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ABSTRACT

This paper analyses the structure of boards of directors and its impact on business performance, which is approximated by economic profitability and the Tobin's Q ratio. We focus on three basic aspects of boards that have been reviewed in the recent reform of the Good Governance Code: the size of boards, their independence and their diversity. For the study of diversity, we use an index that integrates not only the gender of board members, but also their age and nationality, since these are factors that can influence the knowledge, experience and skills of the directors. The results confirm a high degree of compliance with the recommendations of the Good Governance Code, and suggest that the performance of the advisory and monitoring functions are factors that determine the composition of boards. With respect to the performance of the company, we note that there is a negative and significant relationship with the independence of boards. However, the results are sensitive to the performance measure employed.

1. Introduction

One issue that has attracted interest among researchers is the separation between management and ownership, which gives rise to the well-known agency problem. One aspect derived from this issue is the analysis of boards of directors, as they are one of the mechanisms that investors have to mitigate this problem as much as possible and, through monitoring, align the interests of managers with those shareholders who fall outside of management.

As the board of directors is the key element of corporate governance, it is clear that its composition must be responsive to the basic functions that are assigned to it: supervising and monitoring, avoiding opportunistic behaviour on the part of executives, and providing advice to decision makers to improve the management of the business. These aspects have also been looked at by researchers who have studied whether the determining factors in the composition of boards are related to the basic functions assigned and whether this composition has an impact on the management of the business (see Borlea, Achim, & Mare, 2017; Cavaco et al. 2017; Farag & Mallin, 2017; Korent, Dundek, & Calopa 2014; Marinova,

Plantenga, & Remery, 2016; Terjesen, Barbosa, & Morais, 2016, among others). However, as will be discussed later, the results obtained in the literature are neither conclusive nor definitive and, accordingly, the contribution of new evidence will improve the state of knowledge concerning the questions raised in this work, that is, whether the composition of the board of directors gives priority to the functions of supervision and/or advice and, moreover, determining if that composition affects the performance of the firm.

In addition, the recent financial crisis has revealed weaknesses in corporate governance, such as, among others, the complexity of the corporate governance structure of certain companies, their lack of transparency, and their inability both to deal with the crisis and to adequately determine the chain of responsibility within the organisation. Given this situation, in our country, as in other developed countries, the need to legislate or make recommendations regarding the composition, functions and responsibilities of the highest corporate governance body has become apparent, providing this issue with a renewed impulse (Díaz, García, & Baraibar, 2017; Korent et al., 2014; Murayev, Talavera, & Wei, 2016).

Thus, in Spain, in 2013, various aspects of corporate governance were revised.[1] Firstly, the Law of Capital Companies was amended to improve corporate governance (Law 31/2014 of 3 December), which includes a number of recommendations of the Unified Good Governance Code (U.G.G.C.) that became mandatory for capital companies.[2] Secondly, the law provides for the creation of a series of voluntary monitoring recommendations subject to the 'comply or explain' principle, which are included in the 2015 Good Governance Code (G.G.C.) for listed companies whose shares are admitted to trading on a secondary official stock exchange.

Thus, for example, both the U.G.G.C. of 2006 and the G.G.C. of 2015 recommend that the board of directors have between five and 15 directors who, in our country, can be classified as (i) executive directors (internal or insiders) who play senior management roles; (ii) independent directors (external or outsiders) appointed for their personal and professional qualities; (iii) proprietary directors who have the status of being shareholders with a stake greater than or equal to what is considered significant; and lastly, (iv) the directors qualified as other external directors, that is, those that cannot be considered either independent or proprietary.

On the other hand, the G.G.C. of 2015 recommends that the external directors (proprietary and independent) should constitute a large majority, with an adequate proportion between proprietary and independent directors. It is also recommended that, in general, independent directors should represent at least half of the board. The intention is for the independent directors to act as guarantors in the event of agency conflicts that may arise, not only between directors and shareholders but also between majority and minority shareholders (Díaz et al. (2017); Rodríguez, Fernández, & Rodríguez, 2013).

In addition, there is concern about promoting diversity of knowledge, experience and skills (Mateos de Cabo, Gimeno, & Escot 2010). Furthermore, a concrete appeal is made to gender diversity with the recommendation that female directors represent at least 30% of the total number of board members.

One aspect that should be analysed is whether these recommendations are applicable to all companies equally. Previous evidence found in studies such as Raheja (2005), Boone, Casares Field, Karpoff, and Raheja (2007), Guest (2008), Lehn, Patro, and Zhao (2009) Acero and Alcalde (2012) and Farag and Mallin (2017), among others, argue that the structure

and composition of the board are determined by the characteristics of the company, its environment, its information needs and the possible agency conflicts it faces.

On the other hand, it is possible that the recommendations contained in the G.G.C. are trying to achieve the smooth functioning of the governing bodies of firms (Korent et al., 2014). However, following Lehn et al. (2009) we expect that the board structure established by the company, regardless of these recommendations, will be consistent with the objective of maximising the value of the company. If this is so, changes in the board of directors made solely and exclusively to conform to the G.G.C. recommendations would detract from its optimal composition and would have negative effects on the value of the firm (Zantout, 2015).

The importance of a well-managed board of directors for the efficient performance of companies is undeniable, and the above empirical evidence has shown this. Moreover, several issues related to the composition of the board, such as the fact that the chairman of the board is a member of the executive board (Fich, 2005), the effect of appointing directors that are also executive directors in other firms (Murayev et al., 2016), the professionalisation of directors (Andreas, Rapp, & Wolff, 2012 and the impact of the proxy advisers (McCahery, Sautner, & Starks, 2016), have all been studied in recent years.

We are particularly interested in the issue of the composition of the board and its possible influence on the creation of value and the improvement of economic profitability. Our objective is to verify which variables determine the structure of the board, measured by its size, independence and the diversity of its members. We will also determine whether, as Linck, Netter, and Yang (2008) and Farag and Mallin (2017) suggest, this structure is a function of the costs and benefits of monitoring and advising, and if, in addition, the recommendations of good governance could have an impact on such composition. Next, we will examine whether the selected structure creates value in the company.

Although there does exist some literature on the subject, we suggest that our work sheds more light on the determinants of the composition of the board of directors and the influence that its composition has on the performance of the firm. Firstly, with regards to Spain, our sample covers the years 2010 to 2015 and is, to the best of our knowledge, the most up to date work available. This aspect is important given that the period includes the release of the new recommendations regarding the composition of the board in order to achieve better management and transparency, which, if they were taken into account, must have affected the structure of the supervisory board.

Secondly, the analysed period is characterised by the economic crisis, when a more sophisticated level of analysis in decision-making was required. By studying the relationship between board composition and company performance, we can see if any significant relationship does exist and if some particular type of board structure has conducted its functions more efficiently. Accordingly, this paper can aid in the understanding of whether the new guidelines for the composition of the board of directors, that is, a greater number of independents, more diversity in its composition, or a greater or lesser number of directors, are guidelines that correlate with better management resulting from the improved performance of its functions.

The work is divided into five parts. The following section discusses the theories and results obtained by other studies which attempt to explain the factors on which the composition of the board depends and whether the said composition influences in some way the performance of the firm. The third section presents the data, the variables and the methodology

that will be used to carry out the work. The fourth section is dedicated to the presentation and discussion of the results achieved, and section 5 concludes.

2. Determinants of the structure of the board of directors and its relationship with the performance of the firm

As we have indicated, there has been an interest on the part of researchers, regulators and society in general in the boards of directors of companies, their functions, composition and impact on the management of the firm. However, this interest has been greatly encouraged by the fact that in recent years there has been a need to transform boards, both as regards their composition as well as the evaluation of their functioning (Díaz et al., 2017; Korent et al., 2014).

2.1. Factors determining the structure of the board of directors

It is clear that if the role of the board is to advise and supervise, we should find relationships that account for its composition so that it may carry out these duties. On the other hand, in recent years and perhaps because of the effects of the crisis on companies and, indirectly, on shareholders and society in general, we are possibly faced with a change in the priority of the functions that must be undertaken by the board of directors, with supervision and monitoring being more important than the classic function of administration. For this reason there is a belief on the part of regulators in the need to take action on various aspects of the board.

