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Women on the Board and Managers' Pay: Evidence from Spain

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Abstract The current literature shows great interest in the issue of gender diversity on boards of directors. Some studies have hypothesized a direct relationship between diversity and the value of the firm, but not many examine the intermediate mechanisms that may exert an influence on such relationships. We employ two stages of GMM estimation methodology to exhibit evidences of the relationship between gender diversity and compensation of top managers in the Spanish context. Results show that gender diversity positively affects the effectiveness of boards—in terms of composition, structure, size and functioning—influencing a proper design of top managers compensation linked to company performance. Evidences suggest that legislative actions aimed at increasing the presence of women on boards of directors are justified not only for ethical reasons, but also for reasons of economic efficiency.

Keywords Board of directors · Gender diversity · Governance effectiveness · Top managers' compensation · Board characteristics

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Introduction

In recent years, the study of gender diversity in organizations has increased interest not only in academic field but also in the social and business ground (Carter et al. 2003; Huse and Solberg 2006). One of the most debated issues is what is known as 'glass ceiling', considered all barriers women face as they attempt to climb the corporate ladder (Francoeur et al. 2008). In order to avoid that, the pressure on companies to incorporate into their business women comes from different stakeholders such as shareholders, politicians, community and social groups.

Gender diversity, defined as the variety inherent in the group's composition (Milliken and Martins 1996) and, in our case, focused in the proportion of women and men on board of directors, has important implications from several points of view. Beyond economic arguments, female presence on the board should not be regarded as a means to an end, but as desirable end in itself. That is, it would be immoral for women to be excluded from corporate boards, and gender diversity would lead to a more equitable outcome for society. That is why we may find in the gender literature arguments in favor of board diversity coming from both ethical and economic arenas.

Focusing our debate in an economic viewpoint, several studies have attempted to analyse the effect of gender diversity on company performance (Francoeur et al. 2008; Mahadeo et al. 2012); however, they start from a premise of direct influence, ignoring intermediate factors, such as the characteristics of the board of directors. Given the important role of the board in making decisions, these characteristics may help to explain its influence on firm performance (Adams and Ferreira 2009; Forbes and Milliken 1999; Francoeur et al. 2008). In listed companies, the board of directors is the main mechanism responsible for

governance and supervision policies; that is why different studies have looked at how certain features of a board can affect the monitoring and design of top managers' compensation (Core et al. 1999). However, in the context of gender diversity, most researches have limited to analysing the compensation gap between men and women holding managerial positions, without pay attention to the participation of women in the process of board's compensation monitoring (Adams and Ferreira 2009).

There are in the literature several theories from different academic fields that can advocate that gender diversity in a board of directors may favour the board effectiveness promoting better monitoring of top managers by linking the design of their compensation to firm performance, improving at the end company value (Adams and Ferreira 2009; Bear et al. 2010). Arguments from agency, social psychology, human capital and resource dependence theories indicate different types of individual, collective, organizational women capabilities, qualities and traits that allow us to substantiate the fact that the presence of women on the board can improve monitoring of top managers as well as the board characteristics in which their effectiveness are grounded (Carter et al. 2010; Terjesen et al. 2009).

In base of these several theoretical arguments and in order to fill the void in the study of the relationship between gender diversity, compensation and board effectiveness, this work has two main objectives. The first is to consider whether a board of directors with gender diversity is related to a higher proportion of managers' pay being linked to corporate performance, indicative of a better board effectiveness of monitoring. The second is to analyse the relationship between gender diversity and the main characteristics of the board-size, composition, structure, size and functioning—which determine the effectiveness of such monitoring.

