
Impact of Boardroom Gender Diversity in Portuguese Listed Companies
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Resumo

A presente dissertação estuda a relação entre a diversidade de género nos conselhos de administração e o desempenho das empresas, bem como o seu poder aquisitivo, no caso das empresas cotadas em Portugal, para o período entre 2008 e 2017. Quatro medidas de diversidade são usadas no estudo do impacto no desempenho, *Presença de Administradoras Femininas*, *Percentagem de Administradoras Femininas*, *Presença de Duas ou mais Administradoras Femininas* e *Presença de Três ou mais Administradoras Femininas*. Para o desempenho da empresa, três medidas são usadas, *Q de Tobin*, *ROA* e *ROE*. Relativamente à segunda relação, o poder aquisitivo é medido por uma variável dummy que assume o valor um se ocorrerem negócios de M&A naquele ano civil, e zero, caso contrário. Neste caso, a diversidade de género é medida pela *Percentagem de Administradoras Femininas*. Os resultados obtidos revelam uma relação positiva entre as medidas de diversidade e as medidas de desempenho. Quanto à análise de aquisições e fusões, a relação entre a percentagem de administradoras femininas e o poder aquisitivo não é estatisticamente significativa.

Abstract

This dissertation studies the relationship between the board of director's gender diversity and both firm performance and acquisitiveness, for companies listed in Portugal, for the period between 2008 and 2017. Four measures of gender diversity are used in the study of the impact on performance, *Presence of Female Directors*, *Percentage of Female Directors*, *Presence of Two or more Female Directors*, and *Presence of Three or more Female Directors*. For firm performance, three measures are used, *Tobin's Q*, *ROA* and *ROE*. Regarding the other relationship, acquisitiveness is measured by a dummy variable taking the value of one if there were mergers and acquisitions deals in that civil year, and zero otherwise, and gender diversity by the *Percentage of Female Directors*. Our findings show a significant positive relationship between the measures of diversity and performance measures. The merger and acquisition analysis did not produce a meaningful relationship between the existence of deals and the percentage of female directors.

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List of Abbreviations

- CP – Ceteris Paribus
- DWH - Durbin-Wu-Hausman
- EU – European Union
- GMM – Generalized Method of Moments
- SEM – Simultaneous Equation Approach
- 2SLS – Two-Stage Least Squares
- OLS – Ordinary Least Squares
- PP – Percentage Point
- VIF – Variance Inflation Factor

1. Introduction

The word diversity is defined by Kreitz (2008) as “any significant difference that distinguishes one individual from another”. In the specific case of corporate governance, variety is related to the composition of the board and the mix of attributes, characteristics and expertise that each board member contributes in board processes and decision making (Van der Walt and Ingley, 2003).

Corporate governance, and in specific board's role and composition, have been the subject of debate and attention in the past years, mainly due to corporate (e.g. Enron, WorldCom) and financial (e.g. Lemon Brothers) scandals and subsequent corporate governance reforms (Boulouta, 2013; Singh, Terjesen, and Vinnicombe, 2008).

Board gender diversity, particularly, has gained public interest in the last years, thus becoming a key issue in corporate governance (Kakabadse *et al.*, 2015; Lamkin Broome and Krawiec, 2008; Singh *et al.*, 2008).

Initially, the focus of research on this matter laid on the barriers preventing the promotion of women at lower mid-management levels, a phenomenon denominated glass ceiling effect. However, the focus has shifted to female representation in top management positions and corporate boardrooms (Farrell and Hersch, 2005).

The relevance of this issue has only been enhanced by the introduction of board gender diversity legislation, gender quotas, by some countries in the last decade. These mandatory laws aim of increasing gender diversity in corporate boards (Boulouta, 2013; Reguera-Alvarado, de Fuentes, and Laffarga, 2017).

Following this research stream, the core of this dissertation revolves around the presence of women on the boardroom, namely their impact on company performance and in the propensity to initiate M&A deals. Additionally, a study about the differences in effects two, three or more women have will also be considered in this analysis, thus addressing questions of tokenism. The goal is to study these two relationships for the case of companies listed in Portugal, during a time period that starts in 2008 and ends in 2017.

This dissertation will thus address questions regarding the impact female directors have in Portuguese listed firms' performance, measured by *ROE*, *ROA*, and *Tobin's Q* using panel

data. Besides, a study of the link between the initiation of M&A deals and the percentage of women on the board of directors is also undertaken.

The nature of this work is particularly relevant when we consider that previous research on gender diversity and firm performance often arrived at contradictory conclusions (Gröschl and Arcot, 2014) and that existing literature on board diversity and firm performance is mainly focused on US data (Reguera-Alvarado *et al.*, 2017). Additionally, considering that new rules enforcing gender quotas in public and listed firms in Portugal are to be implemented, both in 2018 and 2020, this study provides an analysis prior to that effect.¹ As for the Section dedicated to the study of M&A deals, we believe that this study has never been done for the Portuguese case. This research will hopefully contribute to the academic literature by adding to empirical evidence for Portugal.

This dissertation is structured into 5 Chapters: Introduction, Literature Review, Sample and Methodology, Results and finally, the Conclusion. Chapter 2 presents the literature review, summarizing the relevant findings of previous research on the matter of boardroom gender diversity. This Chapter ends with an overview of the findings and the explanation of the research hypothesis that will be tested. Chapter 3 exhibits and describes the variables that will be studied, as well as the models that will be used for the empirical research. Chapter 4 presents the results of the regressions alongside an analysis of and interpretation of them. Finally, in Chapter 5 a highlight of the main findings and concluding remarks are provided.

¹ <https://expresso.pt/politica/2017-06-23-Aprovada-lei-das-quotas-de-genero-nas-empresas#gs.cft96t>

2. Literature Review

2.1. Corporate Governance and the Board of Directors

"Corporate governance and the role of boards of directors are issues of fundamental importance in economics."

(Adams, Hermalin, and Weisbach, 2010)

UK's Cadbury Committee defines corporate Governance as "the system by which companies are directed and controlled" (Cadbury, 1992). This system encompasses a set of relationships between a company's management, its board, its shareholders and other stakeholders (OECD, 2015).

The board of directors, on the other hand, is appointed by a company's shareholders, and it is responsible for a company's governance (Cadbury, 1992). Some of these responsibilities include setting company's strategic goals and ensure the resources to achieve them (Tricker, 2009), monitor management on behalf of shareholders (Fama and Jensen, 1983) and provide advice, console and links to other organisations (Hillman and Dalziel, 2003). Additionally, directors are also responsible for controlling the process that leads to top executives being hired, promoted, assessed, and dismissed (Adams *et al.*, 2010). The actions of the board are subject to laws, regulations and shareholders in general meetings (Cadbury, 1992).

Ultimately, they provide leadership within a framework of prudent and effective controls so they can assess and manage risk (Tricker, 2009), while ensuring that the corporation creates value for their stakeholders (Adams, 2016). Overall, the board of directors is a vital governance mechanism (Campbell and Mínguez-Vera, 2008).

2.2. Gender Quotas

In the last years, many countries implemented laws to increase the number of female directors in their organisations (Reguera-Alvarado *et al.*, 2017). In fact, between 2008 and 2015, 32 countries implemented 42 boardroom diversity policies, in the form of, legal quotas for listed or state-owned firms, governance code amendments, and disclosure requirements (Adams, 2016).

The European Union (EU) contributed to the push of this agenda when in 2012 approved a draft law that required a minimum of 40% of the underrepresented sex among the non-

executive directors of listed companies across the EU. This measure is to be met until 2020 (Commission, 2012).²

This legislative phenomenon has also been the subject of many academical studies. Namely, Norway has been the focus of the more significant part of this researches, since it was the first country to introduce gender quotas on company's boards (e.g. Ahern and Dittmar, 2012; Matsa and Miller, 2013).

Ahern and Dittmar (2012) conducted a study about Norway where they concluded that the implementation of quotas caused a significant drop in stock price, at the time this law was announced, and a substantial decline in Tobin's Q in the following years. The authors attributed these results to the fact that the quota caused boards to be younger and less experience, which in turn lead to a deterioration of operating performance.

Similarly, Matsa and Miller (2013) found that after the adoption of quotas, short term corporate profitability declined. As possible justifications, they suggested economic, social, and cultural context.

Additional studies were conducted, where some were unable to support the adoption of gender quotas based on financial performance improvement (Carter, D'Souza, Simkins, and Simpson, 2010), while others found that in the case of well-governed firms, boardroom gender quotas may end up reducing firm value (Adams and Ferreira, 2009). Some even proved that boardroom gender quotas had no impact on firm performance (Noland, Moran, and Kotschwar, 2016).

2.3. Gender Diversity in the Boardroom

The link between good governance, gender diversity and performance has been the subject of literature for a long time (Reguera-Alvarado *et al.*, 2017). Notwithstanding, academic debate on the contribution of women directors in corporate value creation remains open (Torchia, Calabrò, and Huse, 2011).

Arguments in favour of greater female representation on the board of directors are usually of two natures, ethical and economic. The former rests on the evidence that it is immoral to

² <https://www.theguardian.com/world/2017/nov/20/eu-to-push-for-40-quota-for-women-on-company-boards>

exclude women from corporate board based on gender. The latter is based on the premise that if firms fail to gather the appropriate and capable candidates for board positions, solely based on gender, they will ultimately harm their financial performance (Campbell and Mínguez-Vera, 2008).

However, the performance effects of such increases are still not widely accepted by specialised literature. This doubt is mainly driven by the ambiguity of results from past researches. While some studies find the link between women on boards and firm performance to be positive, others provide evidence of a negative relationship or even no link at all between these variables (Joecks, Pull, and Vetter, 2013; Reguera-Alvarado *et al.*, 2017).

2.3.1. Arguments in Favour of Gender Diverse Boards

A. General Behaviour

The presence of women on the boardroom has been referred to as a value-enhancing strategy, that ultimately translates into a competitive advantage relative to companies with less diversity (Campbell and Mínguez-Vera, 2008).

Female directors bring different perspectives, experiences and opinions to the table, which ensures that more issues are considered and enhances problem-solving effectiveness. Also greater diversity has been associated with increased creativity and innovation (Adams and Ferreira, 2004; Arfken, Bellar, and Helms, 2004; Bear, Rahman, and Post, 2010; Campbell and Mínguez-Vera, 2008; Daily, Certo, and Dalton, 1999; Hillman, Cannella Jr, and Harris, 2002).

Additionally, female director's communication, management and leadership styles improve decision making, director participation, communication, board effectiveness and dynamics (Adams and Ferreira, 2004; Bear *et al.*, 2010; Daily and Dalton, 2003).

The presence of women directors is also associated with better management oversight, that is, better quality of the monitoring role, which in turn improves financial performance (Bear *et al.*, 2010; Campbell and Mínguez-Vera, 2008), with higher CEO's accountability for poor stock price performance (through CEO turnover), with equity-based director compensation, suggesting that the board and shareholders' interests are more align (Adams and Ferreira, 2009), with higher quality sustainability reports (Al-Shaer and Zaman, 2016), with fewer

attendance problems at board meetings and with improvement of attendance behaviour of male directors (Adams and Ferreira, 2004),

Lastly, female directors have been pointed as a close match to the theoretical concept of independent director, since they do not belong to the “old boys club”(Adams and Ferreira, 2009), leading them to ask question that otherwise would not be made (Carter, Simkins, and Simpson, 2003). Since directors independence has been, for a long time, viewed as a solution for many corporate governance problems (Clarke, 2007), and in fact, believed to be the secret behind a productive board, it is only fair to ask whether more gender-balanced boards would indeed be more effective (Adams, 2016).

B. Market

As articulated by Arfken *et al.* (2004), “a business is, after all, the clients and the customers it serves. Thus, a diversity of views represented by gender and ethnicity is important in growing the business”. By increasing boardroom gender diversity, insight into the needs of female customers is enhanced, allowing companies to develop their products tailored to the specific needs of their female buyer (Daily *et al.*, 1999), as well as increasing its ability to penetrate markets (Carter *et al.*, 2003; Robinson and Dechant, 1997).

A further argument defending this view can be found in the work by Daily and Dalton (2003), where they state “organizations need to leverage all available resources to compete effectively. Why would an organization exclude, intentionally or otherwise, half of the workforce from consideration for board positions?”.

C. Reputation

The presence and number of female directors can act as a sign that companies pay attention to women, increasing their status by implying that the company is socially responsible (Bear *et al.*, 2010). Even inside organizations, boardroom gender diversity can act as a signal of the company’s commitment to female employees. A direct relationship has also been found between the presence of women on a firm's board of directors and the number of women in other key positions (Daily and Dalton, 2003).

Investors and consumers are also becoming increasingly interested in these matters, to the point of using board diversity as a criterion for investing (Daily and Dalton, 2003), and demanding evidence of firm's diversity policies and initiatives (Catalyst, 2013).

Furthermore, the proportion of women directors is positively related to the level of corporate philanthropy (Cha and Abebe, 2016), and corporate giving, implying a higher sensitivity to corporate social responsibility issues (Wang and Coffey, 1992). Also, more gender-diverse boards have been associated with a lower probability of fraud (Cumming, Leung, and Rui, 2015).

D. Financial Performance

Women directors and women in senior leadership positions have been linked to better financial performance (Catalyst, 2013). Using a sample of Fortune 500 firms, Adler (2001) found that companies with more female executives outperformed their industry median in three measures, profits (measured by per cent of revenues), assets, and stockholders' equity. Carter *et al.* (2003) also found evidence of a positive relationship between the presence of female directors and Tobin's Q³. These results hold after controlling for possible endogeneity between firm value and diversity, for size and other corporate governance measures.

The inclusion of women in companies' boards has also been proven to have a positive impact in stock returns (Daily and Dalton, 2003), share price performance and average growth, i.e., net income growth and lower gearing⁴ (Suisse, 2012).

Additional support is found by Campbell and Mínguez-Vera (2008). Using panel data, these authors found that board diversity (measured by the percentage of women on the board and the Blau and Shannon indices), has a positive impact on firm value (measured by Tobin's Q). More recently, Reguera-Alvarado *et al.* (2017) reached similar results. Both these studies focused on Spanish listed companies.

Furthermore, Mínguez-Vera and López-Martínez (2010) found that more gender-diverse boards have a positive and significant effect on Return on Assets (ROA). Catalyst (2007) found the relationship between women directors and Return on Equity (ROE) and return on invested capital (ROIC)⁵ to be positive.

³ Tobin's Q is commonly viewed as the best measure of firms market value (Dobbin and Jung, 2010).

⁴ Net debt to equity of companies.

⁵ Return on invested capital (ROIC): a ratio of after-tax net operating profit to invested capital.

Plus, using an event study, Campbell and Vera (2010) found a positive response to the appointment of female directors in the short term, which led the authors to conclude that, on average, investors believe female directors add value. The authors also showed that over a sustained period, the appointment of female directors is positively associated with firm value by using a multiple regression approach.

2.3.2. Arguments Against Gender Diverse Boards

Contrarily to what has been presented up until this point, part of previous research has shown that the effect provoked by the presence of female directors is not a positive one.

Some studies have shown that in moderately heterogeneous groups, there are significant communication problems, conflicts and low levels of team identity (Earley and Mosakowski, 2000). Diverse boards may need additional incentives to work together and cooperate since heterogeneous work groups have a weaker cohesion and less member commitment. Also, the presence of women directors has been associated with more internal conflicts, leading to slow decisions, higher member turnover rates and impair the firm's ability to take actions. Additional time may be needed to accommodate the different viewpoints brought by female directors and resolve disagreements. Overall, increasing gender diversity may end up being costly for firms (Adams and Ferreira, 2004; Gröschl and Arcot, 2014; Hambrick, Cho, and Chen, 1996).

Additionally, Adams and Ferreira (2009) found that women in the boardroom only have positive effects on firms with weak corporate governance⁶. Increasing gender diversity in firms with stronger governance may end up decreasing shareholder value, mainly due to excessive monitoring. The authors also found that on average, firms perform worse the higher is gender diversity of the board, as measured by ROA and Tobin's Q. Supporting evidence is presented by Shrader, Blackburn, and Iles (1997) that showed that the percentage of women on the board decreases performance, measured by ROA, ROE, ROS and ROI.⁷

Lastly, Haslam, Ryan, Kulich, Trojanowski, and Atkins (2010) conducted a study for FTSE 100 companies and found no evidence of a relationship between the presence of women on

⁶ Measured by their ability to resist takeovers (Adams and Ferreira, 2009).

⁷ ROA: net income/total assets, ROE: net income/common equity, ROS: net income/net sales, ROI: net income/invested capital.

the board of these companies and accounting-based measures (ROE and ROA), but found a negative relation with stock-market performance (measured by Tobin's Q).

Farrell and Hersch (2005), documented that abnormal returns on the announcement date of women additions to the board are insignificant. Thus, the authors failed to prove that increasing gender diversity in the corporate boardroom is, on average, a value-enhancing strategy, and suggest that an increase in demand for female directors may be a response to internal and external (e.g. shareholder activism) pressure for greater gender diversity.

2.3.3. Possible Limitations

Using a sample of Danish listed firms Rose (2007) found that gender board composition does not influence firm performance (measured by Tobin's Q), and suggested that no relationship is found because board members that do not belong to the traditional "old boys club" (e.g. female directors) may adopt the behaviour and norms of the conventional board members and hide the features that make them different. Otherwise, they would not reach the position. Similarly, Dobbin and Jung (2010) and Haslam *et al.* (2010) found evidence of a negative link between female directors and Tobin's Q, and no effects on ROA. Dobbin and Jung (2010) pointed bias against female directors as the more probable cause, since a decrease in board competence, should first depress profits, then stock price but instead, what they found was a drop-in stock price without affecting profitability.

Another reason often cited to explain the unsatisfactory impact of more gender-diverse boards is tokenism (e.g. Dobbin and Jung, 2010; Konrad, Kramer, and Erkut, 2008). A single woman director may face challenges because she may be considered a token, i.e., perceived less competent and of lower status (Bear *et al.*, 2010). To overcome the problem, a certain proportion of women on the board needs to be reached, so female director's voices are heard and valued (Reguera-Alvarado *et al.*, 2017).

Joecks *et al.* (2013), using 151 listed German firms, found that, until a critical mass of around 30% of female directors is reached, the impact of gender diversity is negative on financial performance (measured by Tobin's Q), and positive after. This translated to three women on the board being the "magic number". Torchia *et al.* (2011) also pointed out the number three to be the point that enabled female directors to exert some influence on board's working-style, processes and tasks. According to these authors, a single women director is often categorised, stereotyped and ignored pressuring her to act in conformity with the majority

and not make any contributions. One can thus conclude that two women on the boardroom should be better than one, and three better than two (Konrad *et al.*, 2008).

Another possible limitation lays on the presumption that women are assigned to board committees that have less impact on the firm (Shrader *et al.*, 1997). It has been proven that gender affects committee selection practices (Bilimoria and Piderit, 1994).

The glass ceiling effect, i.e., discrimination faced by women when trying to attain certain positions, despite their appropriate qualifications, can also be viewed as a limiting factor (Nekhili and Gatfaoui, 2013). However, even when women break the glass ceiling and reach board level, they are faced with a second one, that prevents them from reaching powerful positions such as chairs of board committees (Wearing and Wearing, 2004).

2.3.4. Mergers and Acquisitions

On the subject of more gender-diverse boards and mergers and acquisitions, a research that studied this relationship was conducted by Levi, Li, and Zhang (2014). These authors argue that a merger and acquisitions setting is ideal to investigate differences between males and females behaviour in the boardroom. They suggest this is the case for three reasons. One, M&A deals are significant from an economic point of view, but they usually do not generate positive impact for shareholders. So, it is imperative to figure out why so many deals fail, especially considering their dimensions and scope. Two, it is complicated to have an idea about the success of these types of arrangements immediately, since these are very complex processes. This aligned with the fact that women are perceived to have lower confidence in their abilities than men, allow us to view, in a unique setting, how women act in contexts where they do not have immediate feedback on their decisions. Three, M&A deals are bound to complex board processes, discussions and approvals, where individual directors can make a difference in the final decision.

Therefore, using a sample of acquisition bids, initiated by S&P 1500 firms during the period 1997-2009, the authors' found that the presence of female directors is negatively associated with firm's acquisitiveness and with the size of the bid premium. To be more specific, they discovered that each 10% representation of women on the bidder board is associated with a reduction in the number of a company's acquisition bids by 7.5% and with a decrease in the bid premium of 13.3%.

As a possible explanation, the authors proposed that since female directors are perceived to be more efficient monitors (Adams and Ferreira, 2009), they can be more efficient in preventing companies from completing value-destroying deals. Plus, communication problems associated with the presence of female directors (Earley and Mosakowski, 2000), can increase board discussion time about deals, resulting in fewer deals of better quality, i.e., a lower premium. This theory was corroborated in their work.

Chen, Crossland, and Huang (2016) using a sample of U.S. public firms found robust evidence that female representation in the boardroom was negatively associated with firm acquisitiveness, and, target size. Overall, boards with more female directors are more prudent when it comes to M&A deals (Bozionelos and Affanassieva, 2015).

2.4. Research Hypothesis

This dissertation aims to understand, for the Portuguese reality, the effect female directors have, both in the company's performance, and in the propensity of companies to initiate merger and acquisition deals.

However, as far as company performance goes, past empirical studies do not provide a single, straightforward conclusion on the impact female directors have.

As unveiled in the literature revision Section of this report, prior work provides evidence of a positive (e.g. Carter *et al.*, 2003), negative (e.g. Adams and Ferreira, 2009), and even no (e.g. Rose, 2007) relationship between female directors and firm performance.⁸

Hence, the only conclusion one can reached from past literature is that prior studies arrived at contradictory and incompatible findings and conclusions (Gröschl & Arcot, 2014).

So, the first research questions proposed in this dissertation are:

Hypothesis 1: The *Presence of Female Directors* in the boardroom impacts firm performance (measured by *Tobin's Q*, *ROA* and *ROE*).

Hypothesis 2: The *Percentage of Female Directors* in the boardroom impacts firm performance (measured by *Tobin's Q*, *ROA* and *ROE*).

⁸ A summary of prior researches can be found in Annex 1.

On a comparable basis, the following hypothesis addresses the topic of critical mass and tokenism. To appraise if two, three, or more women on the board are indeed relevant to the female director's overall influence, the next research questions are:

Hypothesis 3: The presence of *Two or more Female Directors* in the boardroom impacts firm performance (measured by *Tobin's Q*, *ROA* and *ROE*).

Hypothesis 4: The presence of *Three or more Female Directors* in the boardroom impacts firm performance (measured by *Tobin's Q*, *ROA* and *ROE*).

The last hypothesis to be tested in the present research harbours a more specific nature. It aspires to analyse the relationship between gender diversity in the board of directors, and the propensity of these firms to enter M&A deals.

Thus, following the work by Levi *et al.* (2014) , the fifth hypothesis to be tested is:

Hypothesis 5: The *Percentage of Female Directors* on the board of the bidder company is related to the propensity of these firms to initiate merger and acquisition deals.

By choosing to test such hypothesis, this dissertation aims, at not only assessing if female directors are more prone than male directors to succumb to empire building motivations but also check some of the traits attributed to female directors. Namely, the association of female directors to, less overconfident behaviour than men (Eagly and Johannesen - Schmidt, 2001; Levi *et al.*, 2014), more effective monitoring skills (Bear *et al.*, 2010; Campbell and Mínguez-Vera, 2008; Levi *et al.*, 2014) and even the fact that women directors are perceived to be more risk-averse than men (Byrnes, Miller, and Schafer, 1999; De Cabo, Gimeno, and Nieto, 2012).

3. Sample and Methodology

This dissertation intends to investigate the relationship between the board of directors' gender diversity and firm performance, as well as the propensity to initiate mergers or acquisitions, for the case of publicly traded companies in Portugal. The aim is to analyse the impact that female directors have, both on firm acquisitiveness, and on firm performance, i.e., determine if there is an economic/financial foundation supporting claims of benefits of gender diversity in the boardroom.

3.1. Sample

To achieve the set goals, a sample of the companies, listed at Euronext Lisbon on 29th of October 2018 were selected. Only listed companies were chosen, to assure that the necessary data was not only available but also accurate. At this date, 43 listed companies were trading at Euronext stock exchange.⁹

From the original sample, composed of 43 companies, sports clubs and financial institutions were removed due to different regulatory rules.¹⁰ This measure follows Rose (2007), that also excluded banks, insurance companies and football clubs from his sample, due to the difficulties faced when calculating Tobin's Q for these firms and to the specific accounting rules they need to fulfil. Companies with preferred stock listings were also disregarded, to ensure that all companies under analyses are comparable. In the end, the final sample was comprised of 36 companies.

Furthermore, panel data was the preferred method because when compared with cross-sectional or time-series data, it has an assortment of advantages, such as higher accuracy of the inference of model parameters and a more exceptional ability to capture human behaviour's complexity (Hsiao, 2007). Plus, it enables the elimination of any unobservable heterogeneity that could be present in the sample's companies (Campbell and Mínguez-Vera, 2008).

To ensure that enough information was retrieved, a period of 10 years – 2008 to 2017 - was considered. This interval represents a total of 360 firm-year observations. However, due to

⁹ Excluding Euronext Growth and Euronext Access.

¹⁰ For more detailed information concerning the companies that form the sample, and the ones excluded, refer to Annex 2.

the lack of information, eight year-firm observations were excluded. Thus, the final sample comprehends an unbalanced panel of 36 companies, observed for ten years, and a total of 352 year-firm observations.

Data was gathered by analysing annual reports of each company, for every year between 2008 and 2017. Information about M&A deals was recovered from the Zephyr database. For this analysis, both mergers and acquisition, representing an increase in ownership of at least 40% were considered.

3.2. Methodology

3.2.1. Company performance

There is a general agreement in the literature that board characteristics are endogenously chosen by firms, *i.e.*, board characteristics are not exogenous random variables (Sila, Gonzalez, and Hagendorff, 2016). For instance, it can be argued that board diversity could impact firm value, however firm value could also affect board diversity (Carter *et al.*, 2003). Notably, concerning gender diversity, if female directors are view as a scarce commodity, it can be expected that they would choose better performing and lower risk firms. Also, firms with better performance may focus more on goals concerning gender diversity. This would represent a positive relationship between gender diversity in the board of directors and firm performance, that may result from variable endogeneity (Campbell and Mínguez-Vera, 2008; Farrell and Hersch, 2005). Hence, it makes sense that previous literature on board composition and firm value often refers to endogeneity concerns (e.g. Adams and Ferreira, 2009; Dobbin and Jung, 2010; Parrotta and Smith, 2013; Reguera-Alvarado *et al.*, 2017). Thus, following the work of Carter *et al.* (2003) and Campbell and Mínguez-Vera (2008), in an attempt to control for this possibility, a Simultaneous Equations Approach (SEM) was chosen.

Furthermore, firm fixed effects were added to the specification of the model. This decision was taken upon after statistical inference, namely, a redundant fixed effects test and a Hausman Test (Hausman, 1978) were applied to each of the equations. The results lead to the choice of firm fixed effects, suggesting that there is unobserved heterogeneity. However, as mentioned in the previous Section, panel data solves this problem.

Hence, using a simultaneous equation approach, the following model will be used to estimate the link between firm performance and boardroom gender diversity:

$$(3.1) \begin{cases} Firm\ Performance_{it} = a_{1,i} + \beta_1 Diversity_{it} + \sum_{j=2} \beta_j CV_{it} + u_{1,it} \\ Diversity_{it} = a_{2,i} + \gamma_1 Firm\ Performance_{it} + \sum_{j=2} \gamma_j CV_{it} + u_{2,it} \end{cases},$$

Firm Performance is alternatively measured by *Return on Equity (ROE)*, *Return on Assets (ROA)* and *Tobin's Q*. When looking at past literature, one can attest that these variables are widely used performance measures. However, a distinction can usually be made between accounting-based (*ROA* and *ROE*) and stock-based (*Tobin's Q*) measures. The formers are perceived to be 'objective' and reflect companies' profitability. The latter is considered 'subjective' to investors' perceptions and provides an estimate of how efficient investors recognise the company's use of its assets to be (Haslam *et al.*, 2010). Prior research usually focuses on one (e.g. Carter *et al.*, 2003), or two (e.g. Adams and Ferreira, 2009; Dobbin and Jung, 2010), of these measures, however, to ensure accurate and plenary results all three measures will be regressed on the estimation procedure. *ROE* is determined as the ratio between Net Income and Equity, *ROA* is the ratio between EBIT and Total Assets, and lastly, *Tobin's Q* is determined by dividing the sum of Market Capitalization and Book Value of Total Liabilities by Book Value of Total Assets.

Diversity represents the variables measuring board's gender diversity. Following Carter *et al.* (2003) and Haslam *et al.* (2010), this analysis includes both the *Percentage of Female Directors*, measured as the ratio of women directors to the total board members, and a dummy variable, *Presence of Female Directors*, that takes the value of one if there are women present on the board, and zero otherwise. Additionally, two dummy variables are also used, *Two or more Female Directors*, that takes the value of one if there are two or more women present in the corporate board, and zero otherwise, and *Three or more Female Directors*, that takes the value of 1 if there are three or more women in the boardroom, and zero otherwise. Thus, *Diversity* is alternatively, *Percentage of Female Directors*, *Presence of Female Directors*, *Two or more Female Directors*, and *Three or more Female Directors*.

During the process of collecting the data, to identify the gender of the directors, it was first considered their name. In case of doubt, the pronouns used when referring to those directors on the companies' annual reports were observed. If these two steps were not enough, an online survey was conducted in attempts of finding an article directly mentioning the person, thus indicating the gender. Following this strategy, all directors were accounted. This process was only applied when the directors' names were foreign.

Lastly, the *CV* stands for control variables. This model includes several that are perceived to influence the financial performance of the sampled firms. As before, the control variables chosen for this regression are also based on past studies (e.g. Adams and Ferreira (2009), Carter *et al.* (2003), Campbell and Mínguez-Vera (2008)). The variables collected are *Firm Size* measured as the natural logarithm of total assets, *Leverage* measured as the ratio between long term liabilities and total assets, *Board Size* calculated as the natural logarithm of the number of directors, *Board Activity* determined as the natural logarithm of the number of annual board meetings, *CEO/Chairman Duality*, a dummy variable taking the value of 1 if the CEO is also the chairman of the board, and 0 otherwise, *Stock Compensation*, a dummy variable taking the value of 1 if stock-based compensation plans for directors exist, and zero otherwise, *Percentage of Independent Directors*, determined by dividing the number of independent directors by the total number of board members, *Percentage of Executive Directors*, determined by dividing the number of executive directors by the total number of board members, *Executive Female Director*, a dummy variable taking the value of 1 if there is at least one executive female director, and zero otherwise, *Board Ownership*, determined by dividing the number of shares owned by directors, excluding the ones owned by family members, by the number of total shares outstanding, *Board Ownership*², determined as the last variable and then squared, and lastly *CEO's age*, defined as the natural logarithm of the age of the CEO.¹¹

Also, when Tobin's Q is used as a dependent variable, two regression will be conducted, one where ROA is a control variable, and another where ROA is not. Some authors, like for instance Campbell and Mínguez-Vera (2008) and Carter *et al.* (2003) use it as a control variable, and others, like Adams and Ferreira (2009), do not. So, as previously stated, considering that Tobin's Q is perceived to be a 'subjective' measure, by running both regressions, it will be possible to access if any considerable differences arise from controlling for an 'objective' measure.

Finally, an examination concerning the existence of imperfect multicollinearity among the explanatory variables, showed that it does not exist since the linear correlations among the variables are low. Further testing was conducted through the use of centred variance inflation

¹¹ Further details about all variables can be found in Annex 3.

factor (VIF), another diagnostic test for multicollinearity.¹² The same results were achieved, i.e., multicollinearity does not exist among the explanatory variables.

3.2.1.1. Descriptive Statistics

Table 1 presents the main statistics of the three variables used as measures of performance, *Tobin's Q*, *ROA* and *ROE*. As it can be observed, *Tobin's Q* has a mean value of 1.53 and a median of 1. *ROA* has a mean and median of approximately 4% and *ROE* takes a mean and median value of 13% and a 9%, respectively.

Table 1. Descriptive statistics: performance measures

	Mean	Median	Maximum	Minimum	Standard Deviation
Tobin's Q	1.5301	1.0015	43.3917	0.4777	2.9580
ROA	0.0377	0.0437	0.3276	-0.4018	0.0563
ROE	0.1254	0.0874	27.9319	-8.9069	1.6813

Tables 2 and 3 represent information concerning the measures of diversity. The only continuous variable measuring diversity is the *Percentage of Female Directors*, and it is presented in Table 2. It shows that on average, 9.26% of the members of corporate boards are female, and the median is 6.25%. It can also be assessed that during the analysed period, none of the observed companies had a majority of female board members, or even 50%. The maximum percentage registered is 44.4% female directors.

Table 2. Descriptive statistics: diversity measure – female percentage

	Mean	Median	Maximum	Minimum	Standard Deviation
Female Director Percentage (%)	9.2616	6.25	44.4444	0	10.9733

The other diversity measures are the dummies represented in Table 3. By analysing it, it can be gathered that in approximately 46% of the observations companies' don't have a single

¹² Further details about the VIF testing can be found in Annex 4.

woman on their board of directors. If this number raises to two or more female directors, this only happens in 18% of the cases. This value decreases further when searching for three or more female directors, where only 7% of the observations companies have such presence.

Table 3. Descriptive statistics: diversity measures – dummy variables

Female Director Presence	%
No female Director	45.79
At least one female director	54.21
2 or more Female Directors	%
Less than 2 female Directors	81.74
2 or more Female Directors	18.26
3 or more Female Directors	%
Less than 3 female Directors	92.7
3 or more Female Directors	7.3

Proceeding, some control variables concerning board characteristics are presented in Table 4. It can be noticed that the mean for the *Percentage of Executive Directors* is 50%, and the median is 44%, approximately. As for the number of meetings boards have within a civil year, on average, this number is about, 13, and the median is 11 meetings. Lastly, regarding the size of the board, on average, it is composed of 9 members and has a median of 8 members.

Table 4. Descriptive statistics: continuous control variables

	Mean	Median	Maximum	Minimum	Standard Deviation
Executive Directors (%)	50.0341	44.4444	100	0	24.8872
Number of Annual Meetings	12.9361	11	59	1	10.0071
Number of Directors on Board	9.0534	8	25	3	4.3242

Lastly, a description of the discrete control variables is presented. By analysing Table 5 a few conclusions are reached: first, *CEO/Chairman Duality* exists in 56% of the cases, second *Stock Compensation* is attributed in 16% of the observations, and third, *Variable Remuneration* exists in 56% of them.

Table 5. Descriptive statistics: dummy control variables

CEO/Chairman Duality	%
Does not exist	44.23
Exists	55.77
Stock Compensation	%
Does not exist	83.99
Exists	16.01
Variable Remuneration	%
Does not exist	44.19
Exists	55.81

3.2.2. Mergers and Acquisitions

Like in the previous Section, the model used to analyse the link between female directors and the proneness to engage in mergers and acquisitions is also based on the work by other authors. In this particular case, the basis for the estimation is the work by Levi *et al.* (2014). In their work, the authors used a negative binomial regression model to conduct the research, however, due to sample limitations, the present study cannot follow the same path. Alternatively, a Probit model will be used. Ergo, assuming that Bid Initiation* is an unobservable continuous variable, the following relationship was considered:

$$(3.2) \text{ Bid Initiation}_{it}^* = \delta_1 + \delta_2 \text{ Diversity}_{it} + \sum_{j=3} \delta_j \text{ CV}_{it} + u_{it},$$

$$\text{where } \text{Bid Initiation}_{it} = \begin{cases} 1, & \text{if } \text{Bid Initiation}_{it}^* > 0 \\ 0, & \text{if } \text{Bid Initiation}_{it}^* < 0 \end{cases}$$

and u_{it} follows a standard normal distribution.

The chosen dependent variable *Bid Initiation* is a dummy variable that takes the value of 1 when there is at least one deal in that civil year, and 0 otherwise.

Diversity is measured with *Percentage of Female Directors*, which, like in the previous Section, is determined with the ratio of women on the board to the total number of directors. The control variables used are the same used by Levi *et al.* (2014): *Percentage of Independent Directors*, *CEO/Chairman duality*, *Tobin's Q*, *ROA* and *Leverage*, are determined in the same way as the previous analysis, in Model 3.1., *Board Size*, representing the number of directors on the corporate board, *Sales Growth*, determined as the ratio of sales in the current fiscal year to

sales in the last year minus one, *Cash Holdings*, representing the amount under the cash and equivalents heading on the companies' balance sheet in each year, in millions of euros and *Natural Logarithm of Market Capitalization*, determined as the number of common shares outstanding times the stock price in euros, at the last trading day of each year. This serves as a measure of company size.