With the intention of comparing the results with those obtained in previous studies, we focus on how the need for guidance and monitoring affects three aspects of the board: size, independence and diversity (Boone et al., 2007; Borlea et al., 2017; Cavaco, Crifo, Rebérioux, & Roudaut, 2017; Farag & Mallin 2017; Guest, 2008; Linck et al., 2008). In addition, in analysing these characteristics, we can see how the recommendations of the G.G.C. have influenced the composition of the board, since the number of directors that constitute it is regulated. This implies increasing the external or independent directors who can, among other things, exercise real supervision work. Finally, as the recommendations establish that the composition of the board should promote diversity and not just gender, this would require the inclusion of more knowledge and experience that would allow the work of the board to be undertaken in the most efficient way.[3]

The advisory needs of a company will depend fundamentally on its characteristics, such as its size, the markets in which it operates, its internationalisation, in short, its complexity. According to authors such as Boone et al. (2007), Coles, Daniel, and Naveen (2008) or Lehn et al. (2009), companies with diverse businesses and/or with complex operational or financial structures need more advice since they potentially need to work with more information, which implies a greater effort in searching for and interpreting the same, and would require a greater knowledge of the sector and the lines of business undertaken, more experience, contacts, etc. If this is true, we should observe a direct and significant relationship between the complexity of the business and any of the characteristics analysed, that is, board size, the number of independents and diversity.

The available evidence is in line with Lehn et al. (2009) where it is argued that large boards of directors can offer a higher standard of advice; in other words, if the complexity of the

business increases, the board will try to add new directors with the necessary knowledge to provide guidance. Accordingly, works such as Booth and Deli (1999), Coles et al. (2008) or Farag and Mallin (2017) argue and conclude that, when faced with the greater complexity of the business, more advice is required and this is reflected in a larger number of directors.[4] However, this result is not unanimous, as there are studies in which the relationship is not observed. For example, Donnelly and Kelly (2005) use the size of the firm as a proxy for business complexity and see a negative relationship between this variable and the size of the board. This result also has its explanation, given that, while a larger number of directors should lead to a greater capacity for analysis, it is no less true that, as Jensen (1993) affirms, on a large board of directors it is more difficult to reach a consensus when making decisions, and may also lead to the inhibition of the director.

Another important aspect is whether internal directors have a greater knowledge of the business and the company than external directors. On the one hand, we find arguments such as those advanced by Fama and Jensen (1983) and Raheja (2005), who hold that internal directors have more and better information when it comes to specific aspects of the company. For example, Coles et al. (2008) advocate a greater presence of internal directors in R&D-intensive companies where the specific knowledge of the company is more important. On the other hand, authors like Boone et al. (2007) and Lehn et al. (2009) suggest a positive relationship between independent and advisory directors, as these directors provide better advice and greater experience.

With regard to the diversity of boards, that is, boards where different attributes, characteristics and levels of experience are mixed, it is not difficult to accept the idea that this greater diversity would provide better advice, thus allowing for better decision-making. In other words, by bringing together diverse individuals, resources of information, talent and ability can be accessed in greater volume (Adams & Ferreira, 2009; Anderson, Reeb, Upadhyay, & Zhao, 2011).

Based on the above discussion we formulate our first hypothesis:

H1: The greater the complexity of a firm, the larger the size, independence and diversity of its board.

As mentioned previously, the other function of the board of directors is to supervise or monitor the management of the firm, thereby preventing opportunistic behaviour on the part of the managers and avoiding the possible conflicts that can arise between management and ownership. In this context, there seems to be a greater consensus that smaller boards require a lower cost of monitoring because they are more cohesive groups compared with large boards where communication and coordination costs are high and where monitoring is much more complex and less effective because of the free-riding problem (Boone et al., 2007).

On the other hand, as Anderson et al. (2011) point out, it will be necessary to have independent directors to carry out monitoring, since insiders will be more reluctant to control the C.E.O. given that their promotion is directly linked to him or her and that, unlike the independent directors, they can have a conflict of interest (Weisbach, 1988).

Regarding the independence of the board and the need for monitoring, diversity in the composition of the board is recommended. As Erhardt, Werbel, and Shrader (2003) indicate, the supervisory function can be more effective with diverse boards, thereby increasing

independence and reducing the probability of opportunistic behaviour that can alter the interests of the owners.

Previous empirical research shows that the composition of the board is the result of the trade-off between the benefits and the costs of monitoring and depends on the firm's characteristics (Boone et al., 2007; Farag & Mallin, 2017; Linck et al., 2008). The ownership structure and the characteristics of the C.E.O., which are used to approximate the potential extraction of benefits, and the indebtedness and growth opportunities of the firm, which are employed as estimates of the cost of monitoring, are some of the aspects considered in the literature with respect to the composition of the board.

Regarding the benefits of monitoring, Mak and Li (2001) suggest that the need to monitor the management team will depend on the ownership structure. In other words, if the ownership of the firm is very concentrated, it will be easier to control the actions of the management team and the need for external and independent directors will be lower. Raheja (2005) suggests that the independence of the board increases with the C.E.O.'s influence.

Related to the cost of monitoring, indebtedness is another mechanism to align the interests of managers and shareholders that will reduce the need for independent directors (Demsetz & Villalonga, 2001). In contrast, some authors argue that greater monitoring is needed in highly leveraged firms (Berger, Ofek, & Yermack, 1997; Bushman, Chen, Engel, & Smith, 2004). On the other hand, Jensen (1993) notes that firms with high growth are more costly to be monitored by large boards and Lehn et al. (2009) argue that information asymmetries in high-growth firms are greater and raise the cost of external monitoring.

The preceding discussion leads us to formulate our second and third hypotheses:

H2: Board size decreases and independence and diversity increase with the potential private benefits of managers.

H3: Board size, independence and diversity decrease with the cost of monitoring.

Finally, and with regard to the determinants of the composition of the board, it is clear that this can be due to the willingness of companies to comply with the recommendations of good governance. In this case, the number of board members, the weight or importance of the independent directors and their degree of diversity will be affected by the recommendations contained in the G.G.C.

2.2. *Structure of the board of directors and its relationship to performance*

The second objective of this work is to study the connection, if any, between the structure of the board and the performance of the company, approximating this through the economic profitability (or return on assets, R.O.A.) and Tobin's Q. We use these two measures because, as Borlea et al. (2017) and Farag and Mallin (2017) affirm, they are alternative measures that can provide us with different information. Thus, while with economic profitability we focus on the accounting profit obtained, with Tobin's Q we will keep the future prospects of the company in mind.

As with the determinants of the structure of the board of directors, upon analysing the relationship between the board's structure and the performance of the firm, diverse results are obtained that do not allow for definitive conclusions to be reached. On the one hand, if the need for advice is positively related to the size of the board, one might conclude that the

quality of the decisions made by companies with large boards would be superior (Dehaene, De Vuyst, & Ooghe 2001; Coles et al., 2008; Farag & Mallin, 2017). That said, as Yermack (1996) argues, in contrast to small boards, a large board of directors is faced with an increase in asymmetric information, the problem of communication between its members and difficulty in achieving consensus to reach a decision. Likewise, Pérez de Toledo (2010) observes an inverted U-shaped relationship between board size and firm performance. These factors could explain the contrary or non-significant results found in Haniffa and Hudaib (2006) and Brick and Chidambaran (2010).

The independence of the members of the board, measured through the percentage of external directors that compose it, and its impact on business results, has been another issue that has aroused some interest in the literature. As discussed earlier, the debate about whether independent directors provide more knowledge than internal directors is a subject that is not closed. However, if this is true and they do in fact offer better advice due to their knowledge or experience, one should find a direct relationship between the performance of the firm and the number of independent directors on the board (Dehaene et al., 2001; Krivogorsky, 2006; Andrés & Vallelado, 2008; Farag & Mallin, 2017).