This paper employs panel data methodology to present evidence of these relationships using a sample of Spanish listed companies over the period from 2004 to 2009. The particular context of Spanish firms regarding the presence of women on boards allows us to make additional contributions. Although the education and labour force statistics in Spain are very similar to those of the US or Western Europe in recent years (proportion of women in the labour force in Spanish companies increase from 28 % in 1980 to 48 % in 2006), a similar change has not occurred regarding the representation of women in positions of corporate responsibility. To correct this situation, the Spanish Government has taken a series of measures. In 2006, the *Comisión Nacional del Mercado de Valores* (CNMV)—the Spanish equivalent of SEC in the US—introduced the *Código Unificado de Buen Gobierno* [Unified Code of Good Governance]. In Article 15, this Code recommends positive discrimination in boards of directors to reflect the diversity of knowledge, gender and experience required to perform their functions effectively, objectively and independently. Furthermore, in 2007, the *Ley de Igualdad* [Gender Equality Act] recommends—is not mandatory but necessary to bid for public contracts- on the topic of the board of directors that at least 40 % of directors be women by 2015 in public and private firms with more than 250 employees. Finally, the *Ley de Economía Sostenible* of 2011 [Sustainable Economy Act], among its different goals, also tries to promote gender equality in public administration, in public services and in the staff of public universities.

Thus, in that vein, it is important to know if this changing Spanish institutional context that is favouring gender diversity on boards also involve an improvement of the effectiveness of board monitoring, extending it to a proper pay-for-performance design to the top managers. In order to develop and contrast these ideas, the paper is organized as follows. 'Theoretical Framework and Hypotheses' section reports the review of the theory and literature related to gender diversity, board monitoring and top managers' compensation. After that, the sample, variables and methodology used are described in 'Sample, Data and Methodology' section. The main results are set out in 'Results' section, and, finally, 'Discussion and Conclusions' section introduces the main conclusions and the discussion.

Theoretical Framework and Hypotheses

Theoretical Perspectives

In recent years, it has been developing an increasingly extensive literature on gender diversity and corporate governance. Terjesen et al. (2009) make a survey including more than 400 studies on this topic, from many different areas of research, adopting several theoretical perspectives depending on the level of study focused—individual, board, firm and industry/environment. These levels and theories usually overlap, making that most studies, even if they may focus only on economic aspects, do not consider just one theory or approach. As an example, both Carter et al. (2010) and Mateos de Cabo et al. (2012) employ the same four theories: resource dependence, human capital, agency and social psychological. In this study, we are also going to adopt this approach, employing arguments from different these theories that we briefly summarize next.

Agency Theory

According to Jensen and Meckling (1976), an agency relationship is a contract under which one or more persons

(the principal/s) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent. In that context agents will try to reach their objectives, which may or may not coincide with those of their principals. A divergence of objectives will lead to agency conflicts and agency costs that will be more pronounced when there is larger information asymmetry. That is, the agent typically has more information than the principal about the environment in which decisions are being made, leading to that information asymmetry. The limited access to information that the principal usually has allows the agent considerable discretion to adopt opportunistic behaviour that does not always translate into a greater benefit for the principal.

Corporate governance examines the mechanisms that the organization can employ in order to provide incentives for the agents to persuade them to behave in the principal's interest, as well as to reduce the information gap and to provide the appropriate control mechanisms. Fama (1980) argues that while the board is the most important internal control mechanism for promoting and protecting shareholder's interest, its monitoring is effective only when it provides high-quality, impartial advice, which is usually considered when the board members are independent. In this line of reasoning, Carter et al. (2003) suggest that a more diverse board may increase board independence; this is why increasing gender diversity could be a means to improve monitoring and controlling management. Although agency theory has received many critics recently (Fontrodona and Sison 2006; Stout 2012), most corporate governance research takes this approach (Terjesen et al. 2009), which is especially useful from an economic viewpoint.

Social Psychology

There are several related theories of social groups, such as social identification and social categorization theories, which explore how individuals seek to surround themselves with people who share similar demographic profiles, perspectives, and values, which are then reinforced in intragroup communication. These theories predict that individuals who have majority status have the potential to exert a disproportionate amount of influence in group decisions, because of that predict a negative effect of diversity on group outcomes (Westphal and Milton 2000). According to these, individuals divide the group members into in-groups (individuals similar to themselves) and outgroups (individuals dissimilar to themselves), having a tendency to perceive positively the former and negatively the latter (Nielsen and Huse 2010). Heterogeneous groups are more likely to present communication and coordination difficulties that reduce the effective use of knowledge and skills and, as a consequence, there is less cohesion and interpersonal attraction and fewer mutually satisfying interactions among members (Forbes and Milliken 1999; Milliken and Martins 1996).

