Determinants of Iberian Companies' Performance: Corporate boards and the non-linearity of gender diversity

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ABSTRACT

Purpose: This paper aims to analyze the performance determinants of listed companies in the Iberian Peninsula, focusing on the analysis of the effect of gender diversity and the structure of the board of directors.

Design/methodology/approach: To achieve this aim, we analyzed 97 listed companies, of which 23 are Portuguese and 74 are Spanish, between 2015 to 2019. We employ Arellano and Bond's (1991) Generalized Method of Moments (GMM) system model to test the hypotheses.

Findings: The results show an important impact of corporate governance variables on corporate performance. Specifically, board size, average director age, and board academic qualifications are crucial to explaining profitability and market value. Moreover, we identified a non-linear relationship between gender diversity and profitability and market value levels due to critical mass theory and quotas that enhance more social justice. We concluded that the corporate performance determinants differ depending on the performance measures.

Originality/value: As far as the authors are aware, this study is the first to analyze the non-linear effect of gender diversity and board structure (size, educational qualifications and average director age) on the performance of Iberian listed companies as a single market.

Keywords: Performance, Board Structure, Gender diversity, Portugal, Spain, GMM system

1. INTRODUCTION

The gender composition of companies' boards of directors has received attention from both shareholders and academics, having gained particular attention after financial scandals in recent decades (failure of World-Com and financial crisis of 2008). However, the study of the role of the female gender in performance remains a controversial theme in corporate governance (Jaber, 2020).

According to the literature (e.g., Garcia and Guerreiro, 2016; Pasiouras and Kosmidou, 2007; Staikouras and Wood, 2004), listed companies' performance, measured through profitability and/or market value, is influenced by internal and external determinants. The internal determinants are specific to each company and result from management decisions, while external ones concern the macroeconomic environment and the specificity of the sector (Neves *et al.*, 2020).

Concerning corporate performance determinants, this research has a particular focus on the analysis of the role of gender diversity in performance, considering the non-linear impact between these two dimensions, and on the analysis of the effect of the structure of board of directors (size, educational qualifications and average director age) in corporate performance. Thus, this investigation aims to study the performance determinants of 97 Iberian listed companies between 2015 and 2019; specifically, their performance is analyzed from the point of view of profitability and market value.

The fact that our sample contains data up to the end of 2019 will facilitate our comprehension of the determinants of performance before the crisis caused by COVID-19, leaving future open work that will enable us to understand whether these determinants change during the pandemic period.

This paper contributes to the literature in different ways. First, it analyzes the Iberian market as a single market, given its geographic proximity and commercial relations

between Portugal and Spain (Neves *et al.*, 2020). The literature demonstrates a diversity of studies that consider multi-country samples, including Portugal and Spain (e.g., de Cabo *et al.*, 2012; Fernandes *et al.*, 2016; Proença *et al.*, 2020; Terjesen, 2016). However, few studies analyze the Iberian market's performance (e.g., Duppati *et al.*, 2019; Madaleno and Vieira, 2020; Miralles-Marcelo *et al.*, 2014; Schwab *et al.*, 2016), where only Madaleno and Vieira (2020) investigate the effect of gender diversity in the two countries as a whole. However, our work uses a broader sample and it covers a wider period than Madaleno and Vieira (2020) – indeed, we have doubled the number of companies under study and we considered a sample that includes the years 2018 and 2019. Furthermore, our research can be considered timely because it studies two border countries that promote gender diversity in listed companies (Portugal since 2017 and Spain since 2007) and considers a period of economic recovery in two countries heavily affected by the sovereign debt crisis.

Second, to the best of our knowledge, this study is the first to investigate the non-linear effect of gender diversity and board structure (board size, educational qualifications, and average director age) on Iberian listed companies' performance, relating corporate governance to behavioral finance. The results show that board size, board age, and board academic qualifications are crucial to explaining Iberian companies' profitability and market value. Moreover, we discovered a non-linear relationship between gender diversity and corporate performance due to critical mass theory and quotas that bring about more social justice. Thus, we concluded that internal and external variables, like company' size, employees' wages and benefits (personnel expenses), leverage, and Gross Domestic Product (GDP), are also decisive in explaining corporate performance, as measured by Return on Assets (ROA), Return on Equity (ROE), Market to book (MTB) and Tobin's Q (TQ).

Third, our findings are essential for companies' directors due to their analysis of financial and economic returns, for shareholders for considering the market value of listed companies, and for investors to show the importance of gender diversity in Iberian listed companies. Moreover, this investigation is also vital to policymakers as it shows the effect of their board gender diversity policies on Iberian listed companies' performance. Furthermore, the results help to teach corporate finance and governance in further and professional education.

This paper is organized as follows. The following section presents the literature review identifying the main theories and hypotheses. The third section describes the sample data, the variables used in the study, and the methodology used to estimate the models, whilst section 4 presents the main results of the analysis. Finally, section 5 presents the conclusions, limitations, and lines of future investigation.

2 . LITERATURE REVIEW

Profitability and market value are two of the most commonly measures for performance. The determinants of corporate performance can be divided into two categories: internal and external factors, subdivided into specific industry and macroeconomic factors (e.g., Garcia and Guerreiro, 2016; Haddoud *et al.*, 2019). In this study, the explanatory variables of interest (exclusively internal) are board size, directors age and educational qualifications, and gender diversity. Internal and external determinants will be analyzed as control variables, such as company size, sales, employees costs, and GDP.

2.1. SPECIFIC DETERMINANTS

2.1.1. STRUCTURE OF THE BOARD OF DIRECTORS

2.1.1.1. BOARD SIZE

The number of directors on boards represents the board size. For Jensen and Meckling (1976), board size plays a crucial role in monitoring and controlling company practices.