However, and just as with board size, the positive relationship between independent directors and performance is not generalised and the empirical evidence suggests that board independence does not always create value. Thus, in works such as those of Agrawal and Knoeber (1996), Yermack (1996), Wintoki, Linck, and Netter (2012) or Borlea et al. (2017), a negative and significant relationship is observed, whereas in others no type of relationship at all is found (Bhagat & Black, 2002; Brick & Chidambaran, 2010; Hermalin & Weisbach, 1991; Rodríguez et al., 2013). These results, mainly unexpected, have several possible explanations. For example, the directors may not be truly independent; they might lack the necessary expertise to carry out their advisory work; they may be subject to excessive oversight; it could be that, as indicated above, the appointment of independent directors is due to an eagerness to follow the recommendations of good governance, thereby leading to a departure from the optimal board composition that causes a negative effect on the value of the company; perhaps this better advice is not reflected in the firm's performance; or there might be a problem with the methodology employed (Hermalin & Weisbach, 1991).

From the perspective of the diversity of board members, works such as those of Baysinger and Hoskisson (1990), Kaplan and Reishus (1990) and Anderson et al. (2011), among others, have argued that boards of directors where diversity exists can better assist in this advisory work. However, Hambrick, Cho, and Chen (1996) find that, in contrast to homogeneous groups, heterogeneity in top management increases the likelihood of not reaching agreement, thus making them less effective, and Milliken and Martins (1996) note that the heterogeneity of boards, while increasing the resources available to the group, is also associated with greater difficulty in making decisions.

Following the above review, we formulate our fourth and fifth hypotheses:

H4: There is an inverted U-shaped relationship between board size and firm performance.

H5: The greater the independence of the firm and the diversity of the board, the better its performance.

In sum, all the hypotheses we are testing are reflected in our model of hypotheses in Figure 1.
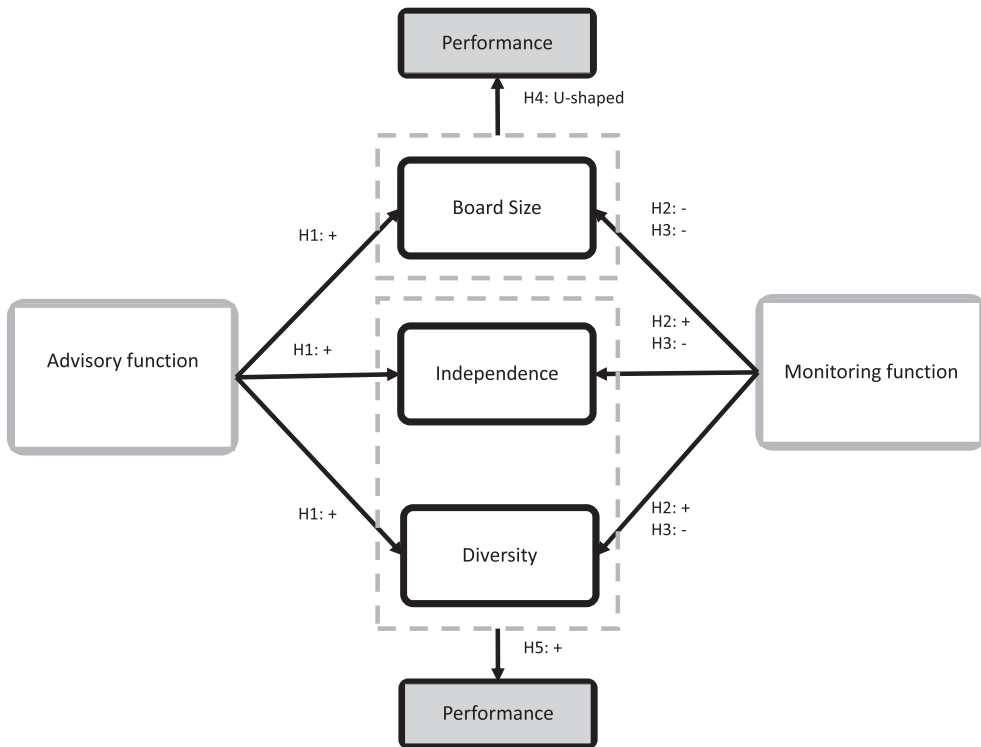
Figure 1. Model of hypothesis. Source: Authors.

3. Data, variables and methodology

In order to carry out the present study, we have selected as the study horizon the period from 2010 to 2015. Since our interest is focused on determining the characteristics that determine the composition of the board of directors and analysing the impact of this composition on the creation of value of Spanish companies, we decided to take as an initial sample all those non-financial companies listed on the Spanish Stock Markets Interconnection System (*Sistema de Interconexión Bursátil Español*, S.I.B.E.) at some point during the mentioned period. Subsequently, we obtained from various databases the following information for these companies:

- From the *Sistema de Análisis de Balances Ibéricos* (S.A.B.I.) database, we obtained indebtedness, the market-to-book ratio (M.T.B.), the market capitalisation, the number of segments in which the company operates, its age and the R.O.A., and we generated the Tobin's Q ratio as the quotient between the market value of the company and the value of the total assets.[5]
- From the Annual Corporate Governance Reports issued by the different companies, we obtained information on the number of total directors, the number of independent directors and the number of female directors.[6] Furthermore, we obtained the nationality and the age of the directors by consulting various websites. With all this information in hand, we approximate the size of the board by the number of directors that it contains; we estimate the independence through the relative importance of the

number of independent directors relative to the total number of directors; and, as the last characteristic of the board, we generate an index with which we try to measure the diversity of the board. This index is generated in a similar way to that created by Anderson et al. (2011), but takes into account only three characteristics: the number of women on the board, the nationality of each director and, finally, the variability of the age of the directors measured by its standard deviation.

- Using the Annual Corporate Governance Reports published by the Comisión Nacional del Mercado de Valores (C.N.M.V.) we generate an indicator of the degree of compliance by each company with the recommendations of good governance. This indicator is calculated as the ratio of the number of recommendations it complies with compared to the total number of recommendations that the company should be complying with.[7]
- The number of shares held by minority shareholders.
- Finally, with the corrected daily quotation prices obtained from *Bolsas y Mercados Españoles* (B.M.E.), we generate for each year the dispersion of the return through the standard deviation of the daily returns of that year, and using the well-known Sharpe model we estimate annually the beta of each title.

To form part of the sample, we require that information about the firms during the period of study be available, that the equity was positive and that the firms were not in liquidation. After this filtering, the number of firms that make up the sample is 82, resulting in 491 observations.[8]

In Table 1 we present the descriptive statistics for the variables used, grouped by the characteristics of the board analysed, the performance of the firm and other variables of interest that will be used as control variables. The table also shows an analysis of the differences in mean at two different moments, the initial period comprising the first two years of the analysed period (2010–2011) and the final period, composed of the last two (2014–2015). In addition, in Table 2 we present the matrix of correlations between the variables used in the work.

Regarding the characteristics of the board, we can observe that the boards of directors in Spain have an average size of 12 directors, which would be in line with the recommendation of the U.G.G.C. and the G.G.C. that establishes a target number of directors of between five and 15. In addition, we can observe how, in recent years, this number has grown slightly and meaningfully compared with the size at the beginning of the period analysed.

With regard to the proportion of independent directors, this figure stands at 35% and, as mentioned concerning the size of the board, in the final years of the analysed period there is a significant increase in this type of director. In any case, we can affirm that, on average, the U.G.G.C. recommendation is followed with respect to at least one-third of the directors being independent, though the 50% level recommended by the G.G.C. of 2015 is not reached.

Finally, focusing on diversity, we observe that both the index as a whole and the variables that compose it show an increase in their values with the passage of time. However, this variation is only significant in terms of gender diversity. That said, it is worth noting that it would still be far from the goal established in the Organic Law 3/2007 of 22 March for the Effective Equality of Women and Men[9] (L.O.I.M.H.) and the 30% established by the 2015 G.G.C. as the target for the year 2020.