Focusing on gender diversity, in most corporate boards, there is only one woman or a small minority of women. Such a minority is easily marginalized when their presence in a large group is modest. Due to their low level of representation in the group, they are viewed as a token (Kanter 1977). For tokens, stereotyping could result a barrier to exert influence on decisions in the group, and are often perceived negatively and not trusted. This tokenism may drive to isolation and self-doubt. This is why some studies such as Torchia et al. (2011) do not focus on the ratio of women on the board, or on the presence of women on the board, but on the size of the minority group, considering that a certain size of the minority group could move this minority group from tokenism to critical mass.

Human Capital Theory

This theory derives from the work of Becker (1964). He examines the role of a person's stock of education, experience, and skills in enhancing cognitive and productive capabilities that can be used to the benefit of an organization. It is commonly assumed by board selectors that women lack adequate human capital for board positions. However, several studies suggest that women are as well qualified as men and that the board effectiveness will be positively affected by diversity because of women' diverse and unique human capital (Carter et al. 2010; Terjesen et al. 2009).

In this regard, Hillman et al. (2002) and Daily and Dalton (2003) affirm that women directors may have nontraditional backgrounds, and provide unique perspectives, experiences and work styles as compared to their male counterparts. The presence of women may enhance the board's deliberations, and their communication style is more participative and process-oriented. There is also a belief that women are more successful than men in some specific tasks. The task developed by the board—monitoring and controlling top managers, providing information and counsel to top managers, etc.—has a large number of categorizations (Loden 1985; Nielsen and Huse 2010). One of these categorizations distinguishes between strategic and financial control. The former is generally long-term and qualitatively oriented, while the latter is usually short-term and quantitative oriented. Loden (1985) points out those women are qualitatively oriented, while men are quantitatively oriented. Thus, women directors may exert a better influence on the firm than men on tasks related to corporate social responsibility and strategic control.

Resource Dependence Theory

Pfeffer and Salancik (1978) argue that boards serve to link the firm to other external organizations in order to address environment dependencies. That is, organizations are viewed as operating in an open system and needing to exchange and acquire certain resources to survive and obtain resources, creating a dependency between the firm and external units (Carter et al. 2010). Most arguments from this theory point to a positive influence of diversity on group outcomes. Thus, Robinson and Dechant (1997) argue that greater diversity in working groups implies a better knowledge of the market and a better identification with customers and employees, thereby increasing the group's ability to penetrate markets. Similarly, the more diverse a group is, the more different views and perspectives their members will have, as well as more alternative solutions to a problem, leading to more realistic decisions being adopted (Daily and Dalton 2003; Hillman et al. 2002). Thus, diversity may increase creativity and innovation and may improve problem solving (Robinson and Dechant 1997). In addition, some authors suggest that a diverse team has access to a larger network and to a larger pool of information, skills, and support that fall within the network (Beckman and Haunschild 2002; Robinson and Dechant 1997). However, some authors also point the possibility of a negative influence of gender diversity due to the fact that women may have fewer relationships with boards of other firms (Zelechowski and Bilimoria 2004), and are less likely to have business occupations.

After highlighting the theories that we consider the more relevant for this study, we also want to point two additional ideas. Both of them may condition the decisions adopted by a board in which there is gender diversity. The first one is the different level of risk aversion that men and women have. Some studies provide arguments and evidences to show that women tend to prefer a lower level of risk (Chaganti 1986; Smith et al. 2006, among others). The second one is that there are authors who point to the possibility of no-influence, either positive or negative, of the presence of women on the board on firm outcome. They argue that women-managers reject feminine stereotypes and values, and thus, they predict that women-managers behave in a very similar way to men-managers (Adams et al. 2002; Powell 1990).

Gender Diversity, Boards of Director and Top Managers' Compensation

The board of directors is the central mechanism of internal control representing the interests of owners and monitoring top managers. It is responsible for supervising and validating most important corporate decisions, among which is the design of top managers' pay packages (Jensen and Murphy 1990). To avoid possible opportunistic behaviour of top managers and align their interests with those of the owners, the board of directors may, by linking pay to company performance, achieve effective supervision and encourage top managers to achieve corporate goals (Core et al. 1999). This appropriate pay design will depend on the effectiveness of the supervision of the board of directors.