The literature has analyzed the effect of board size on performance and indicates a duality of results. Some studies (e.g., Adams and Mehran, 2012; Coles *et al.*, 2008; Halcro *et al.*, 2021) concluded that there was a positive relationship between board size and corporate performance. Larger boards of directors will provide more supervision over management, and will be more competent in dealing with organizational complexity (Adams and Mehran, 2012). Additionally, Madaleno and Vieira (2020) show that board size has no impact on some performance measures proxies. In addition, larger boards may have more experienced and knowledgeable directors (Mangena *et al.*, 2012), positively favoring performance. In fact, according to Resource Dependency Theory, diversity of experience and skills and ideas help obtain resources that improve corporate performance (Waheed and Malik, 2019).

However, Hermalin and Weisbach (2003) ascertained the existence of a negative relationship, which is justified because more directors lead to more conflicts from the agency theory perspective (Jensen and Meckling, 1976). Other studies (e.g., Cabeza-García *et al.*, 2021; Duppati *et al.*, 2019; Ben Fatma and Chouaibi, 2021; Madaleno and Vieira, 2020; Pekovic and Vogt, 2021) show a negative effect of board size on corporate performance, justifying their results based on communication problems, less cohesion, and poor decision-making affecting board effectiveness. In addition, we can also verify that more directors lead to a free-rider problem, with some directors not constructively participating in the company (Kao *et al.*, 2019).

Other studies have failed to find a relationship between board size and performance (e.g., Delis *et al.*, 2017; Kagzi and Guha, 2018; Wintoki *et al.*, 2012).

Despite the duality of results, according to Cancela *et al.* (2020), who analyze the Iberian Peninsula, we can expect board size to negatively impact performance as more members lead to more conflicts from the agency theory perspective and bring about more communication problems. Thus, we propose the first hypothesis to be tested:

Hypothesis 1 – Board size negatively influences Iberian listed companies' performance.

2.1.1.2 . BOARD MEMBER AGE

Board member age can positively or negatively influence performance. On the one hand, the older the board of directors, the greater their professional experience and network of contacts, which will positively affect corporate performance (Talavera *et al.*, 2018). Furthermore, Fernández-Temprano and Tejerina-Gaite (2020), Hassan and Marimuthu (2016) and Mahadeo *et al.* (2012) concluded that age positively affects corporate performance since older directors will have more experience, which will improve company management. Moreover, companies with boards with older directors are less likely to go bankrupt (Platt and Platt, 2012). Kagzi and Guha (2018) also found a positive effect, justifying it with the directors' experience being essential for better decision making.

On the other hand, older board elements can indicate cognitive conflicts, lower group cohesion, and greater aversion to change, adversely influencing performance (Ahn and Walker, 2007; Talavera *et al.*, 2018). Aging also causes cognitive deterioration (Arioglu, 2021) and older elements may only have status quo objectives, and not constructively contributing to companies (Waelchli and Zeller, 2013). In addition, senior directors no longer need to show their value to the market and, therefore, will be less aggressive and opt for less risky decision-making (Arioglu, 2021). Ali *et al.* (2014) justify the negative

effect with the theory of social identity, in which there may be age sub-groups on the board, conditioning the company's performance.

However, the literature also shows that board member age does not significantly affect performance, possibly because older members will be more risk-averse or lack age diversity (e.g., Halcro *et al.*, 2021; Kim and Lim, 2010; Talavera *et al.*, 2018).

Although the literature presents different results, we can propose a positive relationship between board age and performance. Following Fernández-Temprano and Tejerina-Gaite (2020), who study Spain, boards with older elements improve management. Thus, the following hypothesis is proposed:

Hypothesis 2 – Higher average director age positively influences Iberian listed companies' performance.

2.1.1.3. ACADEMIC QUALIFICATIONS OF DIRECTORS

The boards of listed companies have to nominate candidates with appropriate academic qualifications for their administration duties to secure the resources necessary for the company's future, ensure the interests of its stakeholders, and protect and increase company assets (Aguilera, 2005). Moreover, the qualifications are valued by the public (Singh *et al.*, 2008).

According to the higher-level theory, a higher level of education is considered a proxy for individuals' higher intellectual knowledge base and expertise (Hambrick and Mason, 1984). Moreover, higher education is also a proxy to social connections (Ochotnický *et al.*, 2019). A higher education level is expected to lead to better performance in organizations. Several earlier empirical studies give evidence that the educational level of higher echelons has a positive impact on performance (e.g., Boadi and Osarfo, 2019; Cheng *et al.*, 2010; Hambrick *et al.*, 1996; Jalbert *et al.*, 2011). Directors with university

education bring with them new perspectives and provide superior human and social capital to the company, thus positively influencing performance (Ochotnický *et al.*, 2019). Darmadi (2013) also found a positive effect and concluded that higher education improves the companies' strategies and effectiveness.

However, there is a duality in the results found, as Mahadeo *et al*. (2012) identified that more qualified members negatively affect the companies' performance. The author finds that despite the directors having more skills and knowledge, educational qualifications alone do not add value to the companies' performance. This negative effect can be explained by the theory of social identity, in which academic diversity can lead to segmented work, with social barriers in groups with different levels of education (Fernández-Temprano and Tejerina-Gaite, 2020; Kagzi and Guha, 2018). Moreover, Berger *et al.* (2014) and Boadi and Osarfo (2019) reveal that members with postgraduate degrees (MsC's and PhD's) are more risk-averse, affecting performance.

Rose (2007) shows that educational level does not influence company' performance. There may be directors without high academic grades but with equivalent skills, thus ensuring that the board of directors has sufficient human capital to perform its role.

Despite the aforementioned arguments, according to Fernández-Temprano and Tejerina-Gaite (2020), more qualified directors negatively affect the corporate performance in Spain. Thus, we expect that members with no superior education add value to corporate performance, not because of their educational achievement but because of their experience, in line with the previous hypothesis. Thus, we propose the next hypothesis to be tested:

Hypothesis 3 – Members with no superior education positively influence Iberian listed companies' performance.

