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Does Board Gender Diversity Influence Financial Performance? Evidence from Spain

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Abstract In recent years, several countries have enacted guidelines and/or mandatory laws to increase the presence of women on the boards of companies. Through these regulatory interventions, the aim is to eradicate the social and labor grievances that women have traditionally experienced and which has relegated them to smaller-scale jobs. Nevertheless, and despite the advances achieved, the female representation in the boardroom remains far from the desired levels. In this context, it is now necessary to enhance the advantages of board gender diversity from both ethical and economic points of view. This article examines the relation between board gender diversity and economic results in Spain: the second country in the world to legally require gender quotas in boardrooms and historically characterized by a minimal female participation in the workforce. Based on a sample of 125 non-financial firms listed on the Madrid Stock Exchange from 2005 to 2009, our findings show that in the period analyzed the increase of the number of women on boards was over 98 %. This suggests that compulsory legislation offers an efficient framework to execute the recommendation of Spanish codes of good governance by means of the increase in the number of women in the boards of firms. Furthermore, we find that the increase in the number of women on the boards is positively related to higher economic results. Therefore, both results suggest that gender diversity in boardrooms should be incremented, mandatory laws being a key factor to do so.

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Introduction

Although in recent years there has been a decisive trend which has led to women holding board positions, the vast majority of boardrooms are still made up of male directors (Torchia et al. 2011). This recent increment of board gender diversity has been mainly stimulated by the action of some countries which have lately enacted guidelines and/or mandatory laws with the aim of increasing the presence of women on the boards of the listed companies. Some national capital market regulators (e.g., the United Kingdom, Germany, and Australia) have passed recommendations and disclosure requirements. In contrast, other countries (such as Norway, Spain, France, the Netherlands, and Italy) have by legislation required that 40 % of a company's directors be women (Adams and Ferreira 2009; Rose 2007). Via these regulatory interventions, the aim is to eradicate the social and labor grievances that women have traditionally experienced and which relegates them to smaller-scale jobs. Nevertheless, and despite the advances achieved, the female representation in boardrooms remains far from the desired levels (less than 10 % of women on German supervisory boards in the 30 largest listed companies, Holst and Schimeta 2011), especially in the countries with non-mandatory gender quotas. It is therefore now necessary to enhance the advantages of gender diversity on corporate boards from both economic and ethical points of view in order to break through the historic barrier which is

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a relevant restriction to the personal and professional development of women who have entered the workforce later than men. Nevertheless, while the ethical and social reasons are beyond dispute and, from an ethical point of view, board diversity increases the firms' capability to lead the interests of the different stakeholders (Harjoto et al. 2015), the positive impact on the economic results (performance) of firms caused by a high gender diversity of corporate boards is still not widely accepted by the specialized literature (Joecks et al. 2013). Some prior studies associate gender diversity with negative economic performance (De Andres et al. 2005), whereas some other researchers show a positive relation (Campbell and Mínguez-Vera 2008). Some other researchers even find no relation between both variables (Rose 2007).

However, and despite these unclear empirical results and the fact that the existing theories (such as resource dependence, human capital, agency, and social–psychological theories) do not clearly suggest either positive or negative performance effects (Carter et al. 2010), there are three arguments that support gender diversity positively influencing the economic results of firms. This affirmation is based on the following findings. First, women have been shown to be different to men in several aspects: they are more risk averse than men (Croson and Gneezy 2009; Niederle and Vesterlund 2007), and often propose less-aggressive strategies and sustainable investment criteria (Apesteguia et al. 2012). Therefore, based on these intrinsic characteristics of women, female directors may add value to a male-dominated boardroom although proffering different perspectives (Burke 1997; Farrell and Hersch 2005). Second, the trend of current investments toward socially responsible investments[1] encourages the investors and analysts (market opinion makers) to consider, when making investment decisions and reports, the existence of the effective equality of women and men (gender diversity) in the boardroom as a positive investment variable. This fosters the preference for the shares of these companies and thus increases their demand and market values (Bear et al. 2010; Fernandez et al. 2004). Consequently, the economic results, the media visibility, and the demonstration of commitments with respect to social and ethical concerns, among others, will improve and result in a higher demand of stocks and an increase in their price. Third, a study that suggests a negative or no influence of the number of women on company performance may be affected by overall low or high female representation, invalidating their results (for a detailed analysis of this aspect, see Joecks et al. 2013).

Under this framework, the main objective of this article is to provide new evidence on the relationship between the increase of board gender diversity and company performance. We analyze whether the presence of women in firms' boardrooms positively affects their economic results. To do so, we employ a two-stage instrumental variables (IV) regression. By means of the implementation of this research methodology, the potential endogeneity and causality existing in the relationship between gender diversity and firm performance are analyzed. This could bias the coefficients obtained. In addition, in this study, we test the effect that the mandatory regulation promulgated by the Spanish government has had on the presence of women on boards. To do so, a dataset of Spanish companies listed on the Madrid Stock Exchange for the period 2005–2009 is used.

We use a sample from Spain because of it being the second country in the world to pass a mandatory law (the so-called "Law of Equality" enacted in 2007) which promotes women as boardroom members. The objective of this legal normative is to attain 40 % of women on the boards of directors by 2015 (in the year before the implementation of this compulsory legislation, 2006, this percentage was only 3.5 %). Moreover, 1 year before—in 2006—the Spanish national market regulator (CNMV) asked the listed companies to voluntarily comply with the good corporate governance practices contained in the Spanish Code for Good Governance (De Luis et al. 2007) which boosts an equilibrated presence of men and women on boards. Therefore, motivated by both the country and period analyzed in the present study, we consider that this research is very timely. It is also a unique opportunity since we analyze the first years of this relevant law in which the presence of women on company boards has substantially augmented. The number of women on boards has supposed an increment of 98 % in the early years of this legislation, increasing from 52 women at the end of 2005 to 103 women in 2009 (see Table 3 in "Data and Methodology" section). This is despite Spain being traditionally characterized as a European country with a lower number of women in boardrooms (Heidrick and Struggles 2007) and their scarce participation in the Spanish workforce, reflecting deep-rooted societal attitudes toward the role of women (improving the equality of opportunities).