Table 1. Characteristics and evolution of the board, performance and other variables of the firm.

Variable	Panel A: Characteristics of whole period Years 2010–2015					Panel B: Difference between means 2010–11 and 2014–15		
	Mean	Medium	Minimum	Maximum	Standard deviation	2010–11 Mean	2014–15 Mean	Difference between means
Characteristics of board of directors								
Board Size	12.01	11	4	28	4.06	11.46	12.2	0.74[c]
Independence	0.35	0.33	0	0.89	0.17	0.33	0.38	0.05[a]
Diversity	7.07	7	3	12	2.03	6.96	7.10	0.13
(D) Age	9.89	9.69	2.77	19.27	3.07	9.68	10.08	0.4
(D) Foreigners	0.11	0.05	0.00	0.75	0.16	0.10	0.12	0.02
(D) Women	0.12	0.1	0	0.4	0.1	0.1	0.13	0.03[a]
Performance of the firm								
R.O.A.	0.03	0.03	−1.45	0.5	0.11	0.04	0.04	0
Tobin's Q	1.33	1.06	0.27	7.84	0.96	1.24	1.42	0.18[c]
Other variables of interest								
Capitalisation	20.3	20.26	15.89	25.27	2.05	20.24	20.39	0.15
No. of segments	2.01	2	1	5	0.98	2.01	2.01	0
Indebtedness	0.59	0.62	0.04	0.99	0.2	0.59	0.59	0
M.T.B.	2.05	1.19	0.07	23.05	2.8	1.9	2.15	0.25
Power of the C.E.O.	0.04	0	0	0.96	0.12	0.03	0.06	0.03[b]
Minority shareholders	0.44	0.4	0	1	0.22	0.42	0.47	0.04[c]
Index of G.G.	0.81	0.82	0.38	1	0.11	0.77	0.83	0.05[a]
Standard deviation of return	0.03	0.02	0.01	0.49	0.03	0.03	0.03	0

The table presents a statistical summary of the analysed variables for the 82 companies of the sample. Regarding the heterogeneity variable, we present information about the variables that compose it, that is, the standard deviation of the age of the members of the board and the percentage of women and foreigners that are part of the board. Panel A shows the statistics for the whole analysed period 2010–15. Panel B shows the evolution of these variables over time. For this, we compare the mean of the variables in two moments: at the beginning and at the end of the analysed period, i.e., years 2010–11 and 2014–15 and we indicate with the subscript a, b and c the statistical significance at 99, 95 and 90%, respectively.
Source: Authors

There are other variables that we consider interesting to highlight: firstly, the minority shareholders variable shows a significant increase occurring in the dispersion of shareholders; secondly, there is a notable rise in the power of the C.E.O.; and finally, although the observed behaviour in the non-separation of functions between the C.E.O.[10] and chairman of the board is not in line with the recommendations of the U.G.G.C. and the G.G.C., it is observed that, with the passage of time, the average percentage of companies of the sample complying with these recommendations has increased by a meaningful five percentage points.

3.1. Determinants of the structure of the board of directors

In order to analyse if the functions attributed to the board of directors are the determining factors in its composition, we need to look for indicators that flag the advisory and/or monitoring needs of the firm.

The need for advice is related to the complexity of the firm as a whole through the following variables: firm size, business diversification and firm age (Boone et al., 2007; Fama

Table 2. Correlation matrix.

	R.O.A.	Tobin's Q	Board size	Indepen.	Diversity	No. of segments.	Capitalisation	Age	C.E.O. power	Minor.	Indebt.	M.T.B.	S.D. return	Beta
Tobin's Q	0.502 (0.000)													
Board size	-0.042 (0.354)	-0.120 (0.008)												
Independents	0.090 (0.047)	0.069 (0.126)	-0.120 (0.008)											
Diversity	0.064 (0.154)	0.083 (0.065)	0.119 (0.008)	0.047 (0.297)										
No. of segments	-0.029 (0.529)	-0.087 (0.056)	0.019 (0.677)	0.077 (0.088)	0.006 (0.989)									
Capitalisation	0.315 (0.000)	0.317 (0.000)	0.478 (0.000)	0.265 (0.000)	0.252 (0.000)	0.029 (0.530)								
Age	0.007 (0.868)	-0.008 (0.856)	0.167 (0.000)	-0.166 (0.000)	-0.101 (0.024)	-0.081 (0.072)	0.055 (0.218)							
C.E.O. power	0.055 (0.223)	0.047 (0.303)	-0.251 (0.000)	0.128 (0.005)	-0.103 (0.022)	-0.196 (0.000)	-0.089 (0.049)	-0.075 (0.094)						
Minority S.H.s	0.077 (0.088)	-0.013 (0.771)	0.100 (0.026)	0.379 (0.000)	0.026 (0.593)	0.117 (0.009)	0.137 (0.002)	0.067 (0.139)	-0.131 (0.004)					
Indebtedness	-0.219 (0.000)	-0.095 (0.039)	0.366 (0.000)	-0.051 (0.265)	0.051 (0.257)	-0.045 (0.324)	0.265 (0.000)	0.166 (0.139)	-0.121 (0.008)	0.234 (0.000)				
M.T.B.	0.332 (0.000)	0.733 (0.000)	-0.073 (0.108)	0.157 (0.001)	0.1663 (0.002)	-0.088 (0.050)	0.289 (0.000)	-0.039 (0.385)	0.051 (0.263)	0.171 (0.000)	0.174 (0.000)			
S.D. return	-0.195 (0.000)	-0.147 (0.001)	-0.073 (0.105)	-0.091 (0.043)	0.062 (0.165)	0.060 (0.188)	-0.360 (0.000)	-0.045 (0.313)	-0.074 (0.103)	-0.175 (0.000)	-0.114 (0.013)	-0.114 (0.012)		
Beta	-0.010 (0.834)	0.023 (0.617)	0.371 (0.000)	0.090 (0.047)	0.103 (0.022)	0.043 (0.342)	0.439 (0.000)	0.112 (0.014)	-0.130 (0.004)	0.221 (0.000)	0.331 (0.000)	0.049 (0.280)	-0.028 (0.540)	
R.G.G. Index	0.005 (0.903)	-0.040 (0.373)	0.091 (0.043)	0.311 (0.000)	0.172 (0.000)	-0.098 (0.030)	0.209 (0.000)	-0.012 (0.791)	-0.004 (0.930)	0.175 (0.000)	0.026 (0.558)	-0.037 (0.415)	-0.050 (0.265)	0.215 (0.000)

The table presents the correlation coefficients between the variables used. The performance of the firm has been approximated through R.O.A. and Tobin's Q. As variables characteristic of the board of directors, we have the size, independence and heterogeneity of the board and other variables that are used as proxies for the supervision/monitoring or advice needs of the board, such as the number of segments in which the firm operates, the size of the firm, the power of the C.E.O., the dispersion of ownership, the indebtedness and the M.T.B. ratio. Finally, we incorporate a series of control variables such as the dispersion of performance, the beta of the firm, the market share of the firm and an index of compliance with good governance recommendations. The table includes the p-values in parentheses.

Source: Authors.

& Jensen, 1983; Linck et al., 2008). In any case, this greater complexity will be associated with large, heterogeneous and independent boards of directors.

The firm size variable is used as a proxy for the complexity of the firm, since larger firms are expected to undertake more activities, even diversifying their businesses with entry into new markets and/or different sectors of activity (Acero & Alcalde, 2012; Anderson et al., 2011; Boone et al., 2007; Coles et al., 2008; Linck et al. (2008); Lehn et al., 2009, among others).

Some authors such as Boone et al. (2007) suggest that the complexity of companies increases with age. They argue that companies have simpler structures after their creation and during the first years, and their degree of complexity increases over time, although a continued increase in complexity is not clear once the company is mature.[11] In contrast, Mohan-Neill (1995) establishes that young firms may be more involved in the development of new products and/or markets that allow them to have an advantage over already established firms, and they are therefore in greater need of advice.