While previous studies have not reached any definitive conclusions regarding the necessary characteristics of boards of directors to exercise effective monitoring (Dalton and Dalton 2011), most of them have looked at the make-up of the boards, in terms of the mix of internal and external directors, as the first and main dimension contributing to board effectiveness (Core et al. 1999; Hermalin and Weisbach 2003). Some research has shown that gender diversity on boards of directors favours an increase in firm value (Campbell and Minguez-Vera 2008; Carter et al. 2003). This positive effect may be caused by the additional qualities of women in boards, which bring greater effectiveness to the board of directors' decision-making and top managers' compensation monitoring. Several reasons can justify these relationships.

First, a more gender diverse board of directors may provide the organization with the necessary resources, advice and liaison channel with other organizations (Hillman et al. 2002; Milliken and Martins 1996) that facilitate efficient decisions-making to maximize firm value. Resources that board members can bring to the organization are its knowledge and experience (Bear et al. 2010), which is a very important asset as it can encourage innovation and effectiveness through the generation of different solutions and alternatives (Daily and Dalton 2003; Hillman et al. 2002). The greater the diversity of the resources of the board, the greater the potential for understanding and problem solving that enable the organization to adapt more effectively to the environment in which it operates (Bear et al. 2010).

Second, in contrast to traditional boards formed mostly by men, the presence of women can bring the heterogeneity necessary to the board because women have positive aspects, which can improve their effectiveness and influence in making-decision. Thus, decisions made by heterogeneous groups—when the group representing minority in board is large enough—are higher quality than decisions made by homogeneous groups (Forbes and Milliken 1999). Given that male directors tend to select those members who have similar demographic characteristics to themselves, gender diversity on the board of directors incorporates demographic differences that are necessary to exercise more effective supervision (Adams and Ferreira 2009; Nielsen and Huse 2010).

Third, women are more likely to have larger level of education and experience related to business groups than men, bringing different—and creative—perspectives to problem solving and decision-making (Daily and Dalton 2003; Hillman et al. 2002). Studies also indicate that they are more participatory and democratic than men, tend to adopt a more critical attitude (Eagly et al. 2003), encouraging a more open discussions about the board topics and favouring the exposure of more viewpoints (Daily and Dalton 2003; Hillman et al. 2002).

And forth, women have a greater orientation to society and different stakeholders and potential to further discuss and resolve strategic issues and control issues (Burges and Tharenou 2002; Hillman et al. 2002). The diversity of the group may favour network ties, both internal and external (Beckman and Haunschild 2002; Robinson and Dechant 1997), allowing greater support and improved relations with stakeholders, which encourages the decision-making takes into count the interests of all stakeholders of the company, encouraging decisions that benefit all (Bear et al. 2010).

Based on all of these arguments from several theories exposed above, we can assume that the presence of women on boards of directors may provide greater variety of knowledge, experience and relationships, as well as greater willingness to work together and collaborate on conflict resolution, encouraging further discussion on certain critical issues that allows taking into account the different interests of the stakeholders. In this regard, the literature evidences that these additional qualities providing the necessary independence to the boards, contributing to improve the governance of companies, extending the boards effectiveness within its area of competence, as well as reducing agency conflicts (Adams and Ferreira 2009).

Gender diversity may provide the necessary alignment of interests of all stakeholders and prevent opportunistic behaviour of top managers by exerting an effective compensation monitoring of top managers (Adams and Ferreira 2009; Carter et al. 2003), one of the most challenging and important roles played by the board of directors. Therefore, considering that gender diversity can increase the level of board effectiveness, we also expect more effective compensation monitoring of top managers through pay systems strongly linked to company performance. From this arises the following hypothesis:

Hypothesis 1 Gender diversity on the board of directors has a positive relationship with the proportion of top managers' compensation linked to company performance.