In addition, in an attempt of controlling for managerial incentives of empire building, three additional variables were considered, *Variable Remuneration*, a dummy variable taking the value of 1 if the company's board receives variable remuneration, and zero otherwise, *Stock Compensation*, a dummy taking the value of one if stock-based compensation plans are in place for board members, and zero otherwise, and lastly, *Average Director Remuneration*, calculated as the sum of every director's remuneration divided by the number of directors, in millions of euros.¹³ Two regressions will be run, one only with the control variables of the original model, and a second specification where all the variables are included.

3.2.2.1. Descriptive Statistics

Concerning the analysis of the sample regarding the mergers and acquisitions analysis, the evolution of the number of deals can be observed in Table 6. 2008 is the year with more mergers and acquisitions, with 17 deals accomplished. After, with 10 completed deals, is the year 2010, followed by 2009, 2011, 2012 and 2015 with eight deals. 2013, 2016 and 2017 represent a total of 4 deals each, and lastly, 2014 represented the minimum number of deals, 0.

Table 6. Evolution of the number of mergers and acquisitions

Number of Acquisitions	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	17	8	10	8	8	4	0	8	4	4

As can be seen in Table 7, the most common situation is the one where no deals are completed, representing approximately 86% of the cases. The second most common situation is when one transaction occurs, and this happens 11% of the time. The situation

¹³ Further details about all variables can be found in Annex 3.

where two, three, four and five deals happen are approximately and respectively, 2%, 0.3%, 0.6% and 0.3% of the time.

Table 7. Descriptive statistics: number of deals

Number of Acquisitions	Total	%
0	308	85.56
1	41	11.39
2	7	1.94
3	1	0.28
4	2	0.56
5	1	0.28

Lastly, the information provided in Table 8 allows the conclusion that the maximum number of deals a single company completed in a year is 5. Furthermore, the mean number of deals is approximately 0.2, and the respective median is 0.

Table 8. Descriptive statistics: mergers and acquisitions

	Mean	Median	Maximum	Minimum	Std. Dev.	Sum
Number of Acquisitions	0.1972	0	5	0	0.5806	71

3.3. Expected Results

As previously mentioned, one of the goals of this dissertation is to understand the impact gender diversity on corporate boards may have in performance. Thus, the relationship that the percentage of female directors, the presence of female directors and the presence of two or more, or, three or more female directors may have on firm financial performance, measured by ROA, ROE and Tobin's Q, is not given an expected sign, since it is the relationship being studied.

Starting by addressing the impact ROA is expected to have in Tobin's Q, prior research has found it to be positive (Alghifari, Triharjono, and Juhaeni, 2013).

Moving on to firm size, a definite signal for its effect could not be anticipated. A positive impact can be based on evidence suggesting that larger companies usually have more market

power (Smith, Smith, and Verner, 2006) and advantages in raising capital (Bruderl and Schussler, 1990). Furthermore, they benefit from economies of scale and more bargaining power with both suppliers and clients (Fiegenbaum and Karnani, 1991). However, larger firms may suffer from higher agency costs since they are subjected to higher complexity and greater informational obstacles may exist (Doukas, Kim, and Pantzalis, 2000; McKnight and Weir, 2009). Besides, previous work has found evidence of an inverse relationship between profit rates and firm size (Samuels and Smyth, 1968).

Proceeding, Yermack (1996) states that board size will have a negative effect on firm performance, mainly because of the communication issues and decision-making ineffectiveness larger boards are subjected to. This is in line with the work by Conyon and Peck (1998), that assert that larger boards may lead to ineffective management. However, as articulated by Dalton, Daily, Johnson, and Ellstrand (1999), larger boards have also proved to have advantages. They can encompass more director types, with different expertise, training and experiences. Hence, a board's largeness can lead to a broader scope of board roles to be filled. Another benefit pointed by the authors is the links more board members can contribute, providing critical resources like external funding. Thus, the expected sign can take a positive or negative form.

The relationship between the number of times the board convenes in a year, and firm performance is expected to be positive since boards that meet more frequently have a higher chance of having their members carry out their duties by shareholders' interests (Vafeas, 1999). Plus, for the board of directors to make effective decisions, they need periods to work together, making board meetings an essential resource for board effectiveness (Conger, Finegold, and Lawler, 1998).

Likewise, in the debate of the CEO also being the chairman of the board, evidence of a negative impact on performance was found by Yermack (1996). The same results were found by Rechner and Dalton (1991), that suggested that a possible reason for this outcome is the decrease in boards ability to execute its governance responsibilities due to the apparent conflict of interests caused by this duality (Rechner and Dalton, 1991).

On the matter of the director's stock-based compensation, arguments of a positive link can be made. According to agency theory, i.e., the existence of conflicts of interest between owners and managers (Jensen and Meckling, 1976), stock-based compensation works as a

mechanism of alignment of these interests, hence a positive impact is expected on performance (Dalton and Daily, 2001). None the less, a negative impact can also be justified by the manager's preference for a compensation structure carrying low personal risk. Considering that equity-based compensation is dependent on the company's stock return, which isn't totally under the manager's control, this may lead managers to prefer fixed cash remuneration. Thus, when stock-based compensation is in place, managers may be driven to lead the company into low-risk situations, to safeguard their salary and not for the firm's benefit (Mehran, 1995). Considering the evidence, a positive or negative impact can be expected.

Regarding the matter of board ownership, Morck, Shleifer, and Vishny (1988) find evidence of a positive link between certain levels of director's stock ownership and firm performance. Further evidence is found by Mehran (1995) and by Hermalin and Weisbach (1991). Thus, the sign of impact is predicted to be positive. In opposition, when the board ownership is squared, a negative sign is expected, because a stationary point is reached, from which the effect starts to decrease.

Once more, agency theory can be used as a predictive thesis, this time for the impact that the percentage of executive directors is presumed to have in firm performance. According to Fama and Jensen (1983), executive directors are less incentivised than non-executive directors to defend shareholders' interests. This because non-executive directors are motivated to develop their reputation as experts in decision control in such a way that they will increase their human capital value. However, as Hermalin and Weisbach (1991) argue in their work, there are good reasons to include executive directors, one of which is the counsel and advice they share with CEO's and their knowledge of the daily operations of the firm (Mace, 1971). Therefore, the signal could be either negative or positive.

For the forecast of the impact leverage will have on performance, a definite conclusion could not be found. On the one hand, it is expected that debt will prove beneficial for the company due to its disciplinary effect on managers. Since it reduces the amount of cash flow available for spending at their discretion, it will reduce their freedom to take riskier projects (Jensen, 1986; Jensen and Meckling, 1976). Also, when debt is preferred to equity financing, managers will be more motivated to maximise profit due to the risk of bankruptcy (Grossman and Hart, 1982). On the other hand, it is also possible that debt increases conflict within the firm,

namely between creditors, managers and stockholders, especially concerning their different risk profiles (Jensen and Smith, 2000).

The effect of independent directors on performance measures has been proven to have mixed results. Some authors have found a positive impact between firm performance and the portion of independent directors, which can be attributed to the crucial role independent directors have on company's efficient governance and, particularly, its monitoring role (e.g. (Hossain, Prevost, and Rao, 2001; Weisbach, 1988)). Evidence supporting a negative link has also emerged, defending that boards may be enlarged due to political reasons, i.e. to incorporate, for instance, politicians or environmentalists, as independent directors, leading to a worsening of firm performance, either directly or due to political constraints (e.g. Agrawal and Knoeber (1996)). Some even found no connection, pointing as a possibility the fact that both inside and outside directors are equally efficient in defending shareholders' interests (e.g. Hermalin and Weisbach (1991)). Hence, the influence forecast is inconclusive.

Lastly, concerning variable remuneration and its impact on performance, Murphy (1985) found a positive link between variable pay and performance. So, it is expected that the effects will be positive. A possible reason is that the primary determinant of executive bonuses is accounting profits, leading annual bonus plans to work as incentives for increasing company profitability (Murphy, 1999).

Table 9 summarises the expected effects discussed in this Section.

Table 9. Summary of the expected sign of the control variables

	Tobin's Q	ROA	ROE
Tobin's Q		n/a	n/a
ROA	+		n/a
ROE	n/a	n/a	
Percentage of Female Directors	?	?	?
Presence of Female Directors	?	?	?
Two or more Female Directors	?	?	?
Three or more Female Directors	?	?	?
Firm Size	+/-	+/-	+/-
Board Size	+/-	+/-	+/-
Board Activity	+	+	+
CEO/Chairman Duality	-	-	-
Stock compensation	+/-	+/-	+/-
Board Ownership	+	+	+
Board Ownership ²	-	-	-
Percentage of Executive Directors	+/-	+/-	+/-
Leverage	+/-	+/-	+/-
Percentage of Independent Directors	+/-	+/-	+/-
Variable Remuneration	+	+	+

4. Results

4.1. Firm Performance

The simultaneous Equations in the model (3.1.), are estimated by making use of three methods of estimation: Ordinary Least Squares (OLS), Two-Stage Least Squares (2SLS), and Generalized Method of Moments (GMM). By using different methods of estimation, the robustness of the results can be tested. What follows is that only the results of 2SLS and GMM estimation are reported.

The Durbin-Wu-Hausman (DWH) test was used to test for endogeneity. The null hypothesis of the DWH test is that an OLS estimator of the same equation would yield consistent estimators. A rejection of the null indicates that endogenous regressors' effects on the estimates are meaningful, and instrumental variable techniques are required (Baum, Schaffer, and Stillman, 2003). In the present work, the null hypothesis was rejected, suggesting that OLS estimators might be biased and inconsistent, and hence, the OLS was not an appropriate estimation technique. This was the main reason for reporting only 2SLS and GMM.

The GMM is a generalisation of the 2SLS estimator. If the error term has constant variance and the errors are uncorrelated, then the GMM estimator reduces to the 2SLS estimator if the equation is overidentified. If the error term has non-constant variance, that is, the presence of heteroscedasticity, then it uses this information to produce estimates that are more precise than 2SLS. Also, the Pagan-Hall (PH) test was used to test for the presence of significant heteroskedasticity (Baum *et al.*, 2003). The null hypothesis of homoskedasticity was rejected, suggesting that GMM technique is consistent and efficient. Thus, 2SLS is presented as a basis, but only the GMM estimates will be discussed.

Based on the diagnostic tests, the estimated coefficients of the SEM, for the Presence and Percentage of Female Directors, as well as Two or more and Three or more Female Directors are given in Tables 10, 11, 12 and 13, respectively. Each of the diversity measures mentioned is combined with Tobin's Q, ROA and ROE. Tobin's Q is used twice, one time controlled by ROA, and the other not controlled by ROA, as explained in subchapter 3.2.1..

Additionally, as previously mentioned, the SEM was used to control the endogeneity of the variables. Notwithstanding, the present study aims to analyse the impact variables measuring diversity have on company performance, not the other way around. For this reason, the analysis of the estimation results only concern the first equation.¹⁴ Nonetheless, the results of both equations are presented in the Tables.

As it can be seen in Table 10, the relationship between the variable *Presence of Female Directors* and *Tobin's Q*, controlled and not controlled by *ROA*, have similar results, 0.53 and 0.64, respectively, both at the 5% level of significance, which means that there is an estimated increase of approximately 0.5 points and 0.6 points on *Tobin's Q* when there are female directors present in the boardroom, cp. This translates into a positive impact associated with the presence of female directors on the boardroom, which is in accordance with the findings of Carter *et al.* (2003) who also found a positive link between the presence of female directors and Tobin's Q. As the authors themselves mention, this outcome may be the result of an increased understanding of the market, or of better efficiency in problem solving. However, our results differ from the conclusions reached by (Rose, 2007), who found no link between these variables, and by Haslam *et al.* (2010) that found a negative relationship. The other statistically significant variable is, in both cases, *Board Activity* at the 5% significance level with similar magnitude and the same sign.

Concerning *ROA*, a similar conclusion can be reached, only this time the estimated increase is of 0.03, meaning 3 percentage points, at a level of significance of 1%, cp. Again this is in line with past findings, since Mínguez-Vera and López-Martínez (2010) also found a positive link between the presence of women on the board and ROA. A possible motive for the positive result may be the association of women directors with better management monitoring (Bear *et al.*, 2010). Further, statistically, significant variables are *Board Ownership* at the 1% significance level and *Stock Compensation*, *Board Ownership*², *Percentage of Executive Directors* and *Variable Remuneration* at 5%.

¹⁴ Also, the estimates concerning the variable ROE, with both *Presence of Female Directors* and *Three or more Female Directors*, are not analysed and are presented only in Annex, Annex 5 and Annex 6, respectively. This decision was taken since the relationship between ROE, and these variables were found not to be significant.

The coefficient estimates' signs are the expected ones, addressed in Subchapter 3.3..