The remainder of the paper is as follows. The next section is an overview of the previous findings and the theoretical framework is included. The following section has a description of the sample employed and the variables considered. A theoretical explication of the methodology used in this article is also provided in this section. Next we present and discuss the results. Finally the last section provides the study's conclusions.

[1] The United Kingdom Social Investment Forum (UKSIF) defines socially responsible investments as investments that allow investors to combine financial objectives and social values, linked to areas of social justice, economic development, peace and the environment.

Theoretical Background and Literature Review

Diversity, Governance and Performance Relationship: A Theoretical View

The literature links the existence of a gender bias on boards to a symptom of poor governance. In addition, the connection between good governance, gender diversity and performance has a long history in the literature (e.g., Adams and Ferreira 2009; Campbell and Mínguez-Vera 2008; Gallego et al. 2010; Jackling and Johl 2009; Post and Byron 2015; Siciliano 1996). The composition of boards of directors has been extensively analyzed, often from the agency perspective and frequently focused on the characteristic of independence. In fact, one of the main goals of prior research has been to establish links between board characteristics and firm performance. Nonetheless, Carter et al. (2003) find that the dominant theories in the study of corporate governance do not provide a solid and complete explanation for the significant impact of diversity on performance. In this line, Kiel and Nicholson (2003) suggest that, due to the multidisciplinary nature of the topic, no single theory can provide a complete framework to form the relation between diversity and performance. These authors argue that various elements of multiple theories must be applied in different circumstances. Based on these findings we adopt an interdisciplinary approach built on the developments derived from agency theory, the theory of resource dependency and the stakeholder theory to examine the effect of corporate governance gender diversity on firm performance.

First, agency theory is the main theoretical approach underlying the idea that increased diversity in leadership positions can boost performance. Agency theory focuses on the conflicts that occur in organizations based on the contractual relations between the principal and the agent. The existence of asymmetric information and incomplete contracts create agency conflicts between owners and managers. These conflicts are associated with a cost insofar as internal factors, such as corporate governance structures, can reduce these costs and thus become important drivers of performance. Accordingly, weak governance creates agency costs and negatively affects the firm's performance (Core et al. 2006). The board of directors serves as a key governance mechanism to help to align the interests of managers and shareholders. Given the argument that a more heterogeneous board acts as a better control because a wider range of views increases board independence, gender diversity on the board can be a mechanism to reduce the costs associated with agency problems. This thus increases the value of the firm (Hillman and Dalziel 2003).

Second, some prior research substantiates the impact of diversity on the theory of resource dependency, framed in organizational behavior research (Hillman and Dalziel 2003). Resource dependence theory—which is increasingly used to analyze the functions and performance of boards of directors (Gabrielsson and Huse 2004)—shifts the focus of the relation between ownership and management to the company's links with its environment. That is, under the resource dependence theory it is assumed that boards serve to link the company to other external organizations in order to address environmental dependencies. This approach extends the centrality of the role of the board's independence because it emphasizes the ability of board members to establish external links and resources to gather crucial information for the company (Siciliano 1996). Diversity, in this context, expands the directors' profiles to improve relations with competitors and customers, knowledge about the industry, and the possibilities of access to finance. In short, it increases critical resourcing, which leads to better performance. Furthermore, the role of resource dependence is very important in obtaining external financing for companies that do not have access to capital markets (Voordeckers et al. 2007). Therefore, resource dependency theory, in line with agency theory, also suggests that increased diversity benefits firm performance.

Third, in tune with the resource dependency theory's focus on the importance of linking the company with its environment, the diversity literature also suggests a theoretical perspective that is linked to corporate social responsibility. Specifically, Fryxell and Lerner (1989) propose the stakeholder theory that addresses the presence of demographic minority groups on boards of directors. The stakeholder theory suggests that the firm must reflect the interests of other stakeholders involved in the firm apart from the shareholders, such as employees, customers, suppliers, financiers, and so on. Recent literature on corporate governance frequently emphasizes this perspective. Namely those other stakeholders besides shareholders contribute to the creation of value for the company (Berman et al. 1999). Following the stakeholder theory, gender diversity and the incorporation of women on boards and in senior management positions can be understood as important indicators of a firm's corporate social responsibility and a sign of a stakeholder-oriented firm (Ibrahim and Angelidis 1994; Oakley 2000; Webb 2004). Furthermore, Hillman et al. (2002) observe that introducing greater gender diversity on the board allows more open government processes that ensure the incorporation of stakeholder interests.

Board Gender Diversity

As a consequence of the financial scandals and the high failure rate of companies in the past decade (the Enron and WorldCom bankruptcies) and the financial crisis of 2008, in recent

Table 1 Proportion of women directors on the board

Country	% of women directors represented on the board	% of boards with no women directors on the board	Gender quota target and expected date
Austria	10	20	No gender quota target
Belgium	15	15	33 % in 2017
Denmark	17	10	No gender quota target
Finland	27	0	No gender quota target
France	25	3	40 % in 2017
Germany	16	7	No gender quota target
Italy	11	20	20 % in 2013
Netherlands	19	4	30 % in 2015
Norway	39	0	40 % in 2008
Poland	8	40	No gender quota target
Portugal	8	30	No gender quota target
Spain	13	14	40 % in 2015
Sweden	27	0	No gender quota target
Switzerland	14	15	No gender quota target
United Kingdom	18	6	25 % in 2015
European average	17	12	–
United States	18	n. a.	No gender quota target
Japan	2.4	n. a.	No gender quota target
China	9.5	n. a.	No gender quota target
India	7	n. a.	No gender quota target

Source Heidrick and Struggles (2014), Spencer Stuart (2014)

years, there has been a growing concern about improving the effectiveness of boardrooms. One of the most relevant boardroom trends to improve corporate governance has been the inclusion of different types of diversity in boards (Hillman et al. 2002). Diversity in the composition of the board of directors is defined as a diverse mix of attributes, characteristics and skills that individual members bring to the board (Van der Walt and Ingley 2003). Two distinguishable categories of diversity are identified by the literature (Milliken and Martins 1996; Pelled 1996). The first category is demographic, which is based on easily detectable observable characteristics, such as gender, race, and academic level. The second category refers to non-visible attributes such as knowledge, skills, profiles and individual capacities.

