%	19,90%	100,00%
	3	56	90	90	92	108	436
		12,84%	20,64%	20,64%	21,10%	24,77%	100,00%
	4	51	58	72	61	51	293
		17,41%	19,80%	24,57%	20,82%	17,41%	100,00%
	5	59	79	72	65	516	791
		7,46%	9,99%	9,10%	8,22%	65,23%	100,00%
	Total	385	396	380	376	829	2366
		16,27%	16,74%	16,06%	15,89%	35,04%	100,00%
5 quintiles Firm Performance							
5 quintiles Independent		1	2	3	4	5	Total
<i>Observations</i>	1	115	75	59	53	68	370
<i>(Percentage)</i>		31,08%	20,27%	15,95%	14,32%	18,38%	100,00%
	2	37	46	58	51	48	240
		15,42%	19,17%	24,17%	21,25%	20,00%	100,00%
	3	48	66	66	66	64	310
		15,48%	21,29%	21,29%	21,29%	20,65%	100,00%
	4	51	61	58	61	73	304
		16,78%	20,07%	19,08%	20,07%	24,01%	100,00%
	5	90	103	95	103	480	871
		10,33%	11,83%	10,91%	11,83%	55,11%	100,00%
	Total	341	351	336	334	733	2095
		16,28%	16,75%	16,04%	15,94%	34,99%	100,00%
5 quintiles Firm Performance							
5 quintiles B-activity		1	2	3	4	5	Total
<i>Observations</i>	1	151	104	76	106	109	546
<i>(Percentage)</i>		27,7%	19,0%	13,9%	19,4%	20,0%	100,0%
	2	48	54	50	43	63	258
		18,6%	20,9%	19,4%	16,7%	24,4%	100,0%
	3	63	92	88	88	66	397
		15,9%	23,2%	22,2%	22,2%	16,6%	100,0%
	4	67	99	103	84	91	444
		15,1%	22,3%	23,2%	18,9%	20,5%	100,0%
	5	150	143	155	147	700	1295
		11,6%	11,0%	12,0%	11,4%	54,1%	100,0%
	Total	479	492	472	468	1029	2940
		16,3%	16,7%	16,1%	15,9%	35,0%	100,0%
5 quintiles Firm Performance							
Duality		1	2	3	4	5	Total
<i>Observations</i>	0	280	286	245	241	308	1360
<i>(Percentage)</i>		20,59%	21,03%	18,01%	17,72%	22,65%	100,00%
	1	161	175	210	204	177	927
		17,37%	18,88%	22,65%	22,01%	19,09%	100,00%
	Total	441	461	455	445	485	2287
		19,28%	20,16%	19,90%	19,46%	21,21%	100,00%

Table 3. Analysis of necessary conditions.

Conditions tested ^a	Consistency	Coverage
Board size	0.596046	0.583022
~Board size	0.529949	0.522789
Independent directors	0.607682	0.578418
~Independent directors	0.524921	0.532677
CEO duality	0.576482	0.569218
~CEO duality	0.562525	0.549732
Board meetings	0.430888	0.526139
~Board meetings	0.569111	0.467607
Firm size	0.606078	0.566743
~Firm size	0.530585	0.548904
Firm leverage	0.590290	0.556108
~Firm leverage	0.553061	0.567495
Firm age	0.510828	0.517081
~Firm age	0.616872	0.588549

^a The symbol (~) indicates the negation of the characteristic.

Table 4. Board and corporate characteristics predicting high levels of firm performance.

Configuration	Board size	Independent Directors	CEO Duality	Board meetings	Firm size	Firm leverage	Firm age	Raw coverage	Unique coverage	Consistency
1	•		•	~	•			0.131409	0.028004	0.802849
2	~	•	~		•		~	0.091485	0.022817	0.759561
3	•			~	~	•	~	0.102472	0.007860	0.829480
4	•	~		~		•	~	0.109650	0.017767	0.802797
5	~	~	~		•	•		0.078723	0.023431	0.765343
6		~	•	•	•	~		0.055826	0.003310	0.769883
7	•		•	~		~	•	0.076891	0.000546	0.855154
8	~	~	•		•		•	0.056645	0.005949	0.785861
9	•	•	•		•		~	0.093362	0.014582	0.802659
10			•	•	•	~	•	0.066939	0.001547	0.791846
11		•	•	~	~	•	•	0.045782	0.005016	0.812477
12	•			•	~	~	~	0.105339	0.000001	0.831101
13	•		~	•	~		~	0.090677	0.000546	0.793389
14	•	~		•	~		~	0.105487	0.000205	0.805662
15	•	•	•	•		~		0.074207	0.003014	0.827184
16	•	•	•		~		•	0.056042	0.000080	0.871112
17	~	•		~	•	~	~	0.087163	0.000001	0.818782
18		•	•	~	•	~	~	0.057919	0.002161	0.845847
19	•	•	~	•	~	•		0.061467	0.000023	0.795173
20	•	~	•	•	~	•		0.042131	0.000001	0.859996
21	•	•		•	~	•	•	0.072796	0.000001	0.858942
22	•		•	•	~	•	•	0.042063	0.000001	0.885325
	Solution coverage	0.456877								
	Solution consistency	0.766482								

Note: • indicate the presence of causal conditions (i.e. antecedents). ~ indicate the absence or negation of causal conditions. The blank cells indicate “don’t care conditions”, that is, that the variable is not necessary for that configuration (Kraus *et al.* 2018: 383).

Table 5. Summarize of the presence of board characteristics predicting high levels of firm performance.

	Positively		Negatively		Total	
Board size	14/22	63.64%	4/22	18.18%	18/22	81.82%
Independent directors	9/22	40.91%	6/22	27.27%	15/22	68.18%
CEO duality	12/22	54.55%	4/22	18.18%	16/22	72.73%
Board meetings	10/22	45.45%	7/22	31.82%	17/22	77.27%

Table 6. Board and corporate characteristics predicting low levels of firm performance.

Configuration	Board size	Independent Directors	CEO Duality	Board meetings	Firm size	Firm leverage	Firm age	Raw coverage	Unique coverage	Consistency
1	~		•	•	•	~	~	0.039436	0.011330	0.786685
2	~	~	~	•	•		•	0.051282	0.018609	0.807572
3	~	~	•	•	•	•		0.046155	0.010649	0.825285
4	•	•	~	~	•		•	0.099491	0.053885	0.829246
5	•	•	~		~	•	•	0.049438	0.010364	0.802817
6	~	•	•		~	•	•	0.048966	0.012428	0.828226
7	~	•	~		•	•	•	0.066631	0.019389	0.794268
8	~		•	~	•	•	•	0.049460	0.010485	0.807782
9	~	~	•	•	~	~	•	0.036988	0.012911	0.800428
10	•	~	•	~	•	•	~	0.031323	0.010584	0.811665
	Solution coverage		0.284243							
	Solution consistency		0.795173							

Note: • indicate the presence of causal conditions (i.e. antecedents). ~ indicate the absence or negation of causal conditions. The blank cells indicate “don’t care conditions”, that is, that the variable is not necessary for that configuration (Kraus *et al.* 2018: 383).

Table 7. Summarize of the presence of board characteristics predicting low levels of firm performance.

	Positively		Negatively		Total	
Board size	3/10	20.00%	7/10	80.00%	10/10	100%
Independent directors	4/10	40.00%	4/10	40.00%	8/10	80%
CEO duality	6/10	60.00%	4/10	40.00%	10/10	100%
Board meetings	4/10	40.00%	3/10	30.00%	7/10	70%