Hence, Hypothesis 1 referred on Section 2.4., is confirmed, meaning that the *Presence of Female Directors* on the boardroom impacts firm performance, measured by *ROA* and *Tobin's Q*. Besides, the impact is positive.

Table 10. Regression results for the Presence of Female Directors

This Table presents 2SLS and GMM regression results. It includes 352 observations. The sample comprises companies listed on Euronext Lisbon. Robust standard errors were considered in parentheses. Firm fixed Effects were included. *, **, *** significance at 1%, 5% and 10% level respectively. Performance Measure represents Tobin's Q, ROA and ROE in accordance with the dependent variable being used

Dependent Variable	Tobin's Q		Presence of female directors		Tobin's Q		Presence of female directors		ROA		Presence of female directors	
	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM
Presence of Female Directors	1.0216 (0.657)	0.5274** (0.252)			1.1592*** (0.661)	0.6404** (0.268)			0.1038* (0.022)	0.0288* (0.008)		
Company Size	-0.2773 (0.268)	-0.1083 (0.119)	0.1453* (0.049)	0.0627 (0.043)	-0.2540 (0.270)	-0.1357 (0.115)	0.1538* (0.052)	0.0607 (0.043)	0.0294 (0.012)	0.0097 (0.006)	0.0715 (0.116)	0.0014 (0.052)
Board Size	-0.2747 (0.877)	-0.1137 (0.389)	0.2943* (0.110)	0.2142 (0.078)	-0.2671 (0.885)	-0.1851 (0.397)	0.2945** (0.117)	0.2193* (0.078)	0.0369** (0.040)	-0.0352 (0.026)	0.0821 (0.275)	0.0238 (0.103)
Board Activity	1.8314** (0.862)	1.3255** (0.624)			2.0261** (0.866)	1.3368** (0.615)			0.0523 (0.040)	0.0402 (0.033)		
CEO/ Chairman Duality	-0.2938 (0.527)	-0.1232 (0.214)	0.6186* (0.075)	0.4003 (0.068)	-0.3223 (0.531)	-0.2289 (0.234)	0.6218* (0.079)	0.4131* (0.068)	0.0712* (0.024)	-0.0099 (0.009)	0.5310* (0.183)	-0.0031 (0.090)
Stock Compensation	-1.4781** (0.595)	-0.0186 (0.357)			-1.4792** (0.600)	-0.0378 (0.357)			0.0634** (0.027)	-0.0171** (0.007)		
Board Ownership	0.0081 (0.036)	-0.0050 (0.011)			0.0167 (0.036)	-0.0056 (0.011)			0.0078* (0.002)	0.0018* (0.001)		
Board Ownership ²	-0.0001 (0.000)	0.0000 (0.000)			-0.0003 (0.000)	0.0000 (0.000)			-0.0001* (0.000)	-0.0000** (0.000)		
Percentage of Executive Directors	-0.0152 (0.012)	-0.0076 (0.006)	-0.0016 (0.002)	-0.0021 (0.002)	-0.0167 (0.012)	-0.0078 (0.006)	-0.0015 (0.002)	-0.0016 (0.002)	0.0012** (0.001)	-0.0011** (0.000)	-0.0001 (0.004)	-0.0071* (0.002)
ROA	6.9998** (3.083)	1.1797 (2.882)										
Leverage	-0.5607 (0.994)	-0.0032 (0.583)			-0.3446 (0.998)	0.0391 (0.554)			0.1557* (0.046)	-0.0276 (0.032)		
Percentage of Independent Directors	0.0181 (0.013)	0.0040 (0.006)			0.0181 (0.013)	0.0041 (0.007)			-0.0018* (0.001)	0.0002 (0.000)		
Executive Female Director			0.7508* (0.066)	0.7837 (0.055)			0.7441* (0.070)	0.7887* (0.056)			0.7114* (0.159)	0.5605* (0.063)
Variable Remuneration	0.6804 (0.446)	0.1340 (0.155)			0.7056 (0.449)	0.1625 (0.158)			0.0371*** (0.021)	0.0160** (0.007)		
CEO Age			-0.1550 (0.202)	-0.1095 (0.159)			-0.1728 (0.215)	-0.0832 (0.154)			0.0923 (0.494)	-0.3037 (0.197)
Performance Measure			0.0524*** (0.030)	0.0401 (0.020)			0.0723** (0.036)	0.0717* (0.025)			17.7589* (4.527)	-4.6266* (1.711)
J-statistic	0.1082				0.1004				0.1606			

Moving on, Table 11 presents the regression results when diversity is measured by the *Percentage of Female Directors* and performance is measured by *Tobin's Q*, *ROA* and *ROE*. As showed, the variable measuring diversity, is statistically significant at the 1% level of significance, using all three measures.

When comparing *Tobin's Q* without *ROA* to the one controlled by it, the estimates of the *Percentage of Female Directors* have a positive signal in both cases, 0.04 and 0.03, respectively. This means that, when controlling for *ROA*, an increase of 1 percentage point (pp) of the percentage of female directors leads to an estimated increase of approximately 0.03 points on firm performance, measured by *Tobin's Q*, *ceteris paribus* (cp). These results differ from the ones found by Adams and Ferreira (2009) that found a negative link between the percentage of women directors and *Tobin's Q*, and by Rose (2007), who again found no relationship. As Rose (2007) himself said, women directors may adopt the behaviours of more traditional board members, hiding the features that distinguish them, thus leading to the lack of impact. A negative effect may be the result of communication problems caused by an increased heterogeneity (Earley and Mosakowski, 2000), or even by over monitoring, since gender diverse boards are considered to be more rigorous monitors, thus decreasing value (Adams and Ferreira, 2009). Our results suggest that this is not the case for Portugal during the time period being analysed considering that they show a positive impact of gender diversity in firm performance.

For *ROE* the estimate is smaller than for *Tobin's Q*, and *ROA* is lower than the one for *ROE*, meaning that even though the variable representing *Female Director Percentage* is statistically significant, its impact is shallow. Namely, the value is 0.004, meaning 0.4 percentage points, for *ROA* and 0.006, which corresponds to 0.6 percentage points, for *ROE*. Just like with *Tobin's Q*, these results also differ from prior work, namely the work by Shrader *et al.* (1997), who found a negative link between the percentage women on the board of directors and *ROA* and *ROE*. The authors suggest that women directors are in disadvantage since they are usually assigned to less instrumental types of committees. Once more this must not be the case in our study, since opposite results were obtained.

Furthermore, concerning both *Tobin's Q*, *Board Size* and *Board Activity* are statistically significant. The variable *Board Activity* was already a relevant variable in the diversity measure previously analysed. Also, when *ROA* is used as a control variable, *ROA* and the *Percentage of Independent Directors* are significant at the 1% significance level, while *Stock Compensation* is

statistically significant at 10%. For *Tobin's Q* without *ROA*, it has, as statistically significant variables, *Company Size* at the 1% level of significance and *Percentage of Executives* and *Variable Remuneration* at 10%.

Concerning *ROA* and *ROE*, we have in both, the variable *Percentage of Independent directors* as statistically significant, at 5% and 10% level of significance respectively, even though the estimates have opposite signs. For *ROE*, we also have *Percentage of Executive Directors* as statistically significant at the 1% level of significance. *ROA* has *Board Activity* at the level of significance of 10%, *Board Ownership*, *Board Ownership*² at the 1% level and *Leverage* and *Variable Remuneration* at the 5%, to add to the statistically significant variables.

Regarding the signs of the estimates of the control variables, they are all in conformity with the economic literature addressed in Subchapter 3.3..

Hypothesis 2 referred on Section 2.4., is thus confirmed, meaning that the *Percentage of Female Directors* on the boardroom impacts firm performance, measured by *ROA*, *ROE* and *Tobin's Q*. This impact is positive.

Table 11. Regression results for the Percentage of Female Directors

This Table presents 2SLS and GMM regression results. It includes 352 observations. The sample comprises companies listed on Euronext Lisbon. Robust standard errors were considered in parentheses. Firm fixed Effects were included. *, **, *** significance at 1%, 5% and 10% level respectively. Performance Measure represents Tobin's Q, ROA and ROE in accordance with the dependent variable being used.

Dependent Variable	Tobin's Q		Percentage of female directors		Tobin's Q		Percentage of female directors		ROA		Percentage of female directors		ROE		Percentage of female directors	
	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM
Variables																
Percentage of Female Directors	0.0694** (0.031)	0.0284* (0.010)			0.0722** (0.031)	0.0413* (0.012)			0.0051* (0.001)	0.0040* (0.001)			-0.0109 (0.015)	0.0060* (0.002)		
Company Size	-0.4560 (0.285)	-0.0888 (0.092)	3.7466* (1.068)	2.2164* (0.728)	-0.4411 (0.287)	-0.2800* (0.096)	3.6023* (1.039)	2.0873* (0.712)	0.0171 (0.013)	0.0104 (0.010)	2.6254*** (1.447)	1.5573 (1.081)	0.8132* (0.195)	0.0200 (0.044)	3.7364* (1.343)	1.2722 (4.072)
Board Size	0.3453 (0.848)	0.7110* (0.255)	-4.7663** (2.417)	-8.3984* (2.240)	0.4048 (0.851)	0.9898* (0.330)	-4.7693** (2.327)	-6.6139* (2.291)	0.0928** (0.039)	0.0383 (0.030)	-7.1023** (3.434)	-4.6740*** (2.537)	-0.8337 (0.596)	0.0072 (0.106)	-5.1521** (2.344)	-8.6918 (7.239)
Board Activity	1.9534** (0.868)	0.7913** (0.345)			2.1081** (0.866)	1.5584* (0.514)			0.0546 (0.039)	0.0447*** (0.027)			-0.9824 (0.606)	0.0205 (0.080)		
CEO/ Chairman Duality	-0.5271 (0.547)	0.0946 (0.181)	9.9289* (1.633)	9.0566* (1.699)	-0.5374 (0.549)	-0.0532 (0.241)	9.8742* (1.573)	8.3985* (1.750)	0.0630* (0.024)	-0.0028 (0.015)	8.8500* (2.284)	11.1154* (1.751)	-0.3017 (0.366)	-0.0499 (0.059)	9.4988* (1.566)	9.8655** (4.593)
Stock Compensation	-1.6784* (0.609)	0.3980*** (0.217)			-1.6789* (0.612)	-0.0745 (0.277)			0.0519*** (0.028)	-0.0044 (0.019)			0.0333 (0.424)	0.0149 (0.019)		
Board Ownership	0.0182 (0.035)	0.0043 (0.006)			0.0269 (0.035)	-0.0032 (0.007)			0.0088* (0.002)	0.0053* (0.002)			0.0017 (0.024)	-0.0001 (0.003)		
Board Ownership ²	-0.0003 (0.000)	-0.0001 (0.000)			-0.0004 (0.000)	0.0000 (0.000)			-0.0001* (0.000)	-0.0001* (0.000)			0.0001 (0.000)	-0.0000 (0.000)		
Percentage of Executive Directors	-0.0142 (0.012)	0.0009 (0.003)	-0.0858** (0.038)	-0.0106 (0.038)	-0.0153 (0.012)	-0.0093*** (0.005)	-0.0888** (0.037)	-0.0199 (0.034)	0.0013** (0.001)	0.0007 (0.001)	-0.0752 (0.052)	-0.0488 (0.038)	0.0216** (0.009)	0.0057* (0.002)	-0.0878** (0.038)	-0.3313* (0.124)
ROA	5.8365*** (3.158)	6.3657* (1.837)														
Leverage	-0.3524 (1.004)	0.5216 (0.400)			-0.1710 (1.002)	0.1120 (0.554)			0.1662* (0.046)	0.0801** (0.035)			-1.7948** (0.702)	0.1160 (0.182)		
Percentage of Independent Directors	0.0158 (0.013)	-0.0087* (0.003)			0.0154 (0.013)	-0.0074 (0.005)			-0.0020* (0.001)	-0.0012** (0.001)			0.0078 (0.009)	0.0015*** (0.001)		
Executive Female Director			14.0333* (1.437)	19.9914* (1.407)			14.1460* (1.389)	12.7566* (1.294)			13.8443* (1.988)	13.8205* (1.354)			14.3648* (1.337)	15.7954* (2.310)
Variable Remuneration	0.6000 (0.446)	0.0258 (0.071)			0.6150 (0.449)	0.1725*** (0.102)			0.0299 (0.020)	0.0336** (0.016)			0.1108 (0.315)	0.0377 (0.029)		
CEO Age			2.9748 (4.437)	-1.7838 (3.623)			3.2772 (4.284)	-0.4867 (3.900)			6.3406 (6.162)	-1.2736 (4.605)			3.7995 (4.146)	-6.7839 (4.743)
Performance Measure			1.3028** (0.647)	4.4678* (0.537)			0.9654 (0.713)	0.2672 (0.488)			194.9386* (56.493)	181.4426* (44.957)			-0.6423 (1.099)	70.2199* (5.451)
J-statistic	0.1296				0.0984				0.2569				0.0990			

In Table 12, diversity is measured by the variable *Two or more Female Directors*, and it can be observed that both *Tobin's Q* have the same statistically significant variables, except the *ROA* that is also significant.