2.1.2. GENDER DIVERSITY OF THE BOARD OF DIRECTORS

The literature review shows that male and female economic agents present behavioral differences. Women, compared to men, have higher ethical levels (Ku Ismail and Abdul Manaf, 2016), propose less aggressive strategies, invest less in research or development and more in social sustainability initiatives (Apesteguia *et al.*, 2012) and exhibit less confidence in decision making (Barber and Odean, 2001; Huang and Kisgen, 2013).

The relationship between gender and corporate performance has been inconclusive in the literature, with evidence of non-linearity. Indeed, gender diversity has been found to increase corporate performance (e.g., Chong *et al.*, 2018; García-Meca *et al.*, 2015; Horak and Cui, 2017; Mastella *et al.*, 2021; Reguera-Alvarado *et al.*, 2017; Yap *et al.*, 2017), decrease corporate performance (e.g., Adusei *et al.*, 2017; Mínguez-Vera and Martin, 2011) or leave it unchanged (e.g., Carter *et al.*, 2010; Coleman and Kariv, 2013; Rose, 2007). In fact, greater gender diversity can increase performance. There will be a better understanding of markets, better resolution of business problems (Campbell and Mínguez-Vera, 2008), and adequate business monitoring (Pasaribu, 2017). However, if there is greater competition and if the appointment of women to boards of directors is motivated by laws and social pressures, the impact of gender on performance will be negative (Campbell and Mínguez-Vera, 2008; Rodríguez-Ruiz *et al.*, 2016). Moreover, the imposition of gender quotas may not bring more experienced women to the board, negatively conditioning performance (Grosvold and Brammer, 2007). Other studies have ascertained a non-linear effect (e.g., Owen and Temesvary, 2018; Proença *et al.*, 2020; Rodríguez-Ruiz *et al.*, 2016), showing that performance could increase or decrease after the implementation of a gender diversity threshold.

With the inclusion of women only to fulfill quota requirements, many companies adopt the familiar tokenism. Kanter (1977) argues that women who are symbolic, or simply

tokens, are treated as representatives of their category instead of individuals. Furthermore, when women, or a minority group, are treated only as representatives, this treatment results in women end up minimizing gender differences, leading to "role traps" (Bratton, 2005). In groups with a majority and a minority, Kanter (1977) argues that the majority, or simply the dominant, end up controlling the entire group and its culture, while the minority, or the tokens, are reduced to symbolic representatives of their social category. The only way to increase the presence of minorities would be through external interventions (Childs and Krook, 2008) such as the use of quotas on boards of directors based on the critical mass theory. This theory believes that there is a number from which the minority can actively participate in the group. This theory arose to eliminate the effect of tokenism. This critical mass would be 30% or at least three women on boards of directors. From the moment there is a critical mass on the board, gender diversity positively affects the performance of companies (Jaber, 2020).

In light of these results, the recent literature proposed a non-linear relationship between gender diversity and performance, with a threshold (maximum or minimum) perhaps being the critical mass. Thus, we present the fourth hypothesis to be tested, following Proença *et al.* (2020) and Rodríguez-Ruiz *et al.* (2016), who study Portuguese and Spanish banks:

Hypothesis 4 – The boards' gender diversity non-linearly influences Iberian listed companies' performance.

2.1.3. COMPANY SIZE

The literature that has analyzed company size presents a duality in the results. Some studies indicate a positive relationship between size and performance (e.g., Boadi and Osarfo, 2019; Duppati *et al.*, 2019; Kao *et al.*, 2019; Madaleno and Vieira, 2020; Topak,

2011; Yazdanfar, 2013); this positive effect signals that larger companies can take advantage of economies of scale and diversify activities and products (Serrasqueiro and Nunes, 2008). Madaleno and Vieira (2020) concluded that more mature Iberian companies are better prepared to employ sustainable practices to maintain their reputation. In this context, Ben Fatma and Chouaibi (2021) determined that companies with more assets will have better performance because they will have more credibility and the ability to provide a return to shareholders.

However, company size can negatively influence corporate performance (e.g., Forte *et al.*, 2019; Goddard *et al.*, 2005; Halcro *et al.*, 2021; Kao *et al.*, 2019; Topak, 2011). The underlying arguments for the negative effect are that company growth tends to lead to diseconomies of scale. In addition, the company growth can also mean the growth of competitors and more significant regulatory constraints on market expansion, which can affect the corporate performance (Goddard *et al.*, 2005). According to Forte *et al.* (2019), larger companies will be more complex and less flexible, facing more difficulties and challenges in developing their market value. Moreover, Halcro *et al.* (2021) conclude that smaller companies are more driven to grow, showing that larger companies have worse performances. Other studies failed to identify a significant relationship between size and corporate performance (e.g., Amin *et al.*, 2021; Arioglu, 2021; Kagzi and Guha, 2018; Proença *et al.*, 2020).

Despite the mixed results, Madaleno and Vieira (2020) analyze the Iberian Peninsula, finding a positive relationship between company size and performance. Based on this, we propose the hypothesis to be tested:

Hypothesis 5 – Company size positively influences Iberian listed companies' performance.

2.1.4. PERSONNEL EXPENSES

Personnel expenses (PE) can be seen as promoting social welfare, with companies increasingly concerned with social issues (Neves *et al.*, 2021). Indeed, higher PE promote a better quality of life (Cancela *et al.*, 2020). Moreover, Faleye and Trahan (2011) display that increasing personnel expenses can increase employee motivation and firm value. In another perspective, Iverson and Zatzick (2011) and Wei *et al.* (2020) show that these expenses increase productivity and innovation, affecting companies' performance. In addition, Neves *et al.* (2021) also state that an increase in personnel expenses and other benefits to workers increases profits and therefore increases performance. Moreover, low labor costs are seen as a competitive advantage in developing countries, while in developed countries high PE may encourage labor productivity and performance (Vu et al., 2019). Finally, Maqbool and Zameer (2018) present that companies with corporate social responsibility, including good wages, are more reliable, thus positively influencing performance.