Another variable used as a proxy for the need for advice is the number of sectors in which the company participates. Several authors argue for the existence of a direct relationship between this variable and the size of the board of directors and the presence of independent directors who help control the different lines and have specialised knowledge of the business areas (Boone et al., 2007; Coles et al., 2008; Lehn et al., 2009).

The other function that the board of directors undertakes and that should be able to explain the composition of the board is the function of supervision or monitoring, that is, preventing opportunistic behaviour by some interest group, mainly executives and/or majority shareholders. In short, the board serves to prevent as far as possible the known problem of agency.

The monitoring function will have diverse implications on the variables we have considered as characteristics of the structure of the board. Thus, smaller boards are more effective at monitoring and supervising board decisions, since it is easier to coordinate between directors and minimise the free-rider problem (Boone et al., 2007). In addition, this monitoring function is linked to the presence of independent directors, since one of the basic functions of these directors is to verify and monitor that the decisions made by the board are aligned with the interests of the shareholders and to avoid possible conflicts of agency between the various stakeholders.

Related to the independence of the board, diversity is important as this increases the independence and reduces the probability of collusion among the members of the board to alter the interests of shareholders. Accordingly, authors such as Erhardt et al. (2003) or Anderson et al. (2011) believe that the supervisory role can be more effective when there is a greater diversity of opinions or, as indicated by Carter, Simkins, and Simpson (2003), when the diversity of the board makes it less likely that it succumbs to the pressure of executives.

On the other hand, the need for monitoring will depend on the possibility of extracting private benefits or the likelihood of opportunistic behaviour on the part of executives, and it will be related to the characteristics of the firm. To capture these aspects we will use different variables, one of which, which we have called C.E.O. power, measures the percentage of ownership held by the board chairman who is also the C.E.O. of the firm. The other is the ownership structure of the firm, measured as the number of shares held by minority shareholders compared with the total. The cost of monitoring is approximated by the M.T.B. ratio and the indebtedness.

As a director accumulates more power, the possibility of entrenchment and opportunistic behaviour increases, meaning that more supervision by the board of directors would be necessary, which would be manifested in small, independent and heterogeneous boards (Anderson et al., 2011; Boone et al., 2007; Raheja, 2005).

The ownership structure of the company is another variable that can help us explain the composition of the board. Specifically, Acero and Alcalde (2012) argue that if we are faced with a dispersed ownership structure, the smaller shareholders will demand more supervision, which would require a greater presence of independent directors. In this same line, Kang, Cheng, and Gray (2007) state that according to stakeholder theory, it is expected that the greater the presence of small shareholders, the greater the diversity and independence of the boards, since this ensures that the different groups are represented in the decision-making process.

A number of papers, such as Smith and Watts (1992), Gaver and Gaver (1993) and Jensen (1993), argue that it is more costly to monitor high-growth companies and therefore the size of the board should be small. In addition, Baysinger and Hoskisson (1990) maintain that in these companies the internal directors are the ones with the best information and, therefore, the recruitment of external directors would not be necessary. Accordingly, Boone et al. (2007) and Linck et al. (2008) note that high-growth companies tend to have smaller, less independent boards.

Indebtedness generates contractual obligations that, for some authors like Jensen (1986), reduce the directionality of the policy with regard to free cash flow and favour the alignment of interests of managers and shareholders. In addition, Demsetz and Villalonga (2001) refer to the monitoring work undertaken by debt holders, which will reduce the need for independent directors as shown by Maug (1997). However, we also find works such as Jensen (1993), Booth and Deli (1999) or Bushman et al. (2004) who argue that greater leverage requires greater supervisory needs and, therefore, are in line with the results obtained by Mehran (1992) or Berger et al. (1997), who find a positive relationship between indebtedness and external or independent directors.

Regarding indebtedness, it should be noted that some authors, such as Coles et al. (2008), Linck et al. (2008) or Guest (2008), use it as a proxy for advisory needs and assert that more indebted companies are more reliant on external resources and have a greater need for information and advice, which would imply larger boards of directors.

In addition to these variables, we will employ diverse control variables: the performance measure, i.e., the R.O.A. or Tobin's Q; the risk, approximated by the standard deviation of the return (S.D. return); and an indicator of compliance with the recommendations of good governance (R.G.G. index).

The methodology that we will use for this first analysis is similar to the one developed by other works, such as, for example, Boone et al. (2007) and Linck et al. (2008), and is based on robust regressions with clusters, the company being the regrouping variable. This procedure will allow us to exploit the information both in the transversal aspect of the data and in the time aspect, controlling the serial correlation of each company (Boone et al., 2007).

However, it is likely that the characteristics analysed – size, independence, board diversity and company performance – are determined endogenously, so we instrumentalise these variables through their lagged value. In addition, we control for the sector to which the company belongs and the time effect.

3.2. Structure of the board of directors and firm performance

The other aspect that will be evaluated is the impact of the size, the independence and the heterogeneity of the board of directors on the financial performance of the firm, which has been approximated through two measures (Borlea et al., 2017; Farag & Mallin, 2017; Terjesen et al., 2016, among others). The first of these is the R.O.A. or economic profitability, measured by the ratio of profit before interest and taxes to the total assets, and the second, Tobin's Q, is calculated as the quotient of the market value of the company and the total assets.

Given the objective of the work, it is evident that the first three variables to be considered as explanatory of the performance of the firm will be the size, the independence and the diversity of the board of directors.

Regarding the size of the board, it could be argued that larger boards are associated with more complex companies with a greater need for guidance, and this should be reflected in better performance, a result that is observed by Coleman and Biekp (2006) and Rehman and Shah (2013). In this line, Coles et al. (2008) obtain a similar relationship if the company is complex and observe a negative relationship in non-complex companies. On the other hand, authors such as Lipton and Lorsch (1992) or Jensen (1993) argue that there may be a negative relationship between the size of the board and performance because, with the increase in the number of directors, the disadvantages caused by problems of coordination and free-riding would outweigh the potential benefits of having additional directors. This argument is supported by several studies, such as the negative and significant relationship obtained by Eisenberg, Sundgren, and Wells (1998) or Yermack (1996). In this vein, Pérez de Toledo (2010) observes a quadratic relationship between board size and performance, highlighting the risk of oversized boards and the difficulty in making decisions and reaching agreements after a certain size.

Another of the characteristics of the board whose impact on the performance of the company has been studied is its independence, about which, as in the previous case, we did not find unanimity in the results. The theoretical arguments establish that the existence of independent directors will minimise agency costs, and their actions, when directed toward the interests of the shareholders, should be reflected in a positive relationship with the performance of the company (Coleman & Biekp, 2006; Dehaene et al., 2001; Rehman & Shah, 2013). However, as indicated by Haniffa and Hudaib (2006), due to the lack of real independence, to excessive monitoring or to a lack of expertise in advising that can limit strategic actions, it is possible to obtain unexpected results, such as those presented by Yermack (1996) and Coles et al. (2008) who observe a negative relationship between the number of independent directors and Tobin's Q, or Bhagat and Black (2002), Haniffa and Hudaib (2006) and Brick and Chidambaran (2010) who do not observe any type of relationship.

The last characteristic of the board that has been considered is its diversity. In this case, it is usual to relate this characteristic to, among other things, access to new resources, higher levels of information, and increased independence encouraging supervision (Carter et al., 2003) and, therefore, to better decision-making (Hillman & Dalziel, 2003) that would lead to better results. However, and as in previous cases, the available empirical evidence does not allow a consensus to be reached.[12] Thus, Carter et al. (2003), Campbell and Mínguez-Vera (2008) or Lückerath-Rovers (2013) show a positive impact between board diversity

and firm performance. However, we also find works arguing that diversity will increase communication problems, aggravate conflicts among board members, and make consensus more difficult to reach (Earley & Mosakowski, 2000; Williams & O'Reilly, 1998). Therefore, it would not be strange to find relationships contrary to those initially expected, i.e., negative (Adams & Ferreira, 2009; Böhren & Ström, 2010), nor to find the absence of a significant relationship (Carter, D'Souza, Simkins, & Simpson, 2010).

Finally, and just as we have analysed the determinants of the composition of the board, we have introduced control variables: the power of the C.E.O. of the company; the dispersion of property; indebtedness; the size of the company measured by its market capitalisation; and the risk of the firm, valued through the beta parameter. For the particular case of Tobin's Q, we have introduced R.O.A. as an additional control variable, since the market value of the company may be related to its profitability.

One of the aspects that deserve special attention when studying the relationship between the board of directors and the performance of the company is the one that refers to the econometric techniques used and the consideration of the problem of endogeneity. The methodology used may lead to biased results if board characteristics and performance are jointly determined by unobservable variables or, for example, if changes in board structure are determined by past business results. To eliminate these problems we follow Schultz, Tan, and Walsh (2010) or Wintoki et al. (2012), who suggest applying a G.M.M. (Generalized Method of Moments) dynamic model as the most appropriate method.

4. Results

As in previous sections, the results obtained will be presented and commented on in accordance with the objective.

4.1. Determinants of the structure of the board of directors

Regarding the determinants of the structure of the board of directors, the results are presented in Table 3 and, as can be seen, they are independent of the variable that reflects the performance of the company, that is, the R.O.A. or Tobin's Q. In columns (1) to (3) of Table 3 we show the results of the regressions of the size, independence and heterogeneity of the board when R.O.A. is used as the control variable of the performance, and in columns (4) to (6) the same analysis is presented when the lagged Tobin's Q is used as the control variable. In addition, in all regressions we control by sector and time and present statistics that measure the goodness of fit.

Focusing on the variables that approximate the need for advice, the size of the firm, the age and the number of segments in which the firm performs its activity, we can say that the only variable that does not reflect any significant relationship is the number of segments. As regards the size of the firm, measured through its market capitalisation, it is directly related to the characteristics of the board analysed, regardless of which one. This result would indicate that the greater the complexity of the business, the more advice is required. Regarding the number of sectors, we did not find any significant relationship.

With respect to the age variable, an inverted 'U' relationship is observed between this variable and the size of the board. Therefore, it seems that the complexity of firms increases with age, but that this increase decreases over time. Moreover, this result could supportw

Table 3. Determinants of the composition of the board.

	Performance measure R.O.A.			Performance measure Tobin's Q		
	BS	IND	HET	BS	IND	HET
Constant	0.06302 (0.876)	−0.21237 (0.217)	0.50116 (0.193)	0.09458 (0.812)	−0.17269 (0.310)	0.53094 (0.165)
Lagged Performance	0.08700 (0.678)	−0.07502 (0.490)	−0.07470 (0.630)	−0.04706 (0.076)	−0.03346 (0.124)	−0.02645 (0.256)
Lagged Board Size		−0.09605 (0.008)	0.07244 (0.571)		−0.10091 (0.006)	0.06753 (0.596)
Lagged Independence	−0.39746 (0.004)		−0.33134 (0.048)	−0.42197 (0.002)		−0.33972 (0.040)
Lagged Heterogeneity	0.10367 (0.314)	−0.04752 (0.162)		0.09719 (0.333)	−0.04937 (0.143)	
Capitalisation	0.09413 (0.000)	0.02795 (0.000)	0.05516 (0.002)	0.09948 (0.000)	0.02983 (0.000)	0.05661 (0.002)
Segments	−0.01454 (0.674)	0.00811 (0.537)	0.01387 (0.598)	−0.01625 (0.610)	0.00676 (0.606)	0.01279 (0.629)
Age	0.00658 (0.051)	−0.00310 (0.026)	−0.00559 (0.099)	0.00665 (0.047)	−0.00297 (0.033)	−0.00551 (0.105)
Age^2	−0.00005 (0.074)	0.00002 (0.045)	0.00000 (0.182)	−0.00005 (0.067)	0.00002 (0.056)	0.00003 (0.192)
M.T.B.	−0.03623 (0.000)	0.00529 (0.457)	0.01094 (0.321)	−0.02255 (0.013)	0.01279 (0.003)	0.01667 (0.133)
Indebtedness	0.32818 (0.011)	−0.12298 (0.100)	−0.10175 (0.403)	0.25639 (0.061)	−0.14521 (0.038)	−0.11747 (0.327)
C.E.O. power	−0.44606 (0.001)	0.21246 (0.020)	−0.10609 (0.595)	−0.46975 (0.000)	0.19322 (0.029)	−0.11968 (0.553)
Minority shareholders	0.22818 (0.070)	0.22639 (0.000)	0.04759 (0.727)	0.20830 (0.099)	0.20932 (0.001)	0.03622 (0.796)
Return variability	1.06004 (0.081)	0.46811 (0.076)	1.56205 (0.000)	1.98145 (0.111)	0.49529 (0.066)	1.596763 (0.000)

Index of Recommendation of Good Governance	−0.02467	0.40184	0.44364	−0.04843	0.20930	0.43389
	(0.942)	(0.001)	(0.059)	(0.887)	(0.002)	(0.062)
Control sector	YES	YES	YES	YES	YES	YES
Control year	YES	YES	YES	YES	YES	YES
F	7.240	7.100	3.040	7.410	8.440	3.060
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0001)
Adjusted R^2	0.4667	0.4149	0.2197	0.4721	0.4264	0.2216

The table presents the results of regressing certain characteristics of the board of directors of 82 companies listed on the Spanish Stock Market during the period 2010–2015 with various characteristics of these companies. The characteristics of the board analysed were: the size of the board (BS), measured by the logarithm of the number of directors that compose it; the weight of independent directors (IND), i.e., the ratio of the number of independent directors to the total number of directors; and the heterogeneity index (HET), which considers the number of women and foreigners on the board, the variability of the age of the directors and their professionalisation. The table presents the coefficients obtained and, in parentheses, its p-value based on robust errors, classifying the observations by firm.

Source: Authors.

Mohan-Neill's (1995) thesis that young firms may need more advice when exploring the business environment or developing new products, that is, achieving some advantage that will allow them to survive against competing companies already established in the market.

Regarding the relationship between age and the independence of the board, we observe an inverse behaviour to that observed for size. It is possible that the type of advice that the firm needs at various times explains this behaviour. In other words, initially the firm requires more specialised advice where the internal directors who know the business would provide the added value. On the other hand, to the extent that complexity increases, perhaps because the firm enters new sectors of activity or, for example, seeks out new national and international markets, it becomes necessary to recruit independent directors. This same argument could explain the relationship between the age of the firm and the diversity of the directors, although the age squared lacks statistical significance.

In sum, the results support hypothesis 1 concerning the advisory needs of complex firms.

If we observe the relationship with indebtedness, we find that the size of the board shows a positive and significant relationship with this variable, taking into account the greater dependence of indebted companies on external resources, their greater financial complexity and, therefore, a greater need for guidance which would be reflected in larger boards (Coles et al. (2008), Linck et al. (2008) and Guest (2008)). In principle, the relationship found between indebtedness and the size of the board could be considered contradictory if, as we said initially, indebtedness is considered as a proxy for the necessity of monitoring, thus smaller boards would be expected, as these are easier to supervise and monitor. However, this greater indebtedness would not only reflect a greater financial complexity, it would also imply a lesser need for monitoring because, firstly, companies with a high degree of indebtedness should have greater transparency and, secondly, they would be faced with a lower need for supervision of the board because of the monitoring role of debt holders. This would explain, as Maug (1997) argues, the negative and significant relationship observed between board independence and indebtedness.

Continuing with the monitoring function, and as shown in Table 3, we obtain an inverse relationship between the size of the board and the growth opportunities approximated by the M.T.B. ratio. This result is expected if we accept that the free-rider problem is greater in companies with growth opportunities and in large boards; therefore, for the board to have incentives to monitor these firms, the board should be reduced in size (Gaver & Gaver, 1993; Smith & Watts, 1992). In addition, this inverse relationship can be explained by considering that these companies need agility and determination in decision-making, aspects that are lost in large boards due to the greater problems of communication and coordination among its members (Lehn et al., 2009).