Much of the research on diversity addresses demographic issues and among them gender diversity (Rosenzweig 1998). This focus on board gender diversity is mainly justified by the gender imbalances which routinely occur in the context of organizations in virtually all geographical areas and due to the laws and the society in general forcing companies toward higher levels of ethical and socially engaged attitudes. Research in this field has also been enhanced by the massive female incorporation in the workforce, their participation in the economy activity and the continuing presence of the issue of gender equality in the political agenda in recent years.

As can be observed in Table 1, in Europe, the representation of women in the boardroom has considerably increased in the last decade (currently the European average is 17 %). Nevertheless this remains low with respect to the U.S. Moreover, the differences between European countries are large. There are countries with a high percentage of women on the board, such as Norway—which has 39 %—and others, e.g., Poland and Portugal, with lower levels of female representation in the boardrooms—only 8 %. As can be observed, the European country with the highest number of women in the boards is Norway, which was the first country in the world to force—by means of a mandatory law—companies to increase their female presence on boards to 40 %. In contrast, the situation of Spain (the second country in the world which enacted, in 2007, a law to increment the female presence in boardrooms to 40 %) is still poor, despite the improvements carried out since the implementation of this law. These differences between European countries can be explained by their historical, political and sociological contexts and facts. For example, Spain could not benefit from the women's rights movements which took place in Europe and the U.S. during the 1960s because of the conservative military dictatorship it endured from 1939 until 1975. During this time-period, it was legally prohibited for women: to work, own property, open a bank account or travel without their husband's permission. Even after 1975, the Spanish gender ideology was

summarized in the Spanish Civil Code. This stated that "husbands must protect their wives and wives must obey their husbands" (Carrera et al. 2001). Consequently, Spain has historically been characterized as a country with a low level of female representation in the social decision–making positions in general and on boards in particular (Heidrick and Struggles 2007). In this type of society in which men, even when protected legally, control all decisions the Administration needs to promote the role of women by using laws that obligate and incite major ethical and gender equality attitudes. For this reason, in 2007, the Spanish government enacted a compulsory legislation (the so-called "Law of Equality", Organic Law 3/2007) to encourage the presence of women on boards and reach 40 % in 2015. This mandatory legislation enabled Spain to outstrip its historical social barriers toward the role of women in the society and lead (together with Norway) the new worldwide wave which fosters women's rights through mandatory laws. As a result of this legislation, the number of women on the boards in Spain has substantially incremented—from 3.5 % in 2006 to 13 % in 2013—although it remains far from the target of 40 % for 2015. Considering the goal to be an effective equality between women and men, the current rate of representation of women in Spain is still low but similar to that of other countries, such as Germany, the United Kingdom or the Netherlands. That is, many European countries are clearly not obeying the gender normative that they themselves have promulgated. Therefore, even now there seems to be a need to demonstrate to society and the business industry that the presence of women on boards should not be necessarily imposed by a legal regulation but should be a common practice justified by reason of both ethical and professional capacity. As the Spanish Securities & Exchange Commission argues, gender-balanced boardrooms are not only a matter of ethics and social justice but also an efficiency objective and represent an economically rational conduct. To justify these affirmations, in the next section, we will show the most relevant and current studies that evidence the relationship between firm performance and board gender diversity.

Board Gender Diversity and Firm Performance

Gender diversity on the board from the perspective of good governance has led researchers to contemplate the connection between the level of diversity and the economic results of firms (Carter et al. 2010). This relation between increased diversity and firm performance has gained a wide acceptance in the recent literature, and many previous empirical studies have attempted to test whether a greater diversity on boards has a positive impact on the performance or value of the company. Robinson and Dechant (1997) argue that companies with top management that consists of men and women who bring different skills, knowledge and experiences have access to more and better creativity and business innovation. Similarly, Tyson (2003) concludes that diversity on boards leads to better company performance, mainly due to the existence of different views. Consequently, most research affirms that heterogeneous groups produce higher-quality decisions (Robinson and Dechant 1997), generate more innovative solutions through cognitive conflict (Chen et al. 2005) and influence the firm's strategy direction (Miller and Triana 2009). In this sense, many previous studies (Bonn et al. 2004; Campbell and Mínguez-Vera 2008; Carter et al. 2003; Erhardt et al. 2003) suggest that an increase in the number of women in boardrooms produces an important improvement of the company's economic results (a positive relationship between board gender diversity and firm performance). In contrast, there is another stream of research that finds a negative relationship between the number of female corporate board memberships and firm performance (e.g., Adams and Ferreira 2009; Carter et al. 2010; De Andres et al. 2005; Pelled et al. 1999; Shrader et al. 1997), and some articles even found no relation between both variables (Randøy et al. 2006; Rose 2007; Zahra and Stanton 1988). Nevertheless, according to the arguments of Joecks et al. (2013), these studies that suggest a negative or no influence of the number of women on company performance may be affected by an overall low or high female representation which invalidates their results. The difference in the inborn characteristics between women and men—such as women being more risk averse than men (Croson and Gneezy 2009; Niederle and Vesterlund 2007; Post and Byron 2015) and women often proposing less-aggressive strategies and sustainable investment criteria (Apesteguia et al. 2012)—are also two arguments that support a more gender diverse board, since these may add value to a male-dominated boardroom through proffering different perspectives (Burke 1997; Farrell and Hersch 2005). In addition, based on the current investment trend toward socially responsible investments, when making investment decisions and reports the investors and analysts (market opinion makers) consider the existence of the effective equality of women and men (gender diversity) in the boardroom as a positive investment variable, encouraging the preference for the shares of these companies and thus incrementing their demand and market values (Bear et al. 2010). Consequently, the economic results, the media visibility and the demonstration of commitments with respect to social and ethical concerns, among others, will be improved and will lead to a higher demand of stocks and an increase in their price. Finally, from the corporate reputation perspective, several studies have investigated the effects on the business reputation of some social, ethical and accountability questions, finding that a favorable reputation

Table 2 Description of the sample by sector and year

	2005	2006	2007	2008	2009	Total
01–17 Agriculture, mining and construction	10	10	12	11	12	55
20–39 Manufacturers	41	41	43	44	45	214
40–49 Transport and communication	19	20	19	20	17	95
50–59 Wholesalers and retailers	0	0	0	0	3	3
60–67 Real estate	13	15	16	15	19	78
70–89 Services	9	10	11	10	12	52
Total	92	96	101	100	108	497

(which is increased in environments with diversity) affects profitability and can even reduce the cost of debt (Kang et al. 2007; Tacheva and Huse 2006).

Based on the theoretical arguments presented above, we test whether board gender diversity is linked to positive economic results. To do so, we state the following research hypothesis:

H1 The increase of the number of women on the boards of companies is positively related to higher economic results.

Data and Methodology

The dataset

Our dataset includes 497 observations of non-financial firms listed in the most relevant and large Spanish stock exchange index, the Madrid Stock Exchange General Index (hereafter, MADX[2]), for the five-year period: 2005–2009. To obtain our final sample, we follow a selection procedure consisting of the application of several filters, which are described step-by-step. First, the financial firms were excluded because they have financial statements that are not compared with the rest of the companies. Second, we only introduced in our sample those firms that have a positive equity in order to avoid financial bias from bankrupt firms. Third, we also eliminated those observations (firm-year) with outliers for any variable considered in our empirical study.

The financial information of the companies of the sample was obtained from the Osiris database. In addition, data on the composition of the boardroom was also collected from the corporate governance reports of each company analyzed.

We consolidate the economic and financial information, in line with Abad et al. (2000), who highlight the potential limitations of accounting information at the individual level. Individual financial statements have been used in the case of non-consolidated financial statements. Table 2 provides an overview of the sample by sector and year.

Table 3 Composition of boards of directors

	2005	2006	2007	2008	2009
Directors (*n*)	1037	1074	1133	1160	1171
Women directors (*n*)	52	65	81	85	103
Total women directors (%)	5.014	6.052	7.149	7.328	8.796

Table 3 provides a summary of the total membership of the boards of directors and women directors. Although the percentage of women directors increases over the time horizon from 5.0 % in 2005 to 8.8 % in 2009, the presence of the total number of women serving on boards of directors remains small. That is, Table 3 confirms women's under-representation in the boardroom, which is in line with the findings obtained by Joecks et al. (2013), Mateos et al. (2011), and Olcese et al. (2005).These results demonstrate that in Spain, there is still a minimal presence of women on boards despite the substantial increase that took place in the first years of the mandatory law (2007 and 2008), which brought about an increase of the number of women on boards. In 2009, the number of women in boardrooms was 103, an increase of 98 % in comparison to 2005 (52 women on boards). As can be observed in Table 1, the presence of women on the boards of Spanish firms is currently 13 %, far from the level of 40 % aspired to for 2015. Other countries, such as France, the Netherlands, the United Kingdom, and Italy—which likewise require their firms to have legal gender quotas—also fail to achieve the target percentages. Only Norway—with 39 % of women in boardrooms—is close to the desired effective equality of women and men in the boards of companies.

Variable Description

The measurement of firm performance in previous studies varies considerably. However, there are two well-differentiated approaches: on the one hand, those studies that use

[2] MADX includes all the firms in the Spanish stock exchange IBEX-35 and other large Spanish companies. MADX is considered by many analysts and investors to be the most representative stock exchange index in Spain.

Table 4 Evolution of the macroeconomic variables

Variable	2005	2006	2007	2008	2009
Volatility MADX	11.423	15.557	18.772	46.392	30.190
GDP (€)	909,298	985,547	1,053,161	1,087,788	1046,894

accounting measures and, on the other hand, those that use Tobin's Q. Following the previous literature, such as Campbell and Mínguez-Vera (2008), Adams and Ferreira (2009), and Garcia-Castro et al. (2010), we use Tobin's Q (TOBINQ) as measure of the financial performance of each firm. Moreover, Tobin's Q is a good proxy regarding the company's competitive advantage as it indicates the market's forecast of future earnings (Montgomery and Wernerfelt 1988). As is widely known, Tobin's Q measures the relationship between a company's market value and its replacement value or its physical assets (Sveiby 1997). Accordingly, a high value for Tobin's Q is associated with the existence of greater intellectual capital, which increases the financial performance of firms. This is why numerous studies use Tobin's Q as financial performance measurement (Lopez and Morros 2014; Coles et al. 2008; Fich and Shivdasani 2006; Haniffa and Hudaib 2006; Ferris et al. 2003).

In order to compare the number of board women with the total number of directors on the board, we defined the variable TAMCAD. This measures the board size or the number of board members to relativize the percentage of women in the boardroom. As proxies for the gender diversity of the boards of directors, we use three variables. First, we define the variable PWOMEN that measures the percentage of women in the boardroom with respect to the total number of board members. Second, according to Campbell and Minguez-Vera (2008), we also calculate two further measures of gender diversity that consider both the number of gender categories (two: women and men) and the evenness of the distribution of board members between them. It is possible to combine these two attributes of diversity—which apply to 'variety' and 'balance,' respectively, into 'dual concept' measures of diversity (Stirling 1998). Based on this concept of diversity, in this study, two variables are calculated (the Blau index and the Shannon index). The Blau index is measured as $1 - \sum_{i=1}^{n} P_i^2$, where P_i is the percentage of board members in each category, and n is the total number of board members. Values of the Blau index for gender diversity vary from 0 to a maximum of 0.5. The latter takes place when the board has an equal number of men and women. The Shannon index is calculated as $-\sum_{i=1}^{n} P_i \ln P_i$, where P_i and n have the same meaning as in the previous expression. Here the minimum value of the index is also zero, and diversity is at a maximum when there is an equal presence of both genders, which results in a value of 0.69.

In addition to the variables associated with the presence of women in the boardroom, four control variables were also included in this study. First, in accordance with Navarro and Martinez (2004) and Sanchez and Sierra (2001), we control the firm size throughout the variable LNTAB, which is calculated as the natural logarithm of total assets. Second, following Adams and Ferreira (2009), we introduce the natural logarithm of sales (LNSALES). Third, we also add the lagged of the dependent variable (TOBINQ) as is considered by Garcia-Castro et al. (2010) and Adams and Ferreira (2009). Fourth, in order to include the effect that the economic crisis has on the economic results of the companies, in accordance with Guenther and Young (2002), Jin (2005), and Lin and Shih (2003), two additional variables with a close relation to the economic cycle were considered: (i) the volatility of the Madrid Stock Exchange General Index (MADX) and (ii) the variation of the Gross Domestic Product (GDP). Table 4 shows the evolution of these variables for the period analyzed (2005–2009). Finally, we consider six sectors according to the SIC sector classification and define SECTOR as a dummy variable for each of the six sectors considered. Appendix Table 10 provides a summary of the variables and definitions.

Instrumental Variables

The previous literature (e.g., Adams and Ferreira 2009; Campbell and Mínguez-Vera 2008; Srinidhi et al. 2011) indicates that there are endogeneity and causality problems in the relationship between gender diversity and the financial performance of firms. In order to address these concerns, we need to define instruments that are correlated with the percentage of women in the boardroom, but (essentially) uncorrelated with firm performance, except through variables which we control for.

The main difficulty of this approach is to identify valid instruments, since the majority of the observable firm characteristics are already included in the main performance equation, causing the system to be unidentified (Campa and Kedia 2002). According to Baum (2006), a valid instrument must satisfy two conditions: (i) not be correlated with the error term in the main performance equation, except through control variables included in the regression (orthogonality condition), and (ii) be correlated with the endogenous variable (weak instruments). Instrumental variables must therefore reasonably predict the

endogenous variable (PWOMEN, BLAU, and SHANNON) and not be correlated with the disturbance terms in our main model (Tobin's Q).Under these two conditions, three instrumental variables were defined: the firm's visibility (IBEX), the mandatory law (LAW), and the compensation of outside directors (REM).

The first instrument which we consider concerns the visibility of the firm. As there is no finer-grained measure of visibility, we operationalize it in this study by using a dummy variable that shows whether a firm is listed in Ibex-35 or not (IBEX). Firms listed in Ibex-35 are expected to have a higher visibility, given that they are supposed to have a higher exposure to investors, media, activists, etc. (Garcia-Castro et al. 2010).

The second instrument is related to the effect that the mandatory law (the so-called "Law of Equality") has. As was argued previously, some countries (e.g., Spain) have promoted the development of a mandatory law to obligate companies to have a minimum number of women on boards of directors. Since the fulfilment of these laws increases board gender diversity, there is a higher probability of increasing the number of women directors in the years following the enactment of this law. Therefore, we divide the period analyzed (2005–2009) into two sub-periods: one before the mandatory law (2005–2006) and another after its enactment (2007–2009). Consequently, the instrumental variable LAW takes value 1 after the promulgation of the Law of Equality (2007–2009) and 0 after this law was enacted (2005–2006).

The third instrumental variable is related to directors' compensation. The previous literature shows that moderate compensation for board members tends to follow the so-called codes of good governance and usually engaging in socially responsible behaviors (Garcia-Castro et al. 2010; Adams and Ferreira 2009). Consequently, companies with a moderate compensation of their directors will tend to follow the codes of good governance and, in the case of Spain, will usually include board gender diversity since this is recommended by the Spanish code.[3] We calculate the natural logarithm of the director's compensation (LNREM).

Methodology

In this study, two statistical methods are used, one for each objective. First, to study whether the board gender diversity influences the financial performance of firms, a two-stage instrumental variable (IV) regression is implemented as research methodology. The first-stage of an instrumental variables (IV) regression is based on ordinary least-squares (OLS) regression, while the second stage applies the generalized method of moments (GMM). The objective of dividing our statistical method into two steps is to address the concern of potential endogeneity and causality associated with the relations between the number of women in the boardroom and financial performance. In addition, to assume from a theoretical view that the relationship between gender diversity and financial performance is endogenously determined, we empirically test this by using the GMM distance test of endogeneity proposed by Baum et al. (2007).

Throughout the implementation of the two-stage instrumental variables (IV) regression, we are assuming that it is possible to determine gender diversity in terms of a set of variables that influence board diversity but are not correlated with performance (TOBINQ). As shown in Eq. 1, we can assume that the presence of women on the board of directors of a firm i in time t is given by

$$\begin{aligned}\text{TOBINQ}_{it} = {} & \beta_0 + \beta_1 \times \text{WOMEN}_{it} + \beta_2 \times \text{LNTAB}_{it} \\ & + \beta_3 \times \text{LNSALES}_{it} + \beta_4 \times \text{TOBINQ}_{t-1} \\ & + \beta_5 \times \text{GDP}_{it} + \beta_6 \times \text{MADX}_{it} + \beta_7 \\ & \times \text{SECTOR}_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

where TOBINQ is the measure of firm performance, WOMEN are the three variables used to measure the gender diversity in the board of directors (PWOMEN, BLAU, and SHANNON), LNTAB is the company size, LNSALES are the company sales, LAG (TOBINQ) is the lagged of the variable TOBINQ, GDP is the variation of the gross domestic product, MADX is the volatility of the Madrid Stock Exchange General Index, SECTOR are dummy variables for each sector, and ε_{it} is the error term.

Second, in order to analyze the effect of the Spanish mandatory legislation ("Law of Equality") on the presence of women in boardrooms, a panel data methodology is performed. The panel data approach allows controlling for the unobservable constant heterogeneity or fixed effects term (Arellano 2003). This term is intended to reflect the firm-level characteristics, and it thereby avoids the omission bias and renders more efficient estimates. The fixed effects term is unobservable and, consequently, is subsumed in the random disturbance. A key element in panel data is the relation between the fixed effects term and the other explanatory variables. This correlation is analyzed by using the Hausman test, which tests the null hypothesis of the lack of correlation between the independent variables and the fixed effects term.[4] Accordingly, we use the

[3] The code indicates that when the number of women directors is low or null, the board will have to explain the motives and the initiatives adopted to correct this situation. When there are vacancies, it should be guaranteed that the firm deliberately includes among the potential candidates women who have the professional profile sought (this is in recommendation 15 of the Unified Code of Good Governance).

[4] This test follows a χ^2 distribution with as many degrees of freedom as estimated coefficients. When the null hypothesis is not rejected, the fixed effects term must be dropped with the within-groups technique. Otherwise, the random effects method applies.

Table 5 Descriptive statistics and Pearson correlations

Variable	Mean	SD	Q1	Median	Q2
Panel A. Descriptive statistics					
TOBINQ	1.887	1.872	0.910	1.380	2.140
TAMCAD	11.254	3.732	9	11	13
PWOMEN	6.927	8.669	0	5.260	11.110
BLAU	0.115	0.131	0	0.099	0.197
SHANNON	0.193	0.206	0	0.206	0.349
IBEX	0.225	0.418	0	0	0
LAW	0.627	0.484	0	1	1
LNREM	10.677	1.391	10.086	10.820	11.455
LNTAB	13.844	1.903	12.391	13.724	15.185
LNSALES	13.217	2.030	11.872	13.418	14.430

Variable	2	3	4	5	6	7	8	9
Panel B.Pearson correlations								
1. TOBINQ	0.009	0.021	0.027	0.080*	−0.062	0.049	−0.048	−0.016
2. PWOMEN		0.989***	0.966***	0.049	0.094**	−0.048	−0.077*	−0.046
3. BLAU			0.992***	0.055	0.102**	−0.037	−0.075*	−0.045
4. SHANNON				0.065	0.106**	−0.023	−0.064	0.036
5. IBEX					−0.015	0.188***	0.535***	0.500***
6. LAW						0.023	0.072*	−0.011
7. LNREM							0.396***	0.447***
8. LNTAB								0.879***
9. LNSALES								

***, **, and * indicate a significance of less than 1 %, less than 5 %, and less than 10 %, respectively

See Appendix Table 10 for a definition of all the variables

Hausman test to choose the most suitable estimation method.

Results

Evolution of number of women

Panel A of Table 5 provides the descriptive statistics of the main sample. Women are clearly underrepresented as women only average 7 % of total board membership. The average board size is 11 directors of boards that include women (TAMCAD), with an interquartile range between 9 and 13 members. Meanwhile, the average director's compensation (LNREM) is 10.67, while the median is 10.82. The average size of the companies in the sample (LNTAB) is 13.844. This is roughly equal to the median (13.724). These results are in line with those obtained by Monterrey and Sánchez-Segura (2008), and Mahdi et al. (2012). Regarding company sales (LNSALES), firms have a mean during the period of 13.217, while the median is 13.418. Finally, with respect to the statistic relationship between the variables used in this study, Table 5, Panel B, shows the Pearson correlations between these variables. The most relevant relations appear between the variables TOBINQ and MTB, and between the proxies for the gender diversity. The correlation between gender diversity proxies does not disturb our results because we will build a different model for each proxy. The remaining variables are not correlated, or the relations are not very significant due to their coefficients being low.

Instrumental Variables (IV) Estimation

Since, from a theoretical point of view, there are arguments to justify a possible endogeneity and causality of the relationship between gender diversity and firm performance (Campbell and Mínguez-Vera 2008; Srinidhi et al. 2011), we applied the endogeneity test proposed by Baum et al. (2007) to empirically test its existence. As shown in Table 6, the results for this test are statistically significant, and we therefore accept the null hypothesis, which corroborates the presence of endogeneity. These results of the test of endogeneity confirm our theoretical arguments and

Table 6 Results of test of endogeneity

	PWOMEN	BLAU	SHANNON
Value test	4.877**	5.046**	5.579**
p value	0.027	0.024	0.018

***, **, and * indicate a significance of less than 1 %, less than 5 %, and less than 10 %, respectively

suggest, for the three variables of gender diversity employed in this paper (WOMEN, BLAU and SHANNON), that the relationship between gender diversity and financial performance is endogenously determined.

In line with previous studies (Adams and Ferreira 2009) and in order to address the endogeneity and causality concerns, we consider instrumental and control variables as predictors. In Table 7, the results of the first-stage instrumental variables (IV) estimation (OLS regression) are shown. These results allow for the prediction of gender diversity in a firm. The resulting models account for around 50 % of the variance found in the variable TOBINQ (PWOMEN, $R^2 = 0.46$; BLAU, $R^2 = 0.50$; BLAU, $R^2 = 0.53$). Regarding instrumental variables, the variables IBEX and LNREM are significant, and their estimator signs follow our expectations, and thus our models have theoretical sense. In addition, Table 7 also suggests the existence of a positive impact of the previous year's performance on future values of gender board diversity: PWOMEN, 0.439 (p value < 0.10), BLAU, 0.007 (p value < 0.10), and SHANNON, 0.011 (p value < 0.10).

Table 8 shows the results of the second-stage instrumental variables (IV) estimation (GMM estimation). In this stage, the impact of gender board diversity (PWOMEN, BLAU, and SHANNON) on the financial performance of firms (TOBINQ) is analyzed—gender diversity has been instrumented by using: IBEX, LAW, and LNREM. As can be observed in Table 8, our results show a positive relationship between the number of women in the board (PWOMEN, BLAU, and SHANNON) and the financial performance of firms. The coefficients on diversity are, in the three GMM regressions, positive and significant at the 10 % level (PWOMEN, 0.091; BLAU, 6.566; SHANNON, 4.562).Our findings therefore confirm our research hypothesis and suggest, in line with the results of prior studies (e.g., Campbell and Mínguez-Vera 2008; Bonn et al. 2004; Carter et al. 2003; Erhardt et al. 2003; Post and Byron 2015), that board gender diversity increases the value of firms as it enables the board to have new ideas and skills and views which are different.

Our results may be influenced by the tokenism effect since the positive effects of gender diversity diminish in countries with higher female economic participation and empowerment (Low et al. 2015). Theoretically, tokenism

Table 7 First-stage Second-stage instrumental variables (IV) estimation (OLS)

	PWOMEN	BLAU	SHANNON
IBEX	3.459**	0.051**	0.080**
LAW	−0.607	−0.009	−0.015
LNREM	−0.989*	−0.014*	−0.019*
TOBINQ (1 lag)	0.439*	0.007*	0.011*
LNTAB	−0.704	−0.011	−0.017
LNSALES	0.572	0.009	0.015
MADX	0.007	0.000	0.000
GDP	−0.418*	−0.006*	−0.009*
R^2	0.46	0.50	0.53
F-statistic	2.36**	2.50**	2.52**
Industry dummies	Yes	Yes	Yes

***, **, and * indicate a significance of less than 1 %, less than 5 %, and less than 10 %, respectively

Table 8 Second-stage instrumental variables (IV) estimation (GMM)

	TOBINQ (PWONEN)	TOBINQ (BLAU)	TOBINQ (SHANNON)
PWOMEN[a]	0.091*		
BLAU[a]		6.566*	
SHANNON[a]			4.562*
TOBINQ (1 lag)	0.406***	0.398***	0.389***
LNTAB	−0.063	−0.055	−0.048
LNSALES	−0.046	−0.058	−0.073
MADX	−0.031***	−0.032***	−0.032***
GDP	0.056	0.056	0.057
R^2	0.54	0.53	0.51
F-statistic	6.62***	6.55***	6.31***
Industry dummies	Yes	Yes	Yes

***, **, and * indicate a significance of less than 1 %, less than 5 %, and less than 10 %, respectively

[a] PWOMEN, BLAU, and SHANNON have been instrumented using the instrumental variables included in the first-stage OLS regression shown in Table 7 above: IBEX, LAW, and LNREM

argues that the numerical proportion of female directors has to be "significant" enough to allow the female "voice" to be heard and truly valued. Therefore, it is argued that a critical mass is essential before any material difference in performance can be observed (Torchia et al. 2011). However, the tokenism effect must have a limited influence in our results since this is of particular relevance in areas—such as Asia—where the participation of women in senior corporate positions remains low (Jaquette 1997). In Spain, although there is a misrepresentation of women in boards, this is higher than in Asia.

Table 9 Effect of the mandatory law on gender diversity

	PWOMEN	BLAU	SHANNON
LAW	1.557***	0.247***	0.04***
Adj. $-R^2$	0.01	0.01	0.01
F-Test	7.74***	8.70***	9.04***
Hausman Test	0.08	0.24	0.30

***, **, and * indicate a significance of less than 1 %, less than 5 %, and less than 10 %, respectively

Effect of the Law on Board Gender Diversity

In this section, the effect that the mandatory law (the so-called "Law of Equality"), which was promulgated in 2007 by the Spanish government, has had on the presence of women on the board of the companies is analyzed. The results, shown in Table 9, demonstrate that the enactment of this compulsory regulation has significantly and positively influenced board gender diversity in the boardrooms of Spanish companies. In this sense, the results for the three variables that measure board gender diversity (PWOMEN, BLAU, and SHANNON) suggest a positive and significant influence at the 1 % level effect of the law on the presence of women in the boardrooms of firms. These results therefore confirm the power that mandatory laws have in order to boost the presence of women on boards. Consequently, the promotion of mandatory laws by governments is a key factor that contributes to balancing the effective equality between men and women and boards of directors and thus it is a mechanism that must be employed in other countries where the presence of women in the boardrooms remains low.

In summary, in line with previous studies (e.g., Bonn et al. 2004; Campbell and Mínguez-Vera 2008; Carter et al. 2003; Erhardt et al. 2003) we find that the increase of female representation in the boards of firms positively influences their economic performance. Consequently, based on the results of this study, companies should clearly increase the percentage of women in their boardrooms for both economic and ethical perspectives.

Discussion and Conclusions

This article offers new insights into the relationship between board gender diversity and economic results (measured through business success). To do so, a sample of 125 non-financial companies listed on the Madrid Stock Exchange for the four-year period 2005–2009 was used. The sample and period considered in the present study are two noteworthy characteristics that enhance the value of this research since (a) the existing literature on board diversity and firm performance is mainly focused on the US data, and (b) it is possible to analyze the effects that the mandatory laws to increase the female presence on the boards have on the economic results of the firms (as explained above, Spain was the second country in the world to pass—in 2007—a mandatory legislation to promote women as members of boardrooms). In addition, the suitability of Spain as the country under study is strengthened by the social turnaround that has taken place in the last decade. Moreover, this has happened in a country that could not benefit from the women's right movements which occurred in Europe and the U.S. in the 1960s because of the then conservative military dictatorship being in place from 1939 until 1975 and in which female representation in the social decision–making positions was traditionally low. In this type of society in which men, even when protected legally, control all decisions, the Administration needs to promote the role of women by using laws that obligate and incite major gender equality attitudes.

Our findings show two relevant conclusions. First, our findings show a positive relationship between board gender diversity and positive economic results. That is, the results show that having more women in governance positions increase the business performance. Hence, in line with previous studies (e.g., Bonn et al. 2004; Campbell and Mínguez-Vera 2008; Carter et al. 2003; Erhardt et al. 2003), we suggest that firms increase female representation on their boards, since it positively influences their economic results. Thus, board gender diversity adds value to firms since it brings to the board new ideas and different skills and views. For this reason, we encourage firms to increase the presence of women in their boardrooms, since it positively redounds on both economic results. Consequently, it is necessary to promote the presence of women on boards not by external coercive measures (such as laws) but from within companies and due to social and labor justice and professional skills. Moreover, it is beyond dispute that the increasing of board gender diversity will provide firms and society in general with substantial ethical and social advances (Harjoto et al. 2015), as this decidedly boosts the effective equality between men and women. Thus, the incorporation of women in decision-making positions, such as boardrooms, is necessary to eradicate the social and labor grievances traditionally experienced by women, and to improve the economic results of firms. Second, regarding the effect of the compulsory legislation—the so-called "Law of Equality"-on board gender diversity—our results show that the enactment of this mandatory law has significantly increased the presence of women in boardrooms. Therefore, compulsory regulations are a powerful mechanism that is in the hands of governments in order to achieve effective gender diversity in boards, enforcing the accomplishment of the recommendation of the Spanish code of good governance. However, our descriptive results—in line with those obtained by

Joecks et al. (2013), Mateos et al. (2011), and Olcese et al. (2005)—indicate that in Spain, there is still a low presence of women in boardrooms despite the substantial increment which took place in the first years of the mandatory law (2007 and 2008) that brought about an increase in the number of women on boards. Specifically, in 2009, the number of women on boards was 103, with an increment of 98 % in comparison to 2005 (52 women on boards).

In conclusion, we suggest that companies must have a more efficient view—from the economic perspective—through the incorporation of a greater percentage of women into their boards. This increase of female representation in the boardrooms will provide firms not only with economic benefits but also with greater ethical commitments, social visibility, and the attraction of human talent. Based on our findings, we clearly affirm that the regulatory interventions carried out by several governments are a relevant assistance to increase the number of women in boardrooms. Therefore, this situation may only be explained by a wish to maintain the historical status of man's power over women since from an economic view, our results substantially suggest the positive effect of board gender diversity on the financial performance of the firms.

This research has strong implications for, on the one hand, governments and law makers (market regulators) and, on the other hand, shareholders and company managers. Both groups should carefully consider our results in order to enhance public policies and business decisions that promote the incorporation of women in boardrooms. Finally, the results of the present study are also really interesting for all those countries which have not yet enacted either mandatory laws or recommendations/disclosure requirements to increase the presence of women in boardrooms, since our findings show the positive experience—from both ethical and economic points of view—that such a law has had in the Spanish context.

This paper contributes to the existing literature on gender diversity in boardrooms and firm financial performance in three ways. First, to the best of the authors knowledge, this is the first study in which there is an analysis of the effects that a mandatory law, created to increase board gender diversity, produce on the economic performance of Spanish companies. Because of the recent publication of these legislations and the fact that only a few countries have imposed them, the results of this paper have strong economic and public policy implications, especially for the stakeholders, directors, and law makers (mainly market regulators and governments). Second, by using the test of endogeneity proposed by Baum et al. (2007), we empirically analyze the existence of endogeneity in the relationship between gender diversity and firm performance. Third, to date, this is the third research work that studies the impact of the number of female corporate board memberships in the Spanish capital market, since most previous empirical evidences on this issue have been based on the US market. Furthermore, we improve the two unique studies for Spanish companies carried out by Campbell and Mínguez-Vera (2008) and Gallego et al. (2010) by means of a more current dataset. Until 2006, there was an insufficient number of women in boardrooms, and the period 2007–2009 (which is analyzed in this paper) produced the highest increase of the percentage of women in boardrooms known until now in the Spanish market.

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Appendix

See Table 10

Table 10 Definition of variables

Abbreviation	Variable	Definition
TOBINQ	Tobin's Q	Stock price/replacement value
TAMCAD	Size council	Number of board members
PWOMEN	Women board members	% board members who are women
BLAU	Index Blau	Blau index of diversity
SHANNON	Index Shannon	Shannon index of diversity
IBEX	Firm's visibility	Dummy variable, 1 if a company is listed in the Ibex-35 and 0 otherwise
LAW	Mandatory law	The period before and during the current mandatory law
LNREM	Compensation	Logarithm of outside directors compensation
LNTAB	Company size	Logarithm of total assets
LNSALES	Company sales	Logarithm of total sales
GDP	Gross Domestic Product	Variation of the Gross Domestic Product
MADX	Madrid Stock Exchange General Index	Volatility of the Madrid Stock Exchange General Index
SECTOR	Sectors of activity	Dummy variable for each sector considered

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