However, the literature has shown that personnel expenses can also have a negative effect on performance, as managers need to select which position favors the company according to the expectations of different stakeholders (Kim and Jang, 2020). Lazăr (2016) finds this negative relationship and justifies that Romanian companies have weak firing policies and strong labor unions, using their workforce inefficiently. Dong (2015) identifies that more personnel expenses result in substandard performances because higher-wage workers may be more likely to manipulate earnings, thus negatively influencing performance. We also found other studies that show an insignificant relationship (e.g., Faleye and Trahan, 2011; Neves *et al.*, 2021).

Following Neves *et al.* (2021), who ascertained the existence of a positive relationship between personnel expenses and some *proxies* to performance, we propose a sixth hypothesis with this impact:

Hypothesis 6 – Personnel expenses positively influence Iberian listed companies' performance.

2.1.5. LEVERAGE

Jensen and Meckling (1976) argue that the capital structure will influence the performance of companies, and according to the agency theory, highly leveraged companies will have more agency costs. Thus, this variable is considered to be a performance determinant in the literature, with dubious results.

On the one hand, some studies show a positive effect (e.g., Agyemang-Mintah and Schadewitz, 2019; Bărbută-Misu *et al.*, 2019; Waelchli and Zeller, 2013; Wu *et al.*, 2012), concluding that companies that manage debt efficiently may increase their performance in the future (Kartikasari and Merianti, 2016). In addition, companies with high levels of leverage will have to provide both more information and credible information to shareholders and creditors, positively affecting corporate performance (Haj-Salem *et al.*, 2020). Indeed, debt can be interpreted as a mechanism for management discipline (González, 2013).

However, other studies highlight the negative effect of leverage on corporate performance (e.g., Cancela *et al.*, 2020; Halcro *et al.*, 2021; Hu and Izumida, 2008; Kao *et al.*, 2019; Madaleno and Vieira, 2020; Miralles-Marcelo *et al.*, 2014; Pais and Gama, 2015; Proença *et al.*, 2020). This negative relationship argues that companies with higher leverage will be riskier, affecting profitability, reputation and visibility (Madaleno and Vieira, 2020). Moreover, according to the pecking order theory, leverage is inversely associated with

companies' profitability (Myers, 1984) and leveraged companies have more agency costs resulting from conflicts between creditors and shareholders (Hu and Izumida, 2008).

Some studies did not find a significant relationship between leverage and performance (e.g., Ben Fatma and Chouaibi, 2021; Kagzi and Guha, 2018; Vieira *et al.*, 2019), indicating that various stakeholders see risk differently through financial statements, with factors other than leverage explaining good or bad performances (Ben Fatma and Chouaibi, 2021).

Despite the duality of results, we follow the Iberian research (e.g., Cancela *et al.*, 2020; Madaleno and Vieira, 2020) proposing a negative impact of leverage on performance in the seventh hypothesis:

Hypothesis 7 – Leverage negatively influences Iberian listed companies' performance.

2.2. EXTERNAL DETERMINANTS

2.2.1. GROSS DOMESTIC PRODUCT

The Gross Domestic Product (GDP) as a macroeconomic variable can impact the financial decisions of companies and their performance (Vieira *et al.*, 2019).

This effect is not consensual in the literature, with studies showing that GDP is positively related to performance (e.g., Boadi and Osarfo, 2019; Dietrich and Wanzenried, 2011; Ndlovu and Alagidede, 2018; Vieira *et al.*, 2019), since higher economic growth increases investment and consumption, allowing companies to grow and improve their performance (Garcia and Guerreiro, 2016).

However, in the literature, some studies have discovered a negative impact between GDP and corporate performance (e.g., Issah and Antwi, 2017; Neves *et al.*, 2022; Terjesen *et al.*, 2016); indeed, GDP can lead to more aggressive competitiveness (for example, reduced margins) and decreasing performance (Neves *et al.*, 2022). Moreover, the low-

average rate of GDP growth of the countries' economies in study period could explain this negative relationship (Garcia and Guerreiro, 2016). Finally, Liu *et al.* (2020); Reguera-Alvarado *et al.* (2017) and Proença *et al.* (2020) show that GDP has an insignificant effect on performance.

In light of these findings, as the last hypothesis, we consider a positive effect according to Garcia and Guerreiro (2016) and Vieira *et al.* (2019), both of whom investigate Portuguese companies:

Hypothesis 8 – The country's GDP positively influences Iberian listed companies' performance.

3. DATA, VARIABLES AND METHODOLOGY

3.1. DATA

Our sample is composed of 97 Iberian listed companies, of which 23 are Portuguese and 74 are Spanish, from 2015 to 2019. Only companies with complete data for at least four consecutive years were included in the sample, a necessary condition to estimate the absence of second-order correlation (Arellano and Bond, 1991). As the second-order correlation is a GMM assumption, the estimation method used, we must test this correlation (Neves, 2018; Vieira *et al.*, 2019). Data to calculate specific variables come from the Orbis Europe and SABI, Bureau van Dijk databases. At the same time, the macroeconomic variables come from the World Bank[1]. The procedure was carried out manually in the first three months of 2021 and is as follows: i. collection of directors' names through SABI; ii. verification through reports and accounts to which year the administrators belong; and iii. collection of biographical data of administrators through SABI and Reports and Accounts; when the information was not available in these,

[1] We have access to these databases through our universities.

LinkedIn and press documents were analyzed, following Proença *et al.* (2020). To validate the data collected, and prevent bias, another author, other than the data collector, verified the data of 30 random companies, presenting them correctly, without ambiguous names or information.

For some companies, there were inconclusive values, absent values, or outliers, so it was our strategy to eliminate this data from the database, as performed by Bărbuță-Mișu *et al.* (2019) and Munjal *et al.* (2019) with GMM methodology. Thus, we obtained 469 valid observations for the research out of a possible 485.

3.2. VARIABLES

The variables used in this paper are summarized in Table 1. Corporate performance is measured using ROA and ROE (measures based on accounting and internal management variables) and Market to Book Ratio and Tobin's Q (considered market measures).

Regarding the explanatory variables, we analyze board size, board age, board academic qualifications, gender diversity, company size, personnel expenses, leverage and GDP. We chose these corporate governance variables, since voluntary information is dispersed in the reports and treated in a very heterogeneous way; these variables were the easiest to deal with as they are the ones that are most often reported in the reports of these companies. Moreover, the other explanatory variables have been used in the literature, but not for the Iberian Peninsula simultaneously.

[Insert Table 1 about here]

3.3. METHODOLOGY

Considering ROA, ROE, MTB and TQ as the dependent variables and the independent variables defined in Table 1, we obtain the following models:

$$ROA_{it} = \beta_0 + \beta_1 ROA_{it-1} + \beta_2 Boardsize_{it} + \beta_3 Boardage_{it} + \beta_4 Boardaq_{it} + \beta_5 Gender_{it} + \beta_6 Gender_{it}^2 + \beta_7 Size_{it} + \beta_8 Costs_{it} + \beta_9 Lev_{it} + \beta_{10} GDP_{it} + u_{it} + v_i \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 ROE_{it-1} + \beta_2 Boardsize_{it} + \beta_3 Boardage_{it} + \beta_4 Boardaq_{it} + \beta_5 Gender_{it} + \beta_6 Gender_{it}^2 + \beta_7 Size_{it} + \beta_8 Costs_{it} + \beta_9 Lev_{it} + \beta_{10} GDP_{it} + u_{it} + v_i \quad (2)$$

$$MTB_{it} = \beta_0 + \beta_1 MTB_{it-1} + \beta_2 Boardsize_{it} + \beta_3 Boardage_{it} + \beta_4 Boardaq_{it} + \beta_5 Gender_{it} + \beta_6 Gender_{it}^2 + \beta_7 Size_{it} + \beta_8 Costs_{it} + \beta_9 Lev_{it} + \beta_{10} GDP_{it} + u_{it} + v_i \quad (3)$$

$$TQ_{it} = \beta_0 + \beta_1 TQ_{it-1} + \beta_2 Boardsize_{it} + \beta_3 Boardage_{it} + \beta_4 Boardaq_{it} + \beta_5 Gender_{it} + \beta_6 Gender_{it}^2 + \beta_7 Size_{it} + \beta_8 Costs_{it} + \beta_9 Lev_{it} + \beta_{10} GDP_{it} + u_{it} + v_i \quad (4)$$

where Betas denote parameters, i and t are, respectively, individual- (company-) and time-indices, and variables' notation are expressed in Table 1.

To estimate these models, where the past performance influences the present one, the GMM system dynamic model was used, initially proposed by Arellano and Bond (1991) and improved by Arellano and Bover (1995) and Blundell and Bond (1998). Other methodologies, like two- or three-stage least squares analysis (2SLS or 3SLS) for running simultaneous equations, produce inconsistent parameter estimates for dynamic models (García-Meca *et al.*, 2015). Moreover, we solved two fundamental problems using the GMM system method - endogeneity and unobserved heterogeneity (Djalilov and Piesse, 2016; Okoyeuzu *et al.*, 2021; Proença *et al.*, 2020; Vieira *et al.*, 2019). This methodology combines an equation in levels, where explanatory variables in first differences are used as instruments and an equation in first differences where level explanatory variables are used as instruments (Farag and Mallin, 2018). We use three tests to validate this methodology – the autocorrelation test (null hypothesis: absence of autocorrelation); the Sargan test (null hypothesis: instruments used are valid); the Wald test (null hypothesis:

nonsignificant parameters jointly) (Munjal *et al.*, 2019). A estimation is valid if these three tests are passed.

4. RESULTS

4.1. Descriptive Statistics

This section describes descriptive statistics (mean, minimum, maximum and standard deviation) for the variables used in the sample. Regarding the dependent variables, in Table 2, we can conclude that the ROA has an average of 6.634, while the ROE has an average of 10.832; the MTB variable has 2.252 and the TQ is less than 1. Concerning the independent variables, it can be seen that, on average, the boards of directors have ten members, with companies with 21 members. The average age of the board of directors is 58 years old, and only 1.7% of board members have no higher education. On average, women represent 17.3% of the board of directors.

[Insert Table 2 about here]

4.2. DISCUSSION OF RESULTS

4.2.1. Economic and Financial Dimensions – Using Accounting Data

Analyzing the economic and financial dimensions, Table 3 illustrates that board size negatively affects both returns (ROA and ROE); this result aligns with Hermalin and Weisbach (2003) and Madaleno and Vieira (2020). Thus, more directors lead to more conflicts from the agency theory perspective (Jensen and Meckling, 1976), bringing with it more communication problems and poor decision-making affecting boards effectiveness (Madaleno and Vieira, 2020). We therefore do not reject our first hypothesis.

The age of directors has a positive effect on ROA. Fernández-Temprano and Tejerina-Gaite (2020) and Mahadeo et al. (2012) show that age positively affects ROA, as management will better leverage the experience of executives to improve the management of their assets. Furthermore, this result combines with the effect of a lack of superior academic qualifications in profitability. Indeed, we found a positive impact following Mahadeo et al. (2012), who identified that more qualified members negatively affect the company's performance. Thus, members with no superior education add value to the corporate performance, not for their educational qualifications but rather for their experience. In fact, in our sample, the companies with more than 15% of members with no superior education present an average age of 61, which indicates some experience. In this way, our second and third hypotheses are corroborated.

Regarding the impact of gender diversity on profitability, this corporate governance determinant is inverted U-shaped until the peak (predominantly positive, concave downward curve). This shape means that profitability increases with lower growth rates when the number of women increases. Thus, the ROA increases up to 25% women, and for ROE, this percentage increases to 29%. Therefore, our results align with the critical mass theory, which states that a female representation of about 30% positively affects the performance of companies (Jaber, 2020). Thus, women will actively participate in the group, with these percentages, giving more value to companies' performance (Kanter, 1977). Moreover, the increasingly slower growth of profitability may mean that the appointment of women stems from a legal obligation that can decrease performance (Campbell and Mínguez-Vera, 2008; Rodríguez-Ruiz *et al.*, 2016). Thus, we do not reject hypothesis four.

Concerning control variables, we conclude that company size negatively influences the ROA and has no effect on ROE, as found by Goddard *et al.* (2005) and Proença *et al.*

(2020), contrary to hypothesis 5. Thus, the Iberian listed companies' growth tends to lead to diseconomies of scale. Employee costs positively impact performance as personnel expenses and benefits improve social welfare, following Neves *et al.* (2021), corroborating the sixth hypothesis. Moreover, as these social costs increase productivity and innovation, they affect companies' performance (Iverson and Zatzick, 2011; Wei *et al.*, 2020). Leverage has a contradictory effect on profitability, with a positive impact on ROA, as found by Bărbută-Misu *et al.* (2019), and a negative influence on ROE as concluded by Proença *et al.* (2020). Thus, this negative relationship reveals that shareholders are reluctant to use more debt since this involves more outflows, and companies with higher leverage will be riskier, affecting reputation and visibility (Madaleno and Vieira, 2020). However, managers, who represent ROA, are convinced of their efficient debt management (Kartikasari and Merianti, 2016).

In this line, GDP has a negative effect on managers' view (ROA) and a positive influence on shareholders' perspective (ROE), following other studies (e.g., Issah and Antwi, 2017; Ndlovu and Alagidede, 2018). Thus, for managers, an increase in the GDP can lead to more aggressive competitiveness (for example, reduced margins), which decreases results and, consequently, performance (Neves *et al.*, 2022). However, shareholders have a broader vision and for them, GDP will positively influence performance since economic growth will bring about company growth through more investment and consumption (Garcia and Guerreiro, 2016). Thus, the seventh and eighth hypotheses are supported for a performance proxy, but not for any others.

Finally, the lagged dependent variable is statistically significant, so past performance influences the present. We emphasize that there are no model autocorrelation problems, the instruments are valid, and there is joint significance.

[Insert Table 3 about here]

4.2 2. Market Dimension

When analyzing the market size in Table 4, it appears that there are differences regarding accounting data in the results. For Tobin's Q, which represents companies' growth opportunities, only the educational qualification variable impact performance, in addition to the control variables. Thus, for Tobin's Q we reject hypotheses 1, 2, 4 and 5.

Thus, it appears that directors without a higher academic degree have a negative effect on MTB and a positive impact on TQ. Indeed, the absence of a higher educational degree is seen as unfavorable for potential investors and favorable for external stakeholders. These results agree with the literature, which demonstrates that one hand the public values academic qualifications (Singh *et al.*, 2008), as a higher level of education implies individuals possess higher levels of intellectual knowledge and expertise (Hambrick and Mason, 1984). However, on the other hand, for external stakeholders, members with no superior education add value to corporate performance, not because of their educational achievement but because of their experience. Thus, the third hypothesis is supported (TQ).

Regarding the remaining corporate governance variables and their impact on MTB, the board size is unfavorable for potential investors, but directors' age increases market value, corroborating the first and second hypotheses. In this way, more directors on the board lead to more conflicts and communication problems (Pekovic and Vogt, 2021). However, older directors are seen as more experienced and with better management skills (Fernández-Temprano and Tejerina-Gaite, 2020; Mahadeo *et al.*, 2012).

The percentage of women leading to maximum market value (MTB) is around 20% for potential investors, sustaining the inverted U-shape. This result is in line with Kogut *et al.* (2014), who show that a gender share between 10% to 20% can contribute to social

justice and intended structural changes. Thus, this will be the percentage that enhances the most social justice in Iberian listed companies from the perspective of potential investors. Thus, the fourth hypothesis is not rejected.

As for the control variables, we found that size negatively influences the MTB, as detailed by Forte *et al.* (2019), rejecting the fifth hypothesis. Potential investors see larger companies as promoting greater diseconomies of scale. However, personnel costs positively influence the MTB and Tobin's Q, according to Faleye and Trahan (2011). These authors show that increasing wages and benefits (personnel expenses) could lead to greater employee motivation, increasing firm value. Thus, social welfare is fundamental for better performance for potential investors and external stakeholders. This result is in line with the sixth hypothesis.

Leverage has a negative effect on Tobin's Q following Miralles-Marcelo *et al*. (2014) and Vieira *et al.* (2019). Thus, external stakeholders understand that more debt levels imply more future risk (Madaleno and Vieira, 2020). However, for potential investors, leverage increases the company's market value since companies that manage debt efficiently may improve their performance in the future (Kartikasari and Merianti, 2016).

The increase in GDP leads to lower market values, but it positively affects growth opportunities. This result is in line with Vieira *et al.* (2019), who show that GDP positively influences Tobin's Q since economic growth will increase companies' market value from the perspective of external stakeholders. Thus, the seventh and eighth hypotheses are supported for a performance proxy, but not for any others.

The models show no autocorrelation of first or second-order errors; there is no correlation between errors and instruments (Sargan), so the instruments are valid, and there is joint significance. The lagged dependent variable is statistically significant as expressed in previous models.

[Insert Table 4 about here]

5. CONCLUSION

This study analyzes the determinants of the performance of listed companies in the Iberian Peninsula, focusing on diagnosing the effect of gender diversity and board structure on performance. To achieve the proposed objective, we studied 97 listed companies, of which 23 are Portuguese and 74 are Spanish.

With the adoption and imposition of gender quotas to ensure greater diversity on boards of directors, this research on the Iberian Peninsula aims to contribute to gender diversity and business performance studies by analyzing two border countries in which it operates. To measure corporate performance, we considered both accounting variables (ROA as a management variable and ROE as a shareholder interest variable) and market variables (MTB as a measure of potential investors and Tobin's Q as a measure of future growth opportunity from perspective of external stakeholders). Using the GMM system estimation method, our results identify the vital impact of corporate governance variables on corporate performance.

Regarding ROA and ROE as dependent variables, board size and directors with no postgraduate academic qualifications negatively and positively affect profitability, respectively. Board age has a positive effect on ROA. Concerning gender diversity, profitability increases until a quota of about 25% for ROA and 29% for ROE, supporting the critical mass theory. Managers and current investors have different perceptions about leverage and GDP. In fact, more debt implies an increase in ROA because managers are convinced of their virtuous management of debt; and a decrease in ROE as shareholders are reluctant to use more debt since this involves more outflows.

At the same time, GDP has a negative relationship with ROA and a positive one with ROE.

Thus, from managers' perspective, more GDP can lead to more aggressive competitiveness (reduced margins), therefore decreasing profitability. However, shareholders have a broader vision, so the economy's growth can positively influence the development of companies and subsequently their performance. Personnel costs positively impact profitability since, for managers and shareholders, the social welfare of employees will lead to better performances.

Regarding the market value perspective, we determined that directors with no postgraduate degrees negatively affected MTB. This result suggests that academic qualifications could improve the company's market value for potential investors. Moreover, a gender quota of about 20% leads to a maximum market value since it brings with it more social justice. Regarding company growth opportunities, stakeholders' perception is that corporate governance variables are irrelevant. However, personnel expenses and GDP positively affect Tobin's Q, which means that social welfare and economic growth are essential for external stakeholders as they are aware of the potential development of companies in the long term. Once again, leverage negatively impacts corporate performance since external stakeholders understand that higher debt levels imply more future risk. Following Vieira *et al.* (2019), corporate performance determinants differ depending on the performance measures.

These results will be of interest to several stakeholders. Managers, shareholders, potential investors, and other stakeholders, including civil society, will be able to perceive the factors that influence corporate performance. In fact, they provide empirical evidence of how corporate governance factors affect the performance of listed companies. Furthermore, this study informs politicians about the effects of their policies on

performance, namely board size and gender diversity, showing that policymakers can interfere with boards. This study could be important in finance fields in Portuguese and Spanish universities for teaching.

As the study's main limitation, it examined only two countries in which the financial sector was excluded. It would therefore be very interesting to increase the sample in future work, conducting a sectorial analysis to see if there are differences between industries. Second, this study only focuses on a few corporate governance factors (size, age, academic qualifications, and gender diversity on the board). Since voluntary information is dispersed in the reports and treated in a very heterogeneous way, these variables were the easiest to deal with as they are the ones that are most commonly reported by these companies. Future research could analyze other governance variables and expand performance measures to, for example, environmental performance. Moreover, it could also expand our analysis to other capital markets, including different legal systems and protection for legal investors.

Finally, we emphasize the non-uniformity of the reports and accounts of listed companies in the Iberian Peninsula, as many do not provide basic information about the composition of their board of directors.

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Tables

Table 1 - Description of dependent and independent variables

Variable	*Codename*	Formula	Signal	Authors
Dependent Variables				
Economic and financial dimension				
Economic profitability	**ROA**	Net income/Total Assets	N.A.	Grosvold and Brammer (2011); Lazăr (2016); Madaleno and Vieira (2020)
Financial Profitability	**ROE**	Net income/Equity	N.A.	Garcia and Guerreiro (2016); Madaleno and Vieira (2020)
Market Dimension				
Market to book	**MTB**	Market capitalization/Total Book Value	N.A.	Ionascu *et al.* (2018); Madaleno and Vieira (2020)
Tobins' Q	**QT**	Total Market Value/Total Asset	N.A.	Campbell and Mínguez-Vera (2008); Ionascu *et al.* (2018); Mastella *et al.* (2021); Madaleno and Vieira (2020)
Independent variables				
Boards size	**Boardsize**	Number of members of the board of directors	+/-	Adams and Mehran (2012); Coles *et al.* (2008); Duppati *et al*., 2019; Hermalin and Weisbach (2003); Madaleno and Vieira (2020)
Boards age	**Boardage**	Average age of members of the board of directors	+/-	Ahn and Walker, (2007); Fernández-Temprano and Tejerina-Gaite (2020); Hassan and Marimuthu (2016); Kim and Lim (2010); Mahadeo *et al.* (2012); Talavera *et al.* (2018)
Academic Qualifications	**Boardaq**	Number of members of the board of directors without higher education/Total members of the board of directors	+/-	Hambrick *et al.* (1996); Jalbert *et al.* (2011); Mahadeo *et al.* (2012)

Gender Diversity	**Gender**	Natura logarithm of 1 plus Number of female members of the board of directors/Total members of the board of directors	+/-	Carter *et al.* (2010); Chong *et al.* (2018); Coleman and Kariv (2013); García-Meca *et al.* (2015); Horak and Cui (2017); Mastella *et al.* (2021); Reguera-Alvarado *et al.* (2017); Rose (2007); Yap *et al.* (2017)
Firm size	**Size**	Natural logarithm of total assets	+/-	Duppati *et al.* (2019); Forte *et al.* (2019); Goddard *et al.* (2005); Madaleno and Vieira (2020); Proença *et al.* (2020); Topak (2011); Yazdanfar (2013)
Personnel expenses	**Costs**	Natural logarithm of personnel expenses	+/-	Neves *et al.* (2021)
Leverage	**Lev**	Debt/Total Equity	+/-	Cancela *et al.* (2020); Madaleno and Vieira (2020); Proença *et al.* (2020)
Gross Domestic Product	**GDP**	Natural Logarithm of Gross Domestic Product	+	Ndlovu and Alagidede (2018); Reguera-Alvarado *et al.* (2017)

Table 2 - Descriptive Statistics

Variables	Mean	Standard deviation	Minimum	Maximum
ROA	6.634	14.687	-42.432	104.598
ROE	10.832	30.734	-153.453	140.633
MTB	2.252	3.480	-10.288	32.047
QT	0.899	1.114	0	7.344
Boardsize	10.279	3.480	3	21
Boardage	58.426	4.936	45.6	73.714
Boardaq	0.017	0.041	0	0.222
Gender	0.069	0.043	0	0.221
Size	6.915	1.877	1.433	11.363
Costs	2.744	1.917	-3.324	6.792
Lev	1.273	4.996	-15.771	87.739
GDP	13.545	0.756	12.099	14.034

Table 3 - Model 1 and 2 Estimation Results

	Economic and Financial Dimensions									
	ROA					ROE				
	Coefiicient	Standard error	Z	P-Value		Coefficient	Standard error	Z	P-Value	
L(-1)	0.190	0.062	3.020	0.003	***	-0.159	0.051	-3.090	0.002	***
Boardsize	-1.758	0.983	-1.790	0.007	*	-11.710	2.500	-4.680	0.000	***
Boardage	1.445	0.403	3.580	0.000	***	-0.426	1.429	-0.300	0.766	
Boardaq	163.937	50.775	3.230	0.001	***	261.143	135.729	1.920	0.054	*
Gender	276.295	61.941	4.460	0.000	***	1792.620	192.164	9.330	0.000	***
$Gender^2$	-1429.545	339.975	-4.200	0.000	***	-8066.233	1086.144	-7.430	0.000	***
Size	-2.665	1.286	-2.070	0.038	***	-7.716	4.697	-1.640	0.100	
Costs	1.815	0.887	2.040	0.041	**	15.661	2.349	6.670	0.000	***
Lev	0.494	0.546	0.910	0.365	***	-5.522	2.043	-2.700	0.007	***
GDP	-4.979	1.674	-2.970	0.003	***	5.504	5.563	0.990	0.323	***
Hansen			28.3680	0.534				37.520	0.000	
Wald			78.440	0.000				365.250	0.000	
AR(1)			-2.640	0.008				-2.830	0.005	
AR(2)			-0.810	0.416				-1.170	0.243	

Notes: i) *,* *, and *** indicate significance levels at 10%, 5% and 1%, respectively; ii) The Wald test presents a p-value less than 5%, which means that the joint significance and the coefficients are asymptotically distributed as $\chi 2$ under a null hypothesis without significance, with degrees of freedom in parentheses; iv) The AR(1) test has a normal distribution N (0.1) and tests the null hypothesis of the absence of the first-order autocorrelation against the alternative hypothesis of the existence of the first-order autocorrelation; v) The AR(2) test has a normal distribution N (0.1) and with a p-value greater than 5%, it accepts the null hypothesis of the absence of second-order autocorrelation.

Table 4 - Model 3 and 4 Estimation Results

	Market Dimension								
	MTB					TQ			
	Coefficient	Standard error	Z	P-Value		Coeffiicient	Standard error	Z	P-Value	
L(-1)	0.335	0.027	12.190	0.000	***	0.593	0.021	27.840	0.000	***
Boardsize	-0.536	0.201	-2.670	0.008	***	0.010	0.020	0.540	0.591	
Boardage	1.056	0.086	12.260	0.000	***	-0.024	0.016	-1.530	0.127	
Boardaq	-70.313	20.904	-3.360	0.001	***	2.734	0.967	2.830	0.005	***
Gender	35.035	16.319	2.150	0.032	**	-2.265	2.132	-1.060	0.288	
$Gender^2$	-219.589	74.944	-2.930	0.003	***	3.520	11.242	0.310	0.754	
Size	-1.340	0.446	-3.000	0.003	***	-0.033	0.036	-0.920	0.356	
Costs	0.676	0.363	1.860	0.063	*	0.087	0.034	2.550	0.011	**
Lev	0.338	0.150	2.250	0.024	**	-0.071	0.024	-2.900	0.004	***
GDP	-3.481	0.320	-10.860	0.000	***	0.124	0.063	1.950	0.052	**
Hansen			36.380	0.196				35.030	0.267	
Wald			486.18	0.000				93.270	0.000	
AR(1)			-1.000	0.316				-2.460	0.014	
AR(2)			0.710	0.477				1.660	0.097	

Notes: i) *,* *, and *** indicate significance levels at 10%, 5% and 1%, respectively; ii) The Wald test presents a p-value less than 5%, which means that the joint significance and the coefficients are asymptotically distributed as $\chi 2$ under a null hypothesis without significance, with degrees of freedom in parentheses; iv) The AR(1) test has a normal distribution N (0.1) and tests the null hypothesis of the absence of the first-order autocorrelation against the alternative hypothesis of the existence of the first-order autocorrelation; v) The AR(2) test has a normal distribution N (0.1) and with a p-value greater than 5%, it accepts the null hypothesis of the absence of second-order autocorrelation.