On the other hand, if we observe the results, we can confirm that the accumulation of power in a single director will require more monitoring, which is reflected in the negative and significant relationship we see between the power of the C.E.O. and the size of the board. As Lipton and Lorsch (1992) and Jensen (1993) note, large boards of directors are easier to control by the C.E.O. because of the lack of communication, cohesion and even the lack of accountability. In addition, as we expected, this need for supervision, derived from the power of the C.E.O., is reflected in the positive and significant relationship of this variable with the independence of the board, which would inhibit the extraction of private benefits and possible agency conflicts with the remaining shareholders (Boone et al., 2007; Linck et al., 2008; Monem, 2013; Raheja, 2005, among others.)

Also, we expected to see an increase in diversity because this is less likely to be subject to pressure from the C.E.O. (Carter et al., 2003). However, as shown in Table 3, our results do not support this latter idea.

Likewise, a wide dispersion of ownership will increase the number of interest groups, each of which will attempt to be represented on the board, leading, therefore, to larger boards subject to greater supervision by the independent directors who represent the small shareholders (Acero & Alcalde, 2012). As with the C.E.O. power variable, the expected relationship between dispersion of ownership and diversity is not significant.

The above results partially support hypotheses 2 and 3, revealing the trade-off between the benefits and costs of the monitoring role.

Finally, with regard to the relationship between the characteristics of the board that we have analysed and the degree of compliance with the recommendations of good governance, we must indicate that the results are as expected. Thus, there are a greater number of independent directors and more diverse or heterogeneous boards. Regarding the relationship with size, although it has no statistical significance, an inverse relationship is observed, indicating that compliance with these recommendations leads to the acceptance of smaller boards.

Regarding the determinants of the structure of the board, the results are consistent with different empirical works that employ various advanced econometric techniques (Linck et al., 2008; Guest, 2008; Farag & Mallin, 2017).

4.2. Relationship between board of directors and firm performance

Below, we analyse the relationship between the characteristics of the board of directors measured through size, independence and diversity, and the performance of the company.

We perform a multiple regression analysis for each of the performance measures used, that is, R.O.A. and Tobin's Q, and the results obtained are shown in Table 4. As can be seen, we have introduced the variables related to the composition of the board individually (columns (1), (2) and (3) for the dependent variable R.O.A. and (5), (6) and (7) for Tobin's Q) and together (columns (4) and (8)).

The first comment that deserves to be highlighted is the impact of the size of the company and its level of indebtedness on the performance of the firm. As we can see, there is a direct relationship between the performance of the firm and its size and a negative relationship with the debt. For the remaining variables and as regards the characteristics of the board, the results in general are diverse.

If we focus on the impact of the size of the board on the performance of the firm, we can state that, as seen in diverse works such as Brick and Chidambaran (2010) or Rodríguez et al. (2013), it is not related to Tobin's Q. However, we do find a significant relationship if we use R.O.A. as an indicator of business performance and, in addition, its behaviour is not linear. In other words, if we accept that the directors provide knowledge and advice to the company, the incorporation of new members to the board will have a positive effect on its economic profitability. However, consistent with Yermack (1996), starting from a certain size the addition of new directors will have a negative effect, revealing the lack of functionality, communication and coordination that can be found in large boards. The results support hypothesis 4 when R.O.A. is the performance measure employed.

Table 4. Relationship between board composition and performance.

	Measure of performance R.O.A.				Measure of performance Tobin's Q			
Constant	−0.30306 (0.001)	−0.10091 (0.294)	−0.30743 (0.011)	−0.59364 (0.020)	−0.48737 (0.793)	−0.09871 (0.880)	0.08729 (0.909)	−0.10158 (0.957)
Lagged Performance	0.18155 (0.000)	0.29039 (0.000)	0.27799 (0.000)	0.22725 (0.000)	0.80812 (0.000)	0.79685 (0.000)	0.81010 (0.000)	0.80555 (0.000)
R.O.A.				−0.23452 (0.708)	−0.27489 (0.596)	−0.35512 (0.518)	−0.30814 (0.610)	
Board Size	0.12156 (0.044)			0.32106 (0.018)	0.26318 (0.857)			0.19987 (0.889)
Board Size^2	−0.02792 (0.010)			−0.06328 (0.017)	−0.04884 (0.871)			−0.03596 (0.902)
Independence	−0.17027 (0.000)			−0.23506 (0.000)	−0.47457 (0.007)			−0.52230 (0.006)
Heterogeneity		0.08116 (0.000)		0.06512 (0.010)		−0.13731 (0.223)		−0.12496 (0.291)
Capitalisation	0.01109 (0.001)	0.01278 (0.004)	0.01165 (0.018)	0.01224 (0.066)	0.05505 (0.113)	0.06048 (0.025)	0.05997 (0.054)	0.06465 (0.038)
Indebtedness	−0.06492 (0.022)	−0.20922 (0.000)	−0.13278 (0.000)	−0.22841 (0.002)	−0.91110 (0.019)	−1.04014 (0.003)	−0.90603 (0.010)	−1.28366 (0.001)
C.E.O. Power	0.60684 (0.000)	0.94882 (0.000)	0.72785 (0.000)	0.88146 (0.000)	−0.72353 (0.582)	−0.57733 (0.666)	−0.55089 (0.665)	−0.68045 (0.650)
C.E.O. Power^2	−0.88317 (0.000)	−1.22763 (0.000)	−1.11795 (0.000)	−1.07930 (0.000)	1.94426 (0.278)	2.10156 (0.239)	1.45917 (0.404)	1.98483 (0.318)
Minority Shareholders	0.07978 (0.012)	0.06557 (0.177)	0.02749 (0.563)	0.08914 (0.130)	−0.50951 (0.096)	−0.40856 (0.166)	−0.48283 (0.107)	−0.34217 (0.258)
Beta	−0.00787 (0.403)	0.00703 (0.666)	0.01032 (0.588)	−0.01626 (0.516)	−0.11198 (0.448)	−0.12363 (0.377)	−0.10114 (0.469)	−0.10423 (0.484)
Control industry	YES	YES	YES	YES	YES	YES	YES	YES
Control year	YES	YES	YES	YES	YES	YES	YES	YES
Arellano-Bond AR(1) test	0.012	0.007	0.006	0.007	0.011	0.011	0.011	0.012
AR(2) test	0.481	0.448	0.211	0.344	0.349	0.404	0.319	0.366
Hansen Pr>Chi^2	0.660	0.703	0.547	0.689	0.716	0.696	0.775	0.726

The table presents the results of regressing the performance, approximated through R.O.A. and Tobin's Q, of 82 companies listed on the Spanish Stock Market during the period 2010–2015 with several characteristics of the board of directors of these companies that are considered endogenous variables, i.e., the size of the board, the weight of independent directors and their heterogeneity, and other control variables. The table shows the coefficients obtained through a G.M.M. dynamic panel of Arellano and Bond and their p-value in parentheses. In addition, we present the values of the Hansen test that indicate the validity of the instruments and the AR (2) test of Arellano and Bond of the sample shows no second order autocorrelation.

Source: Authors.

Surprisingly, and contrary to expectations, we see that greater independence of the board leads to lower performance of the company, whether it is quantified by its economic profitability (R.O.A.) or Tobin's Q is employed. This result may be due to, as Haniffa and Hudaib (2006) suggest, the excessive monitoring to which companies with a large number of independents may be subject to, or that they do not have the specific knowledge to be efficient. Regarding the professionalism or preparation of the independent directors, and for the specific case of Spain, one of the results revealed by the SpencerStuart Index (2016) is the need to incorporate independent directors with previous experience in the sector, and even business experience. Another element that may explain this negative and significant relationship is the information asymmetries faced by independent directors and the greater cost of monitoring that performing their function involves when additional information is needed for decision-making (Boone et al., 2007). On the other hand, Hermalin and Weisbach (1991) argue that the companies with the highest performance have managers with great capacity and therefore need less monitoring and usually have fewer independent directors. In any event, our findings confirm that the independence of the board does not always create value.

As we mentioned earlier, we expect that diversity in the board will provide value to the firm for a variety of reasons, such as access to greater and better information, talent and skills, although we are aware that these can be nullified by the greater problems of communication, coordination and limited agility in decision-making. As with board size, its diversity has a positive and significant relationship only if the firm's performance is approximated through R.O.A. or economic profitability. This lack of concordance in the results also appears in other studies, such as, for example, Carter et al. (2010) where diversity is positively associated with R.O.A. but no significant relationships with Tobin's Q are observed.

In short, with respect to hypothesis 5, the above results do not support the hypothesised relationship between independence and performance, but do partially support it as regards diversity.

Finally, as far as the C.E.O. power variable is concerned, it is clear from the previous literature that the influence that this variable can have on performance is diverse; on the one hand, a negative relationship is expected because it hinders the board's control by fostering entrenchment and reducing the independence of the board; on the other hand, it can have positive effects because it eliminates ambiguity about the control of the firm, favouring the unity of command and eliminating possible conflicts. As with the size or the diversity of the board, the results show that this variable is only related to performance if it is approximated through the R.O.A. What is more, the relationship obtained is quadratic, indicating that when the C.E.O. maintains a lower level of control, its effect is positive, producing an alignment of interests with the rest of the shareholders. As the C.E.O.'s control increases, the entrenching effect increases, encouraging the extraction of private profits and negatively impacting the performance of the firm.

Overall, the results regarding the relationship between board characteristics and performance are similar to those in other empirical studies although they utilise different methodologies, as in Coles et al. (2008).

5. Conclusions

In this paper we intend to show evidence of the characteristics that determine the composition of boards of directors and the influence that this composition has on the profitability and value of the company. Given the previous evidence and the failure to obtain definitive conclusions, this work contributes to the state of knowledge regarding the proposed objective.

This work is centred on a period after the crisis of 2008, where the need to regulate the functions, duties and responsibilities of the board of directors has become evident in developed countries. This need has been caused by an abandonment of the functions of the board and/or the publication of various scandals that have had a negative impact on the creation of value for the shareholder and for society in general.

Therefore, we consider that the analysis we carry out is useful for companies, regulators and society, as we examine whether the election and the composition of the board of directors respond to the functions attributed to it and how this composition affects the performance of the firm.

First, it can be concluded that there exists a greater degree of compliance with the recommendations of the G.G.C. by companies. Specifically, there has been an increase in board independence and in the number of female directors. Moreover, with respect to the size of boards, they are being maintained within the established limits.

Secondly, and with regard to the determinants of the characteristics of the board, the results obtained confirm that the functions of advising and monitoring are factors that explain the composition of the same. Accordingly, we conclude that complex companies, that is, those firms with a greater need for advice, have larger boards with a greater proportion of independents and wider diversity.

Regarding the monitoring function, we conclude that those companies where the extraction of private profits is more likely are characterised by smaller-sized boards, that is, easier to control and with a greater presence of independents, which favours the alignment of management and shareholder interests. However, in indebted companies this monitoring work is done in part by debt holders.

Thirdly, as regards the relationship between firm performance and the characteristics of the board, it should be noted that the choice of how to measure the performance of the firm is an aspect that affects the results and the possible conclusions.

A matching result for both R.O.A. and Tobin's Q is that the independence of the directors has a negative and significant relationship with these variables. This result can have a number of explanations, such as the absence of truly independent directors, and even that these directors do not bring previous experience in any sector, that is, they suffer from a lack of business experience.

With respect to the other characteristics of the board – size and diversity – they are only significantly related to R.O.A. Regarding size, it seems that the recommendations of good governance are on the right track, preventing large boards that can lead to a lack of coordination and communication and to slowness in decision-making, thereby prejudicing business development. On the other hand, diversity contributes value by providing access to a greater volume of information or skills by incorporating the best board members regardless of gender, age or nationality.

The last conclusion that we can highlight is the negative relationship that an excess of C.E.O. power has on R.O.A. Accordingly, we can also say that the recommendations of good governance are moving in the right direction, indicating the desirability of the separation between the functions of C.E.O. and the chairman of the board of directors. However, we must note that what should really be avoided is the excess of power that can favour managerial entrenchment and the expropriation of wealth from the rest of the shareholders.

5.1. Managerial implications

Our study reveals the importance of considering different aspects, such as ownership structure, indebtedness, size of the firm and C.E.O. power, when determining the structure of the board.

Likewise, the results focus on the role of independent directors and the negative impact on the performance of Spanish firms, suggesting that firms should incorporate experienced and highly qualified directors.

The conclusions may be useful for firms in the design of their boards, taking into account their own characteristics, and for those regulators who create the recommendations, some of which may change in light of our results. To sum up, there is not one optimal board size, since it depends on the characteristics of the firm.

5.2. Limitations and future research

The study also has some limitations that could be addressed in future research. It might be interesting to lengthen the time period studied by including several years after the implementation of the G.G.C. to analyse the effects of this regulation. Future studies could also include more variables than our study did, in particular variables referring to the activity of the board, such as the number of meetings, the remuneration of the directors and institutional ownership.

In addition, the results may lead researchers to analyse in depth the role of independent directors and the quality of the information available to outsiders.

Likewise, due to the importance of the firm's characteristics in the results, it would be useful to extend the sample to incorporate non-listed firms or to split the sample into family and non-family firms.

Notes

1. In Spain, until 2013, there were a series of recommendations on corporate governance set out in the Unified Good Governance Code approved by the Spanish Securities Market Commission (*Comisión Nacional del Mercado de Valores,* C.N.M.V.) in 2006, which attempted to harmonise and update the content of good governance contained in the 1998 Olivencia Report and in the Aldama Report, the first Good Governance Code of 2003.
2. Prior to Law 31/2014, Ministerial Order ECC/461/2013, dated 20 March, brought together the regulations that develop the obligations related to the corporate governance report of listed corporations as well as savings banks and other entities.
3. We must recognise that, on many occasions, speaking about diversity on boards of directors is directly related to the presence of women on these bodies. In 2006, for the first time, the support for female directors is revealed; in 2013, having adequate gender diversity on boards

of directors is indicated as an objective; and in 2015, the goal is set that, by the year 2020, the number of female directors will represent a minimum of 30% of the total number of directors.

4. In previous works, complexity is approximated through variables related to growth opportunities, the number of segments, lines of business or markets in which it operates, the size of the firm and even the age of the company.

5. The market value of the company was calculated as the sum of the market value of the equity plus the market value of the debt. This latter value was approximated through its book value.

6. This report is usually published in June of the next year so the selection of the data reaches until 2015.

7. The information contained in the reports of the C.N.M.V. differs if it complies, does not comply or partially complies. In our case we have differentiated only and exclusively if it complies or does not comply; in the case of partial compliance we have considered that it does not comply with the recommendation.

8. The information available for the firm Distribuidora Internacional de Alimentos (D.I.A.) is available starting from 2011.

9. Specifically, Article 75 of the L.O.I.M.H. talks about a balanced presence of men and women, understood as meaning that people of each sex do not exceed 60% nor are less than 40%.

10. Recall that this variable shows the percentage of ownership held by that person in which the figures of chairman and C.E.O. are merged. If these characteristics are considered separately, it can be seen that, on average, the convergence of the figure of chairman and C.E.O. in the same person amounts to 64%, showing a significant increase of 22% in recent years. On the other hand, the voting rights that the president of the board maintains rises by 7%, on average, without showing significant variations with the passage of time. This information is not presented in the table for reasons of space but is available upon request.

11. Therefore, we will include as an explanatory variable the age of the company and the age squared because this allows us to check if the impact of age on the characteristics of the board is nonlinear.

12. Although one must bear in mind that the diversity or heterogeneity of the group has often been approximated by analysing only and exclusively the importance of women on the board, the number of foreigners or the educational level of the directors, are among other aspects.

Funding

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