In *Tobin's Q* controlled by *ROA*, *Board Activity*, *Percentage of Executive Directors* and *ROA* are significant at the 5% level of significance. *CEO/Chairman Duality*, *Stock Compensation* and *Leverage* are significant at the 1% level. For the *Tobin's Q* not controlled by *ROA*, *Board Activity*, *Stock Compensation* and *Leverage* are significant at the level of significance of 1%, *CEO/Chairman Duality* at 5% and *Percentage of Executive Directors* at 10%.

Also, there is an estimated increase of approximately 2.5 points, in both *Tobin's Q*, when there are *Two or more Female Directors* on the board, which represents an increase relative to the *Presence of Female Directors* of 1.9 points. This conforms with the idea that a single female director may face challenges that prevent her from having a real impact, but that two female directors should be able to have more influence (Bear *et al.*, 2010; Konrad *et al.*, 2008).

With respect to *ROA* and *ROE*, only the variables *Two or more Female Directors* and *Percentage of Independent Directors* are statistically significant in both measures, the first at the 1% level of significance for *ROA* and 5% for *ROE*, and the second at the 10% level of significance for *ROA* and 5% for *ROE*. Also, *ROA* has as statistically significant variables *Board Size*, at the 10% level of significance, and *CEO/Chairman Duality*, *Board Ownership* and *Board Ownership²* at 1%. In *ROE*, the variable *Percentage of Executive Directors* is also statistically significant at the 1% level of significance.

Concerning the variable *Two or more Female Directors*, the estimate for *ROA* is higher by 0.0143, or 1.43 percentage points, when comparing to the *Presence of Female Directors*. For *ROE* this estimate takes the value of 0.1177, meaning 11.77 percentage points.

As for the signs of the estimates of the control variables, they are all in conformity with the economic literature addressed in Subchapter 3.3..

Hypothesis 3 referred on Section 2.4., is confirmed, meaning that the presence of *Two or more Female Directors* on the boardroom impacts firm performance, measured by *ROA*, *ROE* and *Tobin's Q*. Besides, the impact is positive.

Table 12. Regression results for Two or more of Female Directors

This Table presents 2SLS and GMM regression results. It includes 352 observations. The sample comprises companies listed on Euronext Lisbon. Robust standard errors were considered in parentheses. Firm fixed Effects were included. *, **, *** significance at 1%, 5% and 10% level respectively. Performance Measure represents Tobin's Q, ROA and ROE in accordance with the dependent variable being used

Dependent Variable	Tobin's Q		Two or more Female Directors		Tobin's Q		Two or more female directors		ROA		Two or more female directors		ROE		Two or more female directors	
	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM
2/+ Female Directors	3.3268** (1.574)	2.4624* (0.607)			3.3908** (1.569)	2.5426* (0.646)			0.1857* (0.040)	0.0431* (0.011)			-0.1458 (0.590)	0.1177** (0.051)		
Company Size	-0.5040 (0.307)	-0.0092 (0.125)	0.1668* (0.054)	0.0490** (0.022)	-0.4907 (0.310)	0.0586 (0.122)	0.1650* (0.054)	0.0508** (0.023)	0.0179 (0.013)	0.0019 (0.007)	0.0906 (0.077)	-0.0233 (0.078)	0.7907* (0.195)	0.0089 (0.043)	0.1252** (0.059)	0.0723 (0.158)
Board Size	-0.5900 (0.944)	-0.4465 (0.340)	0.2875** (0.123)	0.2568* (0.082)	-0.5642 (0.951)	-0.2216 (0.374)	0.2875** (0.121)	0.2533* (0.082)	0.0363 (0.041)	0.0333*** (0.019)	0.1481 (0.184)	0.1454 (0.172)	-0.7683 (0.609)	-0.0429 (0.094)	0.2859* (0.104)	-0.0303 (0.293)
Board Activity	2.1885** (0.933)	1.2139** (0.532)			2.3104** (0.925)	1.5080* (0.577)			0.0616 (0.041)	-0.0043 (0.014)			-0.9631 (0.610)	-0.0108 (0.078)		
CEO/ Chairman Duality	-1.0860 (0.732)	-0.6953* (0.268)	0.5884* (0.083)	0.3286* (0.063)	-1.0982 (0.734)	-0.6655** (0.279)	0.5877* (0.082)	0.3327* (0.064)	0.0412 (0.027)	-0.0259* (0.009)	0.5205* (0.122)	0.5086* (0.119)	-0.3393 (0.397)	-0.0492 (0.056)	0.5718* (0.069)	0.4490** (0.183)
Stock Compensation	- (0.628)	-1.0384* (0.350)			- (0.631)	-1.2165* (0.398)			0.0638** (0.029)	-0.0077 (0.005)			-0.0076 (0.421)	-0.0136 (0.019)		
Board Ownership	0.0445 (0.0379)	0.0119 (0.012)			0.0518 (0.037)	0.0163 (0.013)			0.0103* (0.002)	0.0043* (0.001)			-0.0001 (0.025)	0.0015 (0.004)		
Board Ownership ²	-0.0006 (0.000)	-0.0001 (0.000)			-0.0007 (0.000)	-0.0001 (0.000)			-0.0001* (0.000)	-0.0001* (0.000)			0.0001 (0.000)	-0.0001 (0.000)		
Percentage of Executive Directors	-0.0107 (0.013)	0.0113** (0.005)	0.0004 (0.002)	0.0017 (0.001)	-0.0115 (0.013)	0.0107*** (0.006)	0.0004 (0.002)	0.0013 (0.001)	0.0014** (0.001)	-0.0001 (0.000)	0.0009 (0.003)	0.0032 (0.002)	0.0215** (0.009)	0.0054* (0.002)	-0.0004 (0.002)	-0.0140* (0.005)
ROA	4.5672 (3.491)	5.8859** (2.423)														
Leverage	0.0186 (1.090)	-2.0142* (0.600)			0.1639 (1.079)	-2.3387* (0.697)			0.1804* (0.048)	0.0283 (0.043)			- (0.709)	0.1345 (0.181)		
Percentage of Independent Directors	0.0117 (0.014)	0.0080 (0.005)			0.0113 (0.014)	0.0074 (0.006)			-0.0023* (0.001)	0.0002*** (0.000)			0.0082 (0.009)	0.0020** (0.001)		
Executive Female Director			0.2560* (0.073)	0.2143* (0.046)			0.2574* (0.072)	0.2296* (0.047)			0.2521** (0.106)	0.2874* (0.078)			0.2891* (0.059)	0.4316* (0.103)
Variable Remuneration	0.1875 (0.515)	0.0314 (0.167)			0.1917 (0.518)	0.0849 (0.171)			0.0074 (0.022)	0.0144 (0.015)			0.1239 (0.326)	0.0572 (0.036)		
CEO Age			- (0.4755** (0.226)	- (0.1967*** (0.114)			- (0.4718** (0.223)	-0.2600** (0.124)			-0.2552 (0.330)	-0.0777 (0.265)			- (0.183)	- (0.220)
Performance Measure			0.0996* (0.033)	0.0633* (0.021)			0.0955** (0.037)	0.0374*** (0.022)			11.6171* (3.025)	19.0057* (3.318)			-0.0012 (0.049)	2.9934* (0.210)
J-statistic	0.0875				0.0930				0.0700				0.0918			

Similarly, in Table 13, using the variable *Three or more Female Directors*, both *Tobin's Q* have the same statistically significant variables: *Company* and *Board Size* at the 1% level of significance, *Variable Remuneration* at 5% and *Board Activity* and *Stock Compensation* at 10%. *CEO/Chairman Duality* is also significant in both *Tobin's Q*, at the 5% level in *Tobin's Q* controlled by *ROA* and 10% in the one that is not. Plus, *ROA* is also significant at a 5% significance level in the *Tobin's Q* controlled by it.

As for the estimates of the dummy variable *Three or more Female Directors*, in spite of being slightly lower than the ones relative to *Two or more Female Directors*, are still higher than the estimates of the variable *Female Directors Presence*.

In the case of *ROA*, the estimates for *Three or more Female Directors* are higher than both, *Two or more Female Directors* and *Female Director Presence*, taking the value 0.056, meaning 5.6 percentage points. These results are thus in line with economic theory that states that, three women on the board should be better than two, and two better than one (Konrad *et al.*, 2008).

The statistically significant variables are, at the 1% level of significance, *CEO/Chairman Duality*, *Board Ownership* and *Board Ownership*². At the 10% level, the variable *Percentage of Independent Directors* is statistically significant.

The estimates' signs, except for the variable *CEO/Chairman Duality* in both *Tobin's Q*, conform with the projected results in Subchapter 3.3..

Hypothesis 4 referred on Section 2.4., is thus confirmed, meaning that the presence of *Three or more Female Directors* in the boardroom impacts firm performance, measured by *ROA* and *Tobin's Q*. Furthermore, this impact is positive.¹⁵

¹⁵ A summary of the main regression results can be found in Annexe 7.

Table 13. Regression results for Three or more of Female Directors

This Table presents 2SLS and GMM regression results. It includes 352 observations. The sample comprises companies listed on Euronext Lisbon. Robust standard errors were considered in parentheses. Firm fixed Effects were included. *, **, *** significance at 1%, 5% and 10% level respectively. Performance Measure represents Tobin's Q, ROA and ROE in accordance with the dependent variable being used

Dependent Variable	Tobin's Q		Three or more Female Directors		Tobin's Q		Three or more female directors		ROA		Three or more female directors	
	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM	2SLS	GMM
Variables												
Three or more Female Directors	3.6126*** (1.929)	2.4073* (0.685)			3.3424*** (1.968)	2.3124* (0.680)			0.1462*** (0.082)	0.0560** (0.025)		
Company Size	-0.4271 (0.287)	-0.2472* (0.076)	0.1424* (0.032)	0.0536* (0.016)	-0.3865 (0.288)	-0.1738* (0.059)	0.1419* (0.032)	0.0558* (0.017)	0.0256*** (0.013)	0.0012 (0.008)	0.1042** (0.043)	0.0267 (0.038)
Board Size	0.0057 (0.848)	0.7569* (0.254)	0.0447 (0.072)	-0.0214 (0.040)	0.0718 (0.850)	0.9087* (0.268)	0.0447 (0.071)	-0.0112 (0.041)	0.0724*** (0.040)	-0.0264 (0.020)	-0.0263 (0.102)	0.0181 (0.082)
Board Activity	2.1911** (0.906)	0.7327*** (0.401)			2.3150** (0.903)	0.7243*** (0.391)			0.0567 (0.042)	-0.0107 (0.015)		
CEO/ Chairman Duality	-0.3240 (0.523)	0.3172** (0.155)	0.3098* (0.048)	0.0744 (0.063)	-0.2849 (0.526)	0.2864*** (0.152)	0.3096* (0.048)	0.0882 (0.062)	0.0893* (0.024)	-0.0239* (0.009)	0.2754* (0.068)	0.2819* (0.069)
Stock Compensation	-1.7515* (0.630)	- (0.277)			-1.7087* (0.633)	- (0.275)			0.0594** (0.029)	-0.0078 (0.005)		
Board Ownership	0.0456 (0.037)	-0.0020 (0.005)			0.0539 (0.037)	-0.0053 (0.005)			0.0102* (0.002)	0.0045* (0.001)		
Board Ownership ²	-0.0006 (0.000)	0.0000 (0.000)			-0.0007 (0.000)	0.0000 (0.000)			-0.0001* (0.000)	-0.0001* (0.000)		
Percentage of Executive Directors	-0.0102 (0.012)	0.0021 (0.003)	-0.0006 (0.001)	0.0002 (0.001)	-0.0119 (0.013)	0.0028 (0.003)	-0.0006 (0.001)	-0.0001 (0.001)	0.0014** (0.001)	0.0000 (0.000)	-0.0003 (0.002)	-0.0002 (0.001)
ROA	6.5301** (3.128)	3.9824** (1.983)										
Leverage	0.0798 (1.073)	0.3425 (0.427)			0.2186 (1.069)	0.0158 (0.445)			0.1762* (0.050)	0.0246 (0.048)		
Percentage of Independent Directors	0.0148 (0.013)	-0.0016 (0.004)			0.0142 (0.013)	-0.0049 (0.004)			-0.0021* (0.001)	0.0003*** (0.000)		
Executive Female Director			0.2738* (0.043)	0.1803* (0.045)			0.2742* (0.042)	0.1848* (0.046)			0.2713* (0.059)	0.2353* (0.050)
Variable Remuneration	0.4680 (0.458)	0.2086** (0.088)			0.4999 (0.459)	0.1902** (0.090)			0.0261 (0.022)	0.0161 (0.016)		
CEO Age			-0.2136 (0.131)	-0.0423 (0.090)			-0.2126 (0.131)	-0.0502 (0.093)			-0.1027 (0.182)	-0.0707 (0.150)
Performance Measure			0.0493** (0.019)	0.0493* (0.013)			0.0481** (0.022)	0.0385* (0.014)			5.9209* (1.670)	8.2163* (1.587)
J-statistic	0.0936				0.0864				0.0594			

4.2. M&A

In the study concerning mergers and acquisitions activity, two estimations were considered. The first one, estimation (a), encompasses only the variables used in the original model utilised by Levi *et al.* (2014). In the second estimation, estimation (b), three additional variables were added to the previous model, in an attempt to control for managerial self-interests. The results of both regressions are presented in Table 14.

Table 14. Regression results for the dependent variable Bid Initiation* and the Percentage of Female Directors

This Table presents the Probit model results for the relationship between Bid Initiation and the Percentage of Female Directors. These regressions include 331 observations. The dependent variable takes the value of 1 in 15% of the observations. The sample represents companies listed in Euronext Lisbon. Data about M&A deals was recovered from Zephyr. Robust standard errors were considered in parentheses. *, **, *** significance at 1%, 5% and 10% level respectively.

Probit Model		
Dependent Variable: Bid Initiation*		
	(a)	(b)
Percentage of Female Directors	-0.0056 (0.017)	-0.0105 (0.018)
Board Size	-0.0461 (0.059)	0.0023 (0.065)
Percentage of Independent Directors	0.0273* (0.008)	0.0251* (0.008)
CEO/Chairman Duality	-1.0524** (0.426)	-0.8005*** (0.457)
Sales Growth	0.0001 (0.003)	0.0002 (0.004)
Tobin's Q	-0.0917 (0.098)	-0.0585 (0.093)
ROA	0.6862 (3.912)	1.0793 (4.073)
Leverage	-1.0229 (1.065)	-1.1876 (1.134)
Cash Holdings	-0.0006 (0.001)	-0.0013*** (0.001)
Logarithm of Market Capitalization	0.0235 (0.116)	-0.0021 (0.129)
Stock compensation		1.0102** (0.454)
Average Director Remuneration		2.3215** (0.928)
Variable Remuneration		-0.8965*** (0.507)
McFadden R-Squared	0.0922	0.1284
Log Likelihood	-125.9852	-120.9637
LR Statistic	25.5980	35.6410

As it can be assessed, neither of the regressions provides a statistically significant relationship between the dependent variable and the *Percentage of Female Directors*, which was the relationship being studied. Thus, Hypothesis 5 could not be proven or disproven.

A possible motive for this outcome may be the limited number of companies that comprise the sample and specially the low number of deals that took place. During the ten years being studied only 71 deals took place in Portugal, with an increase in ownership of at least 40%, which translates into a mean of 0.2 deals per company/year, as showed in subchapter 3.2.2.1.. This contrasts with other countries, like for instance, the United States of America, that just in 2017 had 19 296 deals.¹⁶ Furthermore, the chosen time interval encompasses the period post 2007-2008 crises. This could present as further limiting factor, considering that in the years that followed the crisis, M&A activity suffered from a decline in the number of deals (Rao - Nicholson and Salaber, 2016).

Nonetheless, in the first specification, there are two statistically significant variables. They are the *Percentage of Independent Directors* at the 1% level of significance, and the dummy variable *CEO/Chairman Duality* at 5%. The *Percentage of Independent Directors* has a positive impact on the estimated probability of occurrence of an M&A deal. This is in conformity with past work that found evidence that boards with higher fractions of independent directors are more likely to make beneficial decisions for shareholders, including M&A (Levi *et al.*, 2014). Contrarily, the variable indicating the existence of *CEO/Chairman Duality* has a negative impact on the estimated probability of occurrence of an M&A deal. This can be linked to the rationale that when the CEO and the chairman are the same people, the ability of the board to fulfil his functions is impaired (Rechner and Dalton, 1991).

In regression (b) the hypothesis of the introduction of the dummy variables *Stock Compensation*, *Average Director Remuneration* and *Variable Remuneration* was tested using the likelihood ratio test. Their introduction, as a whole, is statistically significant with the observed value of the chi-squared statistic of 10.043. Furthermore, they are also statistically significant individually, *Stock Compensation* and *Average Director Remuneration* at the 5% level of significance and *Variable Remuneration* at the 10% level. The variables that were already

¹⁶ <https://www.statista.com/statistics/914665/number-of-ma-deals-usa/>

relevant in estimation (a) remain that way, with the only difference being the level of significance of the variable *CEO/Chairman Duality* that changes from 5% to 10%.

Notwithstanding, concerning the other significant variables, the coefficient estimates for binary models only provide the signal of the relationship between the marginal effect of the explanatory variable in the dependent variable. Thus, a study of the magnitude of the impact needs to be made. To do so, marginal effects are estimated for the significant independent variables. The results of these estimations are presented in Tables 15 and 16.

Table 15. Estimated marginal effects for continuous explanatory variables

Dummy Variability			Percentage of independent Directors	Average Director Remuneration
CEO/Chairman Duality	Stock compensation	Variable Remuneration		
0	0	0	0.4191	0.3879
1	0	0	0.2413	0.2234
0	1	0	0.6129	0.5673
0	0	1	0.2236	0.2070
1	1	0	0.4693	0.4344
1	0	1	0.1123	0.1040
0	1	1	0.4465	0.4133
1	1	1	0.2635	0.2439

Note: Regarding the continuous variables, the sample mean was used.

Upon analysing the estimated marginal effects in Table 15, it can be concluded that if every dummy variable - *CEO/Chairman Duality*, *Stock Compensation* and *Variable Remuneration* – is equal to zero, and there is an increase of one percentage point (pp) in the variable *Percentage of Independent Directors*, this will lead to an increase in the estimated probability of M&A occurrence by 42 pp, considering the mean value for the remaining explanatory variables. When all three dummies take the value one, this value decreases by approximately 16 pp.

Furthermore, when the three dummies take the value zero, and the variable *Average Director Remuneration* increases 1 million euros, this will imply an increase in the estimated probability of M&A occurrence by 39 pp. If the three dummies take the value one, this amount will be 24 pp.

Table 16. Estimated marginal effects for discrete explanatory variables

CEO/Chairman Duality	Stock compensation	Variable Remuneration
-0.1042	0	0
-0.1758	1	0
-0.0519	0	1
-0.1124	1	1
0	0.2129	0
1	0.1414	0
0	0.1328	1
1	0.0723	1
0	0	-0.1131
1	0	-0.0608
0	1	-0.1933
1	1	-0.1300

Note: The shaded section represents the estimated marginal effects

Concerning the analysis of the marginal effects of the dummy variables, the results can be interpreted as follows:

- The estimated probability of M&A deals taking place when the chairman and the CEO are the same people relatively to them not being the same person, its smaller by 10.42 pp, assuming the mean value for the other explanatory variables and that the dummies for the existence of stock compensation and variable remuneration are zero. When these two dummies are one, the difference decrease by 11.24 pp.
- The estimated probability of M&A deals taking place when stock-based compensation plans for directors exist comparatively to when it does not, increases by 21.29 pp, assuming the mean value for the other explanatory variables and that the dummies for the existence of CEO/Chairman Duality and variable remuneration are zero. If these dummy variables are one, the difference only increases by 7.23 pp.
- The estimated probability of M&A deals taking place when directors earn variable remuneration versus when they do not, decreases by 11.31 pp, assuming the mean value for the other explanatory variables and that the dummies for the existence of CEO/Chairman Duality and Stock compensation are zero. If the dummies take the value one, the difference decreases by 13.00 pp.

5. Conclusion

This dissertation studied the relationship between three measures of performance- *Tobin's Q*, *ROA* and *ROE*- with four measures of boardroom gender diversity- *Female Director Percentage*, calculated as the number of female directors divided by the total number of board members, *Female Director Presence*, a dummy variable taking the value of 1 if there is at least one female director present, and zero otherwise, *Two or more Female Directors*, a dummy variable taking the value of 1 if there are two or more female directors present in the boardroom, and zero otherwise, and lastly, *Three or more Female Directors*, a dummy variable taking the value of 1 if there are three or more female directors present in the boardroom, and zero otherwise.

Apart from the link between *ROE* and the presence of a single women director, or three or more female directors, all other relationships between boardroom gender diversity and firm performance were statistically significant and positive, hence providing evidence supporting the inclusion of women in companies' boards. An economic/financial foundation encouraging gender diversity in the board of directors is thus accomplished.

These outcomes may be the result of many aspects. When women are considered as real candidates for board positions, an efficient use of resources available to companies is being made (Daily and Dalton, 2003). Besides, including them will render a competitive advantage descendant from an enhanced ability of solving problems and finding alternative solutions, due to the broadening of perspectives, opinions and overall experiences that are being considered in the board of directors (Arfken *et al.*, 2004; Bear *et al.*, 2010). Plus, female directors inclusion in the board enhances the consumer needs that are being contemplated and understood, in particular, the necessities of female costumers (Daily *et al.*, 1999). Furthermore, with the increasingly importance of diversity issues, taking affirmative action to become more inclusive, in this particular case, including women in the boardroom, will transcribe into a favourable reputation with investors and consumers (Daily and Dalton, 2003). Any of the above arguments could be used to justify the success of the presence of women on the boards of Portuguese companies in the last ten years as our results have suggested.

In particular, for *Tobin's Q*, both the presence of two or more, and, three or more women directors have an impact that is four times larger than the impact of considering only if female directors are present. This was to be expected since according with tokenism theory, a single

woman may face problems that prevent her from having a meaningful impact, but with two the situation tends to improve, and even more with three women directors (Bear *et al.*, 2010; Konrad *et al.*, 2008). Regarding the percentage of women directors, the effect, despite being statistically significant, is minimal.

When analysing the effect that female director's percentage has on ROA, the impact is statistically significant but very low. Also, the estimates of the impact female directors have on performance are higher, the largest is the number of women the variables represent, providing further evidence align with tokenism theory (Konrad *et al.*, 2008). In the case of ROE, when two or more women directors exist, the effect is approximately 20 times higher than when considering the percentage of women on the board.

The second relationship that this work aimed at studying is the impact that the Percentage of Female Directors have on the propensity of firms to initiate mergers and acquisitions deals. Regrettably, the link between these two variables is not statistically significant in any of the estimations used. However, other variables were found to have an impact. Those variables are the *Percentage of Independent Directors*, *CEO/Chairman Duality*, *Cash Holdings*, *Stock Compensation*, *Average Director Remuneration* and *Variable Remuneration*.

Finally, the limitations of the present research should not be disregarded, like for instance the sample size, which is comprised only by companies listed at Euronext Lisbon. Additionally, a more extensive period could also allow results to be different, especially in the case of the study about M&A propensity. Further research could thus include more firms and a more substantial period, as well as more variables or different countries.

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Annexes

Annexe 1. Empirical studies sustaining the research hypothesis (chronological)

Authors	Gender Diversity Measure (Explanatory variable)	Performance measures (Dependent Variable)	Control Variables	Statistical model	Data Base (n, Country, Period)	Main Results
Firm Performance						
Shrader <i>et al.</i> (1997)	Women's ratio in management, in top management and in the board	ROS, ROA, ROI, ROE ¹⁷	Total number of managers, the total number of top managers, the total number of board members	Hierarchical regression	200 US firms (from Wall Street Journal), 1992-1993	Negative link for the Percentage of women on the board; no significant link for % of women in top management, mixed results for % women managers
Carter <i>et al.</i> (2003)	Dummy for the presence of female/minorities on the board, women/minorities ratio	Tobin's Q	Board size, number of annual meetings, CEO/chairman duality, a dummy for directors' stock compensation, insider ownership, % of insiders in the board, firm size, ROA, industry Average board member's payment, growth (increase in book assets),	Mean comparison and 2SLS regression analysis	638 US Fortune 1000 firms (1997)	Significant Positive link between the presence of women/minorities on the board and Tobin's Q
Rose (2007)	Women's Ratio and Presence	Tobin's Q		Cross-sectional regression	Danish firms listed on the Copenhagen Stock	No link between the ratio and presence of female directors

¹⁷ ROS: net income/net sales, ROA: net income/total assets, ROI: net income/invested capital, ROE: net income/common equity

			Cumulated ownership of all shareholders (>5%), size (Net turnover), industry dummies, incentive dummy, year dummy		Exchange, 1998–2001	and firm performance
Campbell and Minguez - Vera (2008)	Dummy for female director's presence, women's ratio, Blau and Shannon Index	Tobin's Q	Total number of directors, debt level, ROA, size of the firm	Panel Data analysis, 2SIS	68 Spanish Companies, 1995-2000	Dummy not significant, Other measures show a positive link
Adams and Ferreira (2009)	Women's Ratio	ROA, Tobin's Q	Board size and independence, log(sales), number of business segments, year and industry dummies	IV regression, Arellano-Bond one-step regression	1939 US firms based on IRR, 1996-2003	Negative link
Haslam <i>et al.</i> (2010)	Dummy for female director's presence, Women's Ratio	ROA, ROE, Tobin's Q	Board size, number of employees, industry	Variance analysis, Regression analysis with bivariate correlations	126 British companies (FTSE 100 index), 2001-2005	No link with ROA and ROE, Negative link with Tobin's Q
Minguez -Vera and López-Martínez (2010)	Dummy for female director's presence, women's ratio, Blau and Shannon Index	ROA	Firm age, firm size, number of directors, debt level	Panel data analysis	10,786 Spanish SMEs	Positive link with ROA
Mergers and Acquisitions						
Levi <i>et al.</i> (2014)	Women's Ratio	Natural logarithm of the number of acquisition bids made within a fiscal year	Board and firm size, independent directors' ratio, CEO/chairman duality, sales growth, Tobin's Q, ROA, leverage,	Negative Binomial Regression	S&P 1500 companies 1997-2009	Negative link (Each additional female director is associated with 7.6% fewer bids)

	cash holdings, Year and industry effects
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Annexe 2. Sample composition and companies excluded from the analysis

Company Listing Name	Reason for Exclusion
1. ALTRI SGPS	-
2. B.COM.PORTUGUES	Financial Company
3. BANCO BPI	Financial Company
4. BENFICA	Sport Club
5. COFINA, SGPS	-
6. COMPTA	-
7. CORTICEIRA AMORIM	-
8. CTT CORREIOS PORT	-
9. EDP	-
10. EDP RENOVAVEIS	-
11. ESTORIL SOL N	-
12. FUT.CLUBE PORTO	Sport Club
13. GALP ENERGIA-NOM	-
14. GLINTT	-
15. IBERSOL, SGPS	-
16. IMOB.C GRAO PARA	-
17. IMPRESA, SGPS	-
18. INAPA-INV.P.GESTAO	-
19. INAPA-PREF S/ VOTO	Preferred Shares
20. J.MARTINS, SGPS	-
21. LISGRAFICA	-
22. LUZ SAUDE	-
23. MARTIFER	-
24. MEDIA CAPITAL	-
25. MOTA ENGIL	-
26. NOS, SGPS	-
27. NOVABASE, SGPS	-
28. OREY ANTUNES ESC.	-
29. PHAROL	-
30. RAMADA	-
31. REDITUS, SGPS	-
32. REN	-
33. SAG GEST	-
34. SEMAPA	-
35. SONAE	-
36. SONAE CAPITAL	Financial Company
37. SONAE IND.SGPS	-
38. SONAECOM, SGPS	-
39. SPORTING	Sport Club
40. TEIXEIRA DUARTE	-
41. THE NAVIGATOR COMP	-
42. TOYOTA CAETANO	-
43. VAA VISTA ALEGRE	-

Annexe 3. Variables definition

Variable Name	Definition	Some of the authors that used equal or similar variables	Source of information
Tobin's Q	The sum of market capitalization and total liabilities (debt proxy) divided by total assets, where market capitalization is determined using share prices of the last trading day of each year.	(Levi <i>et al.</i> , 2014); (Carter <i>et al.</i> , 2003); (Adams and Ferreira, 2009)	Companies' Annual Reports
ROA	The ratio of EBIT to total assets.	(Levi <i>et al.</i> , 2014); (Carter <i>et al.</i> , 2003); (Adams and Ferreira, 2009)	Companies' Annual Reports
ROE	The ratio of net income to total equity.		Companies' Annual Reports
Percentage of Female Directors	The number of female directors divided by the total number of board members, percentage.	(Levi <i>et al.</i> , 2014); (Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Presence of Female Director	Dummy variable taking the value of one if there is at least one female director in the board, and zero otherwise.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Two or more Female Directors	Dummy variable taking the value of 1 if there are at least two female directors on the board, and zero otherwise.		Companies' Annual Reports
Three or more Female Directors	Dummy variable taking the value of 1 if there are at least three female directors on the board, and zero otherwise.		Companies' Annual Reports
Firm Size	Natural logarithm of the amount under the total assets heading in the companies' balance sheet.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Board Size	Natural logarithm of the number of directors serving on a corporate board.	(Levi <i>et al.</i> , 2014); (Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Board Activity	Natural logarithm of the number of board meetings within a year.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
CEO/Chairman Duality	Dummy variable taking the value of one if the CEO is also the Chairman of the Board, and zero otherwise.	(Levi <i>et al.</i> , 2014); (Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Stock compensation	Dummy variable taking the value of 1 if stock-based compensation plans for directors exist, and zero otherwise.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports

Board Ownership	The number of shares owned by directors, excluding the ones owned by family members, divided by the number of total shares outstanding, percentage.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Board Ownership²	The number of shares owned by directors, excluding the ones owned by family members, divided by the number of total shares outstanding, squared, percentage.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Percentage of Executive Directors	The number of executive directors divided by the total number of board members, percentage.	(Carter <i>et al.</i> , 2003)	Companies' Annual Reports
Leverage	Non-current liabilities divided by Total Assets. Non-Current Liabilities is used as a proxy of debt.	(Levi <i>et al.</i> , 2014)	Companies' Annual Reports
Percentage of independent Directors	The number of independent directors divided by the total number of board members, percentage.	(Levi <i>et al.</i> , 2014); (Adams and Ferreira, 2009)	Companies' Annual Reports
Variable Remuneration	Dummy variable taking the value of 1 if directors earn variable remuneration (bonus), and zero otherwise.		Companies' Annual Reports
Executive Female Director	Dummy variable taking the value of 1 if there is at least one executive female director, and zero otherwise.		Companies' Annual Reports
CEO Age	Natural logarithm of the age of the CEO.	(Carter <i>et al.</i> , 2003)	
Bid Initiation	Dummy variable taking the value of one if there is at least one merger and acquisition deal in that year, and zero otherwise. Only deals seeking a percentage increase of at least 40% were considered.		Zephyr
Sales Growth	The ratio of sales in the current fiscal year to sales in the last year minus one, percentage.	(Levi <i>et al.</i> , 2014)	Companies' Annual Reports
Cash Holdings	The amount under the cash and equivalents was heading on the companies' balance sheet, in millions of euros.	(Levi <i>et al.</i> , 2014)	Companies' Annual Reports
Logarithm of Market Capitalization	The number of common shares outstanding times the stock price in euros, at the last trading day of each year.	(Levi <i>et al.</i> , 2014)	Companies' Annual Reports
Average Director Remuneration	The sum of every director's remuneration divided by the number of directors, in millions of euros.		Companies' Annual Reports

Annexe 4. Multicollinearity test – VIF

The centered variance inflation factor (VIF) is a diagnostic test for multicollinearity, calculated for the independent variables. Based on the results the centered VIF values are much lower than 10^{18} . The maximum value of 3.226352 indicates that multicollinearity does not exist among the explanatory variables.

Maximum Centered VIF			
	Performance measures as dependent variable	Diversity Measures as dependent Variable	
Female Percentage	2.965664	Tobin's Q	2.850833
Female Presence	3.226352	ROA	2.846218
Two or more female directors	3.194010	ROE	2.846266
Three or more female directors	3.053021		

¹⁸ Gujarati (1995).

Annexe 5. Regression results for the dependent variable ROE and the Presence of Female Directors

This Table presents 2SLS and GMM results for the relationship between ROE and the Presence of Female Directors. This regression includes 352 observations. The sample is comprised of companies listed on Euronext Lisbon. The J-statistic is 0.2025. Robust standard errors were considered in parentheses. *, **, *** significance at 1%, 5% and 10% level respectively.

	Dependent Variable: ROE		Dependent Variable: Presence of female directors	
	2SLS	GMM	2SLS	GMM
Presence of Female Directors	-0.2389 (0.342)	-0.1771 (0.115)		
Company Size	0.7874* (0.190)	0.2041 (0.165)	0.2767* (0.085)	0.2612* (0.071)
Board Size	-0.7075 (0.610)	-0.0502 (0.306)	0.1886 (0.149)	0.1552*** (0.090)
Board Activity	-0.9801 (0.607)	-0.1692 (0.354)		
CEO/ Chairman Duality	-0.3141 (0.361)	-0.0474 (0.137)	0.5485* (0.100)	0.4164* (0.069)
Stock Compensation	0.0106 (0.421)	-0.0536 (0.127)		
Board Ownership	0.0042 (0.025)	0.0069 (0.008)		
Board Ownership ²	0.0001 (0.000)	-0.0001 (0.000)		
Percentage of Executive Directors	0.0218** (0.009)	0.0182* (0.005)	0.0006 (0.002)	0.0016 (0.002)
Leverage	-1.7737** (0.702)	0.7279 (0.671)		
Percentage of Independent Directors	0.0072 (0.009)	0.0073*** (0.004)		
Executive Female Director			0.7391* (0.085)	0.7751* (0.055)
Variable Remuneration	0.0947 (0.316)	0.1850*** (0.112)		
CEO Age			-0.2044 (0.264)	-0.3218** (0.163)
ROE			-0.1806* (0.070)	-0.2982* (0.062)
Firm Fixed Effects	yes	yes	yes	yes

Annexe 6. Regression results for the dependent variable ROE and the Three or more Female Directors

This Table presents 2SLS and GMM results for the relationship between ROE and Three or more Female Directors. This regression includes 352 observations. The sample is comprised of companies listed on Euronext Lisbon. The J-statistic is 0.0795. Robust standard errors were considered in parentheses. *, **, *** significance at 1%, 5% and 10% level respectively.

Variables	Dependent Variable: ROE		Dependent Variable: Three or more female directors	
	2SLS	GMM	2SLS	GMM
Three or more female directors	-0.0515 1.216	0.1395 0.157		
Company Size	0.7814* 0.200	0.0081 0.074	0.1034* 0.039	0.0998* 0.034
Board Size	-0.7987 0.597	-0.1489 0.153	0.0566 0.068	0.0233 0.089
Board Activity	-0.9503 0.628	0.0537 0.124		
CEO/ Chairman Duality	-0.3831 0.364	-0.1053 0.068	0.3090* 0.045	0.2428* 0.073
Stock Compensation	-0.0110 0.439	-0.0899 0.059		
Board Ownership	0.0004 0.025	0.0072 0.006		
Board Ownership ²	0.0001 0.000	-0.0001 0.000		
Percentage of Executive Directors	0.0217** 0.009	-0.0004 0.002	-0.0013 0.001	-0.0003 0.002
Leverage	-1.7651** 0.740	-0.2025 0.328		
Percentage of Independent Directors	0.0081 0.009	0.0028 0.002		
Executive Female Director			0.2937* 0.039	0.2470* 0.053
Variable Remuneration	0.1061 0.321	0.0315 0.064		
CEO Age			-0.1583 0.120	-0.1641 0.118
ROE			0.0211 0.032	0.4315* 0.048
Firm Fixed Effects	yes	yes	yes	yes

Annexe 7. Summary of the main regression results

	Tobin's Q (with ROA)	Tobin's Q	ROA	ROE
Presence of Female Directors	0.5274**	0.6404**	0.0288*	-
Percentage of Female Directors	0.0284*	0.0413*	0.0040*	0.0060*
Two or more Female Directors	2.4624*	2.5426*	0.0431*	0.1177**
Three or more Female Directors	2.4073*	2.3124*	0.0560**	-