Gender Diversity and Characteristics of the Boards of Directors

Although no definitive conclusions have been reached, most studies agree that certain other features of the board of directors, in addition to composition, such as structure, size and functioning determine its supervisory effectiveness and its ability to design a pay-for-performance compensation for top managers (Core et al. 1999; Hermalin and Weisbach 2003; Yermack 1996). Regarding composition of boards, in terms of the proportion of insider and outsider members, the literature comes down mainly in favour of the evidence that a greater proportion of outsider members will lead to the board being more effective in supervision. The main reason behind this is that outsiders are more independent in monitoring top managers' actions than insiders, who at the same time may be top managers, which may condition their decisions (Sanchez-Marin et al. 2010). Nevertheless, other studies have questioned these findings, arguing that outsider directors may not be neutral and may also lack knowledge, of for several reasons (Hermalin and Weisbach 2003). However, the literature generally finds that a higher percentage of external directors favour more effective supervision and more independent decision-making, exercising, therefore, greater control over the actions of top managers (Conyon and Peck 1998; Sanchez-Marin et al. 2010).

Another element of the general concern for board effectiveness is the manner by which the roles of CEO and Chairman of the board are structured (Boyd 1995; Dalton and Dalton 2011): duality—when the positions of CEO and Chairman are held simultaneously by one person—or not duality—when these two roles are assigned to two different individuals. One of the first researchers uncomfortable with the presence of duality was Jensen (1993), who argued that it would compromise the ability of the board to monitor the CEO and the rest of top management team independently. In that line, most studies advocate separating these leadership roles, advocating that directors are unable, or unwilling, to dispassionately monitor top managers when the CEO serves as chairperson of the board at the same time. In fact, most empirical evidences show that the presence of duality negatively influences the effectiveness of board monitoring over top managers (Jensen 1993).

With regard to board size, previous studies have reached mixed results about whether more board effectiveness is dependent on having a larger or smaller board of directors. Based on information processing perspective (Lipton and Lorsch 1992), some studies report that an increase in the number of directors will lead to a decrease in the level of board effectiveness (Pearce and Zahra 1992), whereas others confirm the opposite (Sanders and Carpenter 1998). Integrating these findings, Yermack (1996) and Core et al. (1999) points out that the relationship between board size and monitoring effectiveness is curvilinear: as the board of directors grows in size, supervision of top manager's increases, resulting in an alignment of interests, but when an excessive number of directors are reached, the trend is

just the opposite. Considering the evidences reached until now, a fitted board size may comprise from a minimum of 5 to a maximum of 15 directors (Core et al. 1999; Dalton and Dalton 2011).

Finally, regarding functioning of boards, we draw on compensation committees and, specifically, on the number of meetings of that committee as a proxy for that dimension (Dalton and Dalton 2011; Vafeas 1999). Compensation committees are a powerful mechanism to monitor top managers through the design of proper compensation packages (Conyon and Peck 1998). Although the nature of this association is complex and its direction unclear, most of the studies show that meetings are beneficial to board effectiveness. Lipton and Lorsch (1992) and Conger et al. (1998) suggest that meeting time is an important resource in improving the effectiveness of board supervision, even at the expense of probability of limited time or the insignificant exchange of ideas (Jensen 1993). Since compensation committees that do not meet cannot exercise their compensation responsibilities worsen the effectiveness of boards monitoring over top managers, most literature evidences a positive association between compensation committee meetings and monitoring effectiveness (Hahn 2007; Lipton and Lorsch 1992; Vafeas 1999).

A few studies have related those four features that bring greater board effectiveness with gender diversity. Although some of them have examined whether board effectiveness are influenced by the presence of women (Adams and Ferreira 2009; Carter et al. 2003), attention has not been paid to whether gender diversity can influence the board characteristics related to the board size, composition, structure and functioning which, at the end, determine the effectiveness of board monitoring over top manages.

Taking into account, as stated in hypothesis 1, that gender diversity is associated with greater diversity of knowledge and skills, as well as a variety of appropriate criteria for problem solving, making a positive impact on qualitative issues and strategic nature of decisions (Bear et al. 2010; Milliken and Martins 1996; Nielsen and Huse 2010), we can assume that their presence in the board positively influences in the characteristics determining an effective board. Several arguments can support this expected relationships.

First, regarding composition and structure of board, the literature shows that the presence of women in the board emphasizes its independence (Carter et al. 2003, 2010). Board diversity may help to represent all stakeholder interests in boards, casting critical and objective judgments in making decisions. The presence of women in boards implies a more diverse team to guarantee the access to a larger network and information supporting the necessity of external directors in boards linked with other institutions or organizations (Beckman and Haunschild 2002; Robinson and Dechant 1997). Concerning board structure, women encourage power not to be concentrated in single interest stakeholders, promoting more democratic decisions, and enhancing board's deliberations more participative (Eagly et al. 2003; Nielsen and Huse 2010). That implies a low probability of dual power structures, emphasizing that the positions of CEO and Chairman are not held simultaneously by one person.

Second, concerning size of the boards, although some studies document a positive relation between firm size, board size and the representation of women on boards (Adams and Ferreira 2009), other studies state that these relationships are more based on firm size and, on the contrary, find evidences of an increasing representation of women on boards together with a trend in the decreasing board size (Farrell and Hersch 2005). These last authors indicate that the oversizing and downsizing of boards come usually at the expense of male and not female directors, arguing that the heterogeneity of groups is more desirable when an extreme increase or decrease in the number of directors takes place, mainly due to the higher level of uncertainty that this process caused (Nielsen and Huse 2010; Torchia et al. 2011). Thus, evidences allow us to interpret that the presence of woman on boards is related to medium-sized boards, where a more fitted number of directors –usually comprised between 5 and 15—take place (Dalton and Dalton 2011).

And third, in relation to functioning of the boards, studies indicate that women tend to show greater willingness to work together and collaborate on conflict resolution, promoting effective communication between boards of directors and interest groups (Bear et al. 2010) and having more ability to encourage teamwork, cooperation and active participation (Eagly et al. 2003; Huse and Solberg 2006). Furthermore, they raise complex issues regarding the future of the company that require more detailed, concise and planned answers (Westphal and Milton 2000). Thus, one of the procedures through which the presence of women may promote greater variety of criteria is by increasing the frequency of meetings (Hahn 2007). A greater number of compensation committee meetings that may provide a more aligned and effective monitoring of boards.

Thus, on the basis of previous arguments, that highlight the influence of gender diversity on board in terms of its composition, structure, size and functioning, we expect that gender diversity supports board's characteristics that promote the effectiveness of monitoring of top managers. Taking all this into account, we propose the following hypotheses:

Hypothesis 2 Gender diversity on board of directors positively influences board effectiveness through: (a) a higher proportion of external and independent directors, (b) an independent—non dual-power structure, (c) a medium number of directors and (d) a higher number of compensation committee meetings.

Sample, Data and Methodology

The sample includes 120 companies listed on the Spanish stock market during the period 2004 to 2009. We excluded financial sector companies because of differences in regulation and in the presentation of annual accounts. The total number of observations was 714.

Governance reports of listed firms were obtained through the *Comisión Nacional del Mercado de Valores* (CNMV)—the Spanish equivalent of SEC in the US. From those reports, the information on the compensation of top managers was collected as well as the characteristics—size, composition, structure and functioning—related to the board of directors. The information on economic-financial variables was obtained from the Osiris database (Source: Bureau Van Dyck Electronic Publishing).

Three measures of gender diversity were employed. First, the percentage of women on the board of directors, PER_WOM_BOA, calculated as the number of women board members divided by the total number of directors. Second, the percentage of female external board members, PER_EXT_WOM, is included. This variable has been computed as the number of external female board members divided by the total number of external board members. Third, a dummy variable takes a value of one when there is a woman or more on the board and zero otherwise (WOM_PRES). Finally, we use the percentage of female board members who also serve on the boards of other companies (PER_WOM_OTH_FIR) as a control variable.

As explained in 'Theoretical Framework and Hypotheses' section, to measure the effectiveness and independence of the board of directors, several variables have been employed: (1) board composition, which considers the proportion of external directors (PER_IND_DIR) and the proportion of independent directors (PER_EXT_DIR), computed as the external board members divided by the size of the board and external board members divided by the size of the board, respectively; (2) board structure, which considers the duality in management through the dummy variable (DUAL), which takes the value 1 when the same person occupies the roles of CEO and chairman of the board, and 0 otherwise; (3) board size (DUM_NUM_DIR) measured by a dummy which takes the value 1 when the number of board members is between 5 and 15, and 0 otherwise; and (4) board functