

Types of director, board diversity and firm performance

Abstract

Purpose – The purpose of this paper is to investigate the effect of board diversity on firm performance.

Design/methodology/approach – From different theories perspective and based on data collected about the composition of board of directors in Spanish non-financial firms, the paper determines statistically the relationship between board diversity and performance for the period 2005-2015.

Findings - The results reveal differences between inside and outside board members in terms of the performance impact of board diversity. Thus, while age diversity has a positive effect on firm performance in both, insider and outsider directors, nationality mix is associated with higher performance levels just in the case of insiders. In addition, educational diversity seems to have a negative effect on performance for supervisory directors. On the contrary, we do not find any evidence about a possible influence of gender diversity on performance.

Practical implications – The paper offers insights into what board demographic diversity characteristics are more relevant for firm performance.

Social implications – Since diverse boards contribute to a greater social value, the paper analyses the performance consequences of demographic diversity.

Originality/value – The paper analyses the firm performance impact of diversity among insider directors, on the one hand, and outsider directors, on the other. Although there is a clear difference between the roles assigned to insider and outsider directors, to our knowledge there has been no analysis of the firm performance effect of the diversity of each type of director using the same sample and methodology.

Key words: Board diversity, Firm performance, Executive directors, Outside directors.

Paper type: Research paper.

1. Introduction

One of the topics most commonly addressed in the corporate governance literature is board's independence, which is recognized essential to its supervisory role, and its influence on a range of firm variables relating to performance. This has led to the analysis of variables such as the size of the board, the percentage of independent directors, the separation of the roles of chairman and CEO, or the frequency of board meetings (Hermalin and Weisbach, 2003), all of which make up its so-called structural diversity.

More recently, many studies have related the recent financial crisis to governance failures (Berglof, 2011; Van Den Berghe, 2009). Within this context, boards have been criticized for having been unable to prevent the crisis, and this has opened new analysis perspectives. Thus, growing attention has been paid, in both academic and regulatory spheres, to board characteristics that might influence the effectiveness of the decision-making process, such as the age, education, gender or nationality of the board members, grouped under the heading of demographic diversity. The idea is to determine how these characteristics affect board functioning and, in turn, firm performance. An in-depth review by Johnson *et al.* (2013), while acknowledging the importance of all these factors, draws attention to the need to investigate the reasons for the variety of findings.

The above motivates the following paper, which fits into the context of the literature on boards of directors, and is aimed specifically at exploring one of the most habitual questions emerging from that research, namely, what determines the board's actions. As noted by Adams *et al.* (2010), "studies look at differences across boards and ask whether these differences explain differences in the way firms function and how they perform" (page 59). The underlying notion is that differences in board structure correlate with differences in board conduct, and this may have repercussions for firm performance. We are not able to capture such differences in board conduct, since a detailed fieldwork would be required, so we focus in the way profits vary with differences in board's structure. Based on complementary theoretical perspectives, the specific purpose of this paper is to contribute to the body of knowledge concerning boards of directors by analysing the impact of the diversity of the various types of board members on firm performance.

The main contributions of the paper can be summed up as follows: (1) board composition has been extensively analysed as a part of good corporate governance. While much of this research has focused on size and independence, there is a growing literature that analyses the composition of directors' demographic diversity. Furthermore, diversity has been the subject of active policy making which makes it even more important to understand the role it plays. In this context, the present paper contributes to this stream of literature analysing the influence of five directors' diversity attributes on firm performance. (2) it is a single study separately analysing the firm performance impact of diversity characteristics among insider directors, on the one hand, and of outsider directors, on the other. The main studies to date focus basically on the board as a whole, the top management team, or on the CEO (Ararat *et al.*, 2015; Johnson *et al.*, 2013)¹. Although there is a clear difference between the roles assigned to insider and outsider directors, to our knowledge, there has been no analysis of the firm performance impact of the diversity of each type of director using the same sample and methodology. Given that their roles differ considerably, it would appear useful to make the distinction. Particular attributes may be appropriate for the performance of some tasks, and irrelevant for others; and (3) in contrast to most of the research on this topic, which is limited to countries with an Anglo-Saxon financial system, our study analyses a sample of firms in a country with a continental financial system and characterised by ownership concentration and blockholders with strong board representation. In these environments, the board of directors plays a key corporate governance role, given the nearly or totally non-existent market for corporate control and poor protection of investors' rights. The literature highlights the predominance of blockholders with strong board representation in management control tasks, while independent directors should focus on the protection of minority interests.

It is required, therefore, to point out some of the features of board of directors in Spain, where corporate governance is unitary, i.e., there is only one board of directors, just as in countries such as the UK, Italy or Portugal. However, while Spanish boards have 11 members on average, in line with other countries of a similar economic and social level, their composition (Table 1) keeps particular features.

[TABLE 1 ABOUT HERE]

As we can see, board composition in Spain has changed little in the last ten years, the only notable feature being a slight increase in the percentage of independent directors and a corresponding decrease in outsiders representing blockholders. Nevertheless, the proportion of independent directors in Spain still remains well below that observed in other countries (Spencer Stuart, 2015). In their absence, and because of a highly concentrated ownership structure, there is a significant proportion of blockholders.

With respect to other board diversity variables, it is worth noting that 12.5% of directors are foreign, which is on a par with Italy, but well below the percentages found in countries such as the UK (32%), France (33%) or The Netherlands (43%). The percentage of foreign board members has varied little in the last ten years, despite the large-scale internationalization of Spanish firms (Spencer Stuart, 2015). Meanwhile, despite a considerable increase in the numbers of female board members (from 4% in 2004 to 14% in 2014) there are still fewer women on boards in Spain than in economically and socially comparable countries, where percentages of women directors range between 20 and 35%. Board tenure (average tenure of board members) stood at 7.1 years in 2014, in line with other countries, such as the United States (8.4 years) or France (5.3 years), while the average age is 60, which is slightly higher.

2. Theoretical framework

2.1. Demographic diversity approaches

Many corporate managers are convinced of the existence of a positive relationship between board demographic diversity and value creation for the shareholder. Carter *et al.* (2003) report several testimonies to support this view, concluding that given the emphasis being placed on board diversity as a part of good corporate governance, the relationship between board diversity and firm performance deserves both theoretical and empirical investigation. Agency theory, complemented with other theories explaining board functioning, is the main basis for the analysis of board of directors until now. Although this theory was originally used in a context where corporate ownership is widely dispersed, explaining the conflicts of interest between managers and shareholders, it is equally significant as theoretical frame in countries where corporate ownership is concentrated, such as Spain, and controlling shareholders can use their control to benefit themselves at the expense of outside shareholders who are more likely minority shareholders. Under the agency perspective, the focus is on the influence of diversity on board

independence, that is, the issue of whether diverse boards are better monitors. One argument is that diversity increases board independence because people of different gender, ethnicity, or cultural background could reinforce a more activist board, but, on the other hand, it is also argued that a different perspective may not necessarily result in more effective monitoring because diverse board members could become marginalized. We can see no a priori reason to expect diversity to affect the incentives for directors to build their reputations as expert monitors (Carter *et al.*, 2003). Furthermore, as Volonté and Gantenbein (2016) stated, “this perspective (agency theory) mostly ignores the fact that groups of directors may require different skills in order to execute their duties adequately. Even proponents of agency theory, Fama and Jensen (1983), underline the importance of independent directors with specific expertise (e.g., in finance, corporate law or industrial technology) suggesting that independent directors do not all have one and the same purpose on the board. Human capital may thus be more relevant than independence or demographic attributes in explaining decision-making processes and firm performance (Volonté and Gantenbein, 2016; pp. 118). In addition, as Hermalin and Weisbach (2003) pointed out, although the principal-agent model provides many insights, it is not particularly useful for explaining board-specific phenomena. In short, agency theory simply does not provide a clear-cut prediction concerning the link between board demographic diversity and firm value (Hermalin and Weisbach, 2003; Carter *et al.*, 2003). For this reason, a number of different studies have adopted a plural approach making room for the theories outlined below.

On this matter, most studies of demographic diversity analyse the influence of diversity on the performance of the top management team, predicting it to have positive effects, based on the resource dependence theory and the cognitive diversity perspective (Williams and O’Reilly, 1998), but also negative effects based on similarity-attraction and social categorization theories (Byrne, 1971; Tajfel and Turner, 1979). We adopt a plural outlook, taking into account these perspectives.

From the resource dependence theory, organizations take advantage of diverse boards because diversity can improve board functions. As Ali *et al.* (2014) state, a diverse board can integrate a wider range of information to make more informed decisions. Moreover, board diversity helps create linkages with important external stakeholders, and it signals the firm’s commitment to diversity which may help the

organization to attract and retain individuals from diverse demographic backgrounds (Spence, 1973). From a cognitive diversity perspective, Cox and Blake (1991), and Robinson and Dechant (1997) sum up the reasons why diversity constitutes a business case. Firstly, it encourages a better understanding of an increasingly diverse and complex marketplace. Secondly, it fosters creativity and innovation, as well as leading to more effective problem-solving, by involving a broader range of perspectives. Finally, diversity generates openness and sensitivity towards other cultures, thereby facilitating firm internationalization. Furthermore, when handled properly, diversity can promote human resources motivation and reduce costs from absenteeism and the high turnover of minorities.

On the other hand, the negative effects associated with greater diversity may be explained by the fact that communication in homogeneous groups is facilitated by the group members' common backgrounds, shared ideas and perceptions, as suggested by social identity theory (Smith *et al.*, 1994). In line with this way of thinking, individuals use demographic attributes to categorize self and others into social groups (Lau and Murnighan, 1998). As a result of self-categorization processes (Turner *et al.*, 1987), individuals are likely to create in-groups and out-groups, and develop "us vs. them" perceptions among its members (Brown and Turner, 1981) which prevent a board from performing efficiently.

Group processes have also been shown to intervene in the relationship between diversity and firm performance (Smith *et al.* 1994). Board diversity may constrain prompt initiative to implement strategic changes or lead to board inefficiency (Adams and Ferreira, 2003). Furthermore, diversity has been shown to have negative effects on group cohesion (O'Reilly *et al.*, 1989), and the frequency or quantity of communication (Smith *et al.*, 1994). In addition, diversity tends to lead to increased conflict within the group (Eisenhardt and Schoonhoven, 1990). Amason (1996) found that affective conflict was negatively related to both decision quality and affective acceptance of the decision. Furthermore, Knight *et al.* (1999) show that diversity hinder strategic consensus and find a positive relationship between functional diversity and interpersonal conflict.

In short, we combine the importance of the study of managers and directors' demographic characteristics, emphasised by these perspectives, with the significance of the managers and directors' corporate governance position, underlined by the agency theory. Consequently, we distinguish between

executive directors, which carry out the strategic management process, and outside directors, which are mainly responsible for the advisory and supervisory roles. The idea is that the different board roles require different attributes from those to whom they are entrusted. For instance, Combs *et al.* (2007) use CEO tenure as a proxy of CEO power and a strong leadership, while outsider directors board tenure increases outsiders knowledge of the firm, but reduce their independence (Huang and Hilary, 2018). So, the same attribute has different consequences depending on the type of director.

2.2. Board demographic diversity: Empirical evidence

In the following paragraphs, we will examine those attributes relating to the diversity of company boards, which will be analysed in this paper.

Age

Age is seen as double-edged sword, being simultaneously associated with greater experience on the one hand, and higher risk-aversion and loss of productivity on the other (Kim and Lim, 2010). Thus, authors such as Ahn and Walker (2007) or Wiersema and Bantel (1992) conclude that elderly executives are less likely to undertake change, while their younger counterparts are associated with strategic change. However, other studies suggest that firms with older directors are less likely to go bankrupt (Platt and Platt, 2012) or find a positive link between the percentage of directors over 50 and adoption of strategic change (Golden and Zajac, 2001). Faced with such mixed empirical evidence, authors such as Kim and Lim (2010), Siciliano (1996), or Mahadeo *et al.* (2012) signal the importance of age diversity among board members, find it to have a positive impact on firm performance, and highlight the synergies between the productivity provided by younger board members and the experience contributed by the more elderly. However, other studies, such as Jhunjhunwala and Mishra (2012) or Bonn *et al.* (2004), find nonsignificant relationship between age diversity and performance. Furthermore, Knight *et al.* (1999) show a negative influence of age diversity on strategic consensus, whereas Hafsi and Turgut (2013) show a negative influence of board age diversity on corporate social performance.

Education

Studies of the influence of education on performance or other firm variables are scarce and the majority deal with executives' qualifications. Most of the evidence suggests a positive influence (Kim and Lim, 2010; Cheng *et al.*, 2010) or no significant link (Daily and Dalton, 1994; Rose, 2007; Assenga *et al.*, 2018). Furthermore, Bathula (2008), and Boadi and Osarfo (2019) even report a negative relationship between the number of board directors with PhDs and firm performance. The type of training also appears to be important, with Barker and Mueller (2002) finding that firms led by CEOs with technological degrees invest more in R&D than those with CEOs trained in other disciplines. Similarly, CEOs with educational backgrounds in business or law tend to be more risk-averse with respect to this type of investment.

Literature about the influence of educational diversity on firm performance is almost nonexistent, although Knight *et al.* (1999) point out a negative relationship between educational diversity and firm strategic consensus. To the extent that board members have different educational backgrounds, they are more likely to experience differences in the way that they perceive, process, and respond to issues they confront on the board (Milliken and Martins, 1996), and these differences are likely to precipitate higher levels of cognitive conflict.

Gender

One board characteristic that has attracted growing attention in recent years is the percentage of women board members. This interest comes from the proliferation of regulation in the majority of developed countries recommending female representation on boards be increased to the point of parity. Beyond ethical reasons, there is debate in economic circles as to the potential impact of gender parity for firm performance and other firm characteristics. The empirical evidence is very confusing, with studies finding positive (e.g., Ahmadi *et al.*, 2018; Bart and McQueen, 2013; Campbell and Mínguez-Vera, 2008; Darko *et al.*, 2016; Green and Homroy, 2018; Vieira, 2018; Terjesen *et al.* 2016), negative (e.g., Ahern and Dittmar, 2012; Adams and Ferreira, 2009), and mix results or no relationship at all (e.g., Bennouri *et al.*, 2018; Chapple and Humphrey, 2014) between gender and firm performance. Even more, Bennouri *et al.* (2018) find that female directorship significantly increases firms' accounting performance, while significantly decreases Tobin's Q, although Loukil *et al.* (2019) show that stock

market liquidity is positively associated with the presence of women directors. One of the reasons for such disparity of findings is the ubiquitous endogeneity problem in research on corporate governance. Some studies attempt to address this problem by analysing samples of Norwegian firms. Norway made a minimum of 40% female board membership compulsory by law in 2008, thus providing data from an exogenous source (Bohren and Staubo, 2016; Eckbo *et al.*, 2016, among others). The evidence, nevertheless, remains ambiguous (Triana *et al.*, 2014). Recently, Owen and Temesvary (2018) point out these inconclusive results are due to the fact that there is a non-linear U-shaped relationship between gender diversity on boards and performance, finding that female participation has a positive effect once a threshold level of gender diversity is achieved. In the same vein, Adeabah *et al.* (2019) show that gender diversity promotes bank efficiency up to a maximum of two female directors on a nine-member board of directors, suggesting a threshold effect.

Nationality

National and ethnic diversity in board rooms has attracted less attention than other types, partly because it is not very common. Like gender, nationality diversity brings different cognitive perspectives and affects group dynamics and decision making, which in turn could influence firm level outcomes (Johnson *et al.*, 2013). In this respect also, however, findings are inconclusive (Carter *et al.*, 2010; Oxelheim and Randoy, 2003). In an attempt to go beyond national diversity to capture more general traits, Delis *et al.* (2017) focus on genetic diversity among board members, concluding that firm performance improves with the incorporation of directors from countries with different genetic diversity levels. However, Guest (2019), in a US context, find no evidence that board ethnic diversity improves overall firm performance, while Khan *et al.* (2019) find that national diversities have the potential to promote the quality of corporate social responsibility disclosure.

Years on board

It can be argued that directors' knowledge of the firm increases over time, enabling them to perform their roles more efficiently. Thus, Knight *et al.* (1999) find a positive relationship between tenure diversity and strategic consensus. However, board independence is reported to decline over the course of a CEO's tenure (Hermalin and Weisbach, 2003), while longer board tenure can result in members

becoming more routine in their decision making. Extended tenure of board members is related with a greater rigidity, and can result in trenching behind existing practices and procedures, with directors distancing themselves from new ideas (Golden and Zajac, 2001). Directors with long tenures are influenced by their own beliefs and schemes when it comes to facing key decisions (Barroso *et al.*, 2011). With respect to this, several studies coincide in reporting that directors' resistance to change increases with years of board tenure (Musteen *et al.*, 2006; Golden and Zajac, 2001). Short tenures should help to increase the capacity for monitoring of the board of directors, because of the rotation promotes the appearance of new people and, therefore, different attitudes and views on certain situations or decisions (Ahmadi *et al.*, 2018). Others analyse dispersion in the tenure distribution (variance), Tuggle *et al.*, 2010, for example, concluding that as tenure variance increases, so does the tendency to discuss entrepreneurial issues during board meetings. However, Johnson *et al.* (1993) find no significant link between tenure variance and corporate restructuring decisions.

Quoted boards to date

According to Barney (1991) directors with experience from other firms have developed a tacit knowledge which, being hard to replicate, constitutes an intangible asset potentially leading to competitive advantages. Generally speaking, the appointment of experienced directors increases the range of perspectives and interpretations and reduces internal biases in the board's strategic decision-making process. It also facilitates the firm's access to a range of network resources (Carpenter *et al.*, 2001). However, there is no evidence about the effect of the variation on the number of board positions among directors on firm performance.

Based on theoretical arguments and existing empirical evidence, the impact of the different variables representing the diversity of board members on performance can be summarised as shown in Table 2. It can be seen a positive tendency in the relationship between board or top management team (TMT) diversity and firm performance.

[TABLE 2 ABOUT HERE]

Most of the existing evidence refer to TMT, which include executive directors. However, an important difference exists between boards, in particular supervisory directors, and TMT in that those are responsible for monitoring and influencing strategy, not for implementing strategic decisions or for day-to-day administration (Fama and Jensen, 1983). Moreover, several additional distinctive features of boards deserve note (Forbes and Milliken, 1999). First, boards include many outsiders, who have their primary affiliation with another organization. These directors serve on only a part-time basis and have limited direct exposure to the firm's affairs. Second, boards average size is considerably greater than that of the other workgroups studied in the management literature. Finally, unlike many workgroups, boards function only episodically, so directors spend little time working on the boards they serve.

As we pointed out before, although diversity increases the aggregate level of resources at the group's disposal, it is also associate with higher levels of conflict, interaction difficulties, and lower levels of integration. These doubled-edged consequences are likely to be particularly pronounced in board settings. Because boards comprise part-timers who interact only periodically, board members have few opportunities to diminish or smooth over the differences that separate them. In the same vein, they are unlikely to have time to fully resolve the attitudinal and linguistic differences among them. More important, the percentage of outsiders (supervisory directors) on a board is likely to have a direct negative effect on board cohesiveness. Whereas insiders are well acquainted and must work together regularly, outsiders have their primary affiliations dispersed across many different organizations and are likely to interact only periodically with insiders or with each other.

According with the arguments exposed in this section, and with the relations shown in Table 2, we expect that:

H.1. Executive diversity will affect firm performance in a different way than supervisory diversity, because of the different role that executive and supervisory directors play.

H.2. A higher diversity among executive directors will positively affects firm performance to a greater extent than a higher diversity among supervisory directors, which are more subject to cognitive conflicts.

3. Empirical design

3.1. Data and variables

When embarking on this study of the diversity of directors on the boards of Spanish firms, the main challenge was obtaining the necessary data, which were ultimately drawn from the BoardEx database. This provided a sample of 87 non-financial Spanish firms, all those for which this kind of data were collected, that is, over 95% of the Spanish stock market's capitalization, excluding finance companies. The latter were not considered, firstly because of the special regulations imposed on them by the nature of their activity, and secondly because of the drastic change and intervention they have undergone as a result of the economic crisis. We consider a period running from 2005-2015, which provides us with a total of 691 observations, given that the data on some firms did not cover the entire period. The panel is therefore unbalanced. Table 3 shows the distribution of the number of firms by sector.

[TABLE 3 ABOUT HERE]

Dependent variables

We use two firm performance measures, obtained from the CNMV (Spanish Securities and Exchange Commission) and Bureau Van Dijk's SABI database: An accounting measure, ROA (Return on assets), calculated as the ratio of earnings before interest and taxes to net assets, that shows the efficiency in the management of firm assets; and a market measure, MTB, market-to-book equity ratio. This measure is high when the firm has valuable intangible assets, such as market power, goodwill, a stock of patents or good managers (Morck, *et al.*, 1988) and valuable investment opportunities.

Independent variables

In order to test our hypotheses, we need a dispersion measure of the directors' attributes analysed. On this matter, as independent variables we use measures representing the diversity of board members, based on BoardEx data as shown in the Table 4. BoardEx is one of the most popular datasets in board of directors' literature (Adams, 2016). It provides the standard deviation as a measure of the diversity of a set of board of directors' features. This dispersion measure has been previously used in board characteristics research (Ahn and Walker, 2007; Bohren and Strom, 2010; Tuggle *et al.*, 2010, among

others). In the case of Spain, BoardEx take the data from a variety of sources: Madrid Stock Exchange, CNMV (Spanish Securities Market Commission) and company information, including press releases, annual reports, and corporate websites.

[TABLE 4 ABOUT HERE]

All variables are defined both for inside or executive directors, in which case they carry the prefix E (ED1, ED2,...,ED6), and for outside or supervisory directors, in which case they carry the prefix S (SD1, SD2,...,SD6).

Control variables

The corporate governance literature shows a relationship between governance quality and performance (Adams *et al.*, 2010). We control for the potential effect of board diversity on board independence by using the usual board and ownership characteristics associated with firm performance: %ID denotes the percentage of independent board members; #BM the number of board meetings; %DO the percentage of firm ownership held by board members. All of them are widely used (Ahmadi *et al.*, 2018; Bennouri *et al.*, 2018; Guest, 2019). Also, we take BvD, an independence index created by Bureau van Dijk denotes the degree of independence of a company with regards to its shareholders. This index is transformed into a binary variable that takes the value 1 when no shareholder owns more than 50% of the stock and 0 otherwise.

In addition, we use two control variables, both widely used in previous performance research literature. LTA stands for firm size, measured as log of total assets, which is related with profitability, firm age, political costs and disclosure; and LEV, measured as total debt divided by total assets. Leverage impact bankruptcy risk, tax benefits, and creditor monitoring. All of them are expected to affect firm performance and board monitoring (Ararat *et al.*, 2015; Bennouri *et al.*, 2018; Erhardt *et al.*, 2003; Terjesen *et al.*, 2016).

We performed a correlation analysis on the explanatory variables of interest, i.e. among the diversity variables, to explore suspected linear relationships. No correlation among the diversity variables exceeded 0.44 (ED1 vs ED2), and no high correlation was observed between executive and supervisory directors as far as diversity is concerned (values not provided for space reasons).

3.2. Methodology

In this subsection, we propose the basic panel data models for executive and supervisory directors. We consider two different performance indicators, MTB and ROA, as response variables; the diversity variables (SD_1 to SD_6 and ED_1 to ED_6) as the main explanatory variables of interest; and the following moderator variables: percentage of independent directors over the total number of directors (%ID), number of board meetings (#BM), percentage of stock held by the directors (%DO), the BvD indicator, the log of total assets (LTA), Leverage (LEV), the sector variables (I.1 to I.5) and the year variables (X2006 to X2015 with year 2005 as the reference category).

As we use panel data, both the individual represented by the sub index j and the time point represented by t are considered. Although not specified in the models for simplicity, the error term ϵ is decomposed into two parts, one that varies between individuals and periods of time (usually known as combined effect), and another which is characteristic of each individual (i.e. the individual effect) and varies among individuals but is constant over time. Thus, the model for supervisory directors can be written as:

$$Performance_{jt} = \beta_0 + \sum_i \gamma_i SD_{ijt} + Moderators_{jt} + \epsilon_{jt} \quad (1)$$

The model for executive directors is similar to model (1) replacing the supervisory diversity variables (SD_i) with analogous variables for executive directors (ED_i).

$$Performance_{jt} = \beta_0 + \sum_i \xi_i ED_{ijt} + Moderators_{jt} + \epsilon_{jt} \quad (2)$$

Note that for each model two different equations are fitted, one for each performance indicator (ROA and MTB). In addition, for each of the models in this and subsequent sections, the choice between a fixed effects or a random effects model was based on the Hausman test (Hausman, 1978), whereby a fixed effects model is viable for a p-value of less than 0.05, and a random effects is the better choice otherwise. Notice that, the sector variables cannot be included in the fixed effects model, because they are constant for each firm, and therefore their coefficients are not shown in the corresponding tables. All models were fitted using the PLM package (Croissant and Millo, 2008) which is part of R statistical software (R Core Team, 2018). In all models fitted, the Breusch-Pagan test (Breusch and Pagan, 1980)

revealed heteroscedasticity. To address this problem and ensure correct estimates for the significance of the variables, the p-values were corrected by White's method (White, 1980, 1984) in the random effects models and by the Arellano method (Arellano, 1987) in the fixed effects models. Moreover, in all models cluster at firm level has been considered for the estimation of the covariance matrices thus allowing for heteroscedasticity across groups.

4. Results and discussion

4.1. Descriptive statistics

We began with a descriptive analysis of all variables. Table 5 shows the results including the means, standard deviations, quantiles and maximum and minimum values for each variable. It can be observed that over 75% of the observations for variable ED5 (Percentage of executive male directors) have the maximum value, i.e., in more than 75% of the observations all the executive directors were male, and that over 75% of the observations for variable ED6 (Nationality mix) have the minimum value, i.e., in more than 75% of the observations all the executive directors were Spanish. Notice that these findings contrast with those for variables SD5 and SD6, the analogous variables for supervisory directors.

[TABLE 5 ABOUT HERE]

4.2 Regression results

Table 6 (models 1.a and 1.b) shows the results for supervisory directors obtained when fitting model (1). Notice that, given the very low p-values of the Hausman test, fixed effects models are used in both cases. It can also be seen that, in the case of ROA response, variable SD3 shows positive statistical significance. Supervisory directors age diversity has a favourable effect on the asset management. Regarding MTB model (1.b), variables SD2 and SD4 were significant and with a negative coefficient, showing that higher educational and number of board positions diversity translates into lower MTB ratios.

[TABLE 6 ABOUT HERE]

Table 6 (models 2.a and 2.b) contains the results of the models for executive directors. In this case, both models (2.a and 2.b) are random effects models, since the p-value of the Hausman test is higher than 0.05. While none of the diversity variables were significant in the ROA model (2.a), it can be observed that variable ED6 is highly significant and with a positive coefficient, indicating that greater national diversity is associated with higher MTB.

We think that it is important to notice the complete contrast in significant variables between the executive and supervisory director models, as no significant common diversity variables appear in the models shown in Table 5.

4.3 Endogeneity

Endogeneity is an important issue in corporate governance research, but it is virtually impossible to discern (Hermalin and Weisbach, 2003; Adams, 2017). However, the literature offers a number of endogeneity checks². Here, we follow Santos and Rumble (2006) who state that “Although there are many ways in which reverse causality can be taken into account, we follow one of the most common tests in the literature, and lag the relevant variables one period” (pp.451). Since we are comparing what happens for executives and supervisory directors, we have decided to consider separate lagged models in all variables (both for the diversity variables and the moderator variables) for executives and for supervisory directors³. So we fit model:

$$Performance_{jt} = \beta_0 + \sum_i \zeta_i LSD_{ijt} + LModerators_{jt} + \epsilon_{jt} \quad (3)$$

for supervisory directors and

$$Performance_{jt} = \beta_0 + \sum_i \rho_i LED_{ijt} + LModerators_{jt} + \epsilon_{jt} \quad (4)$$

for executive directors. In models (3) and (4), L stands for lagged. We have preferred to use this notation instead changing the t index as that makes Table 7 below simpler to write.

Table 7 gives the results for models (3) and (4), which are highly consistent with previous ones. For supervisory directors, lagged SD3 (age diversity) shows a positive significant sign in model (3.a), while lagged SD4 keeps its negative coefficient with a high level of significance in model (3.b), with MTB as

the response variable. Just the variable SD2, which was significant in model (1.b), loss its significance, although it remains with a negative coefficient.

Regarding executive directors, for ROA response (model 4.a), it can be seen that the only significant lagged variable is ED3 (age diversity), with positive sign, for executive directors. As for MTB, lagged ED6 (nationality mix) shows a significant positive coefficient, according with previous models.

[TABLE 7 ABOUT HERE]

4.4 Discussion

The results show several of the variables used to represent board diversity to be significant. One of the most consistent is age diversity, which has a positive influence over ROA for both supervisory and executive directors. It seems like the attributes of younger and older directors complement one another, and the firm can leverage these differences to improve its assets management. This result is in line with most empirical evidence, such as Kim and Lim (2010) or Mahadeo *et al.* (2012), among others. Age diversity does not have the same impact on growth opportunities or market prospects, however, possibly because older board members are more risk averse.

Apart from age diversity, we find that the relationship between board diversity and firm performance is determined by the type of director. Thus, nationality mix among executive directors shows a highly consistent and significant positive impact on firm performance, on MTB in this case, supporting the view that firm performance benefits from the different cognitive perspectives provided by insiders of different nationalities and backgrounds. Accordingly with *H.2.*, executive directors have more opportunities to diminish the differences that could separate them, since they must work together regularly. However, evidence is not found about the same effect of nationality mix on supervisory directors. The heterogeneity of this group could lead to a uncertain relationship between diversity and performance, as social identity and group processes theories state.

Another difference between both types of directors has to do with the variable educational diversity, which shows a negative and significant impact just on supervisory directors, when we use MTB as performance measure. Again, this result can be explained by the premises of the social identity theory

(Smith *et al.*, 1994; Lau and Murnighan, 1998), given that educational diversity among board members can lead to a segmented working environment where social barriers exist between groups with different backgrounds. This become even more relevant since supervisory directors do not interact with each other in a regular basis. Beyond these variables, only SD2 (std. desv. of quoted boards to date) appear with a low level of significance and negative sign in one of the models for supervisory directors, while we do not find any evidence of a possible relationship between years on board diversity or gender diversity and firm performance. In this sense, the persistent lack of women on the boards of Spanish firms reduces the possibility of finding potential differentiating effects. Furthermore, as Benkraiem *et al.* (2017) proposed, the interactions among gender diversity and other directors' attributes can provide clearer relationships.

Therefore, regarding our general hypothesis, we find some evidence pointing to a greater positive effect of board diversity on executive directors, rather than on supervisory directors, among which more cognitive conflicts may arise. Actually, supervisory educational diversity shows a negative influence on MTB.

Finally, as for control variables, while literature about outside directors influence on corporate performance have generated different results and remain inconclusive (Hermalin and Weisbach, 2003), we find that the percentage of independent directors always show a positive coefficient, although it is significant just in two models (with ROA as response variable). In addition, we find a consistent negative relationship between leverage and performance (both in ROA and MTB models) with a high significance level. Regarding the percentage of directors' ownership and firm's size, they tend to have a negative coefficient, although they just show a statistical significance in one model. Finally, we do not find a clear trend in the BvD index or number of board meetings.

5. Concluding Remarks

The board, the highest echelon of a firm's internal control system, plays a particularly important role in environments where investors' rights lack proper protection and appropriate external control mechanisms, such as the market for corporate control, have yet to be set up. This kind of environment prevails in Spain, the setting for our analysis of the diversity of the board members in a sample of non-financial publicly-traded firms. This study's main contribution is to make a distinction between inside and outside directors. To our knowledge, there has been no analysis of the firm performance impact of the diversity of each type of director using the same sample and methodology, although their respective roles have been differentiated in many studies. Separate analysis of the two is therefore required in order to determine which aspects of their diversity have most impact when it comes to improving firm performance.

Although the agency paradigm has dominated the research on corporate governance in general, and boards of directors in particular, analysis of the diversity of board members requires us to adopt a plural approach, including not only the various board theories, such as the resource dependency theory, but also cognitive and social identity perspectives.

Our results enable us to conclude that, when analysing board diversity, it is indeed essential to make a distinction at least between inside and outside directors. Aspects found to be important in one case are of no significance in the other, thus evidencing the fact the various board roles require different attributes from those to whom they are entrusted. Highly significant factors for the typical decision-making role of the insider are age diversity, and national diversity, both in a positive sense. The supervisory tasks and expertise demanded of the outsider, on the other hand, also improve with age diversity but are damaged by education diversity.

Overall, our study demonstrates that the claim of "one size fits all" often implicitly stated by regulators and advisors is misleading. Board's attributes analysis over the boardroom as a whole, turn out in too simplistic conclusions. This is particularly important for regulators: A rigorous analysis should be performed before including general recommendations about, for instance, the age or the board tenure in corporate governance codes.

Our study shows that board diversity make up a phenomenon which is too complex to be fully understood from a single perspective and which requires deeper exploration including the consideration of cognitive and behavioural factors and the analysis of board dynamics, as a complement to the theories traditionally used to analyse board performance and efficiency.

Nevertheless, in our opinion, a longer time period could help understanding the dynamism of board composition, the firm's environment, and their relationship with board performance and decisions. We use data of listed companies in Spain, considered a civil-law based country, so the results may be unique to this context and may not apply for other institutional environments. Also, a relatively small number of firms are included, although they represent a very high percentage, in terms of capitalization, of Spanish stock market. In addition, we are just taking some board's attributes, but the concept of board diversity is a very wide one. In this regard, less traditional methodologies that do not rely on extant archival databases may be necessary to get a deeper understanding of the impact of boards on firm's performance.

Finally, future research should go in depth in the analysis of the effects of entities other than the board as a whole (e.g., insiders vs. outsiders, committees), and to extend the results to other countries. Also, the consideration of cognitive and behavioural factors, as a complement to the theories traditionally used to analyse board performance and efficiency, will enrich the debate.

Endnotes

¹ For instance, just 17 out of 74 papers analysed by Johnson et al. (2013) show analysis and conclusions at individual director level.

² As well as the methodology exposed, as additional robustness test, we perform GMM methodology (see for instance Arellano and Bover, 1995). The results (no reported because of space reasons) allow us to maintain our conclusion.

³ When models (3) and (4) were re-estimated using lagged values only for the variables representing diversity, no significant difference in the results was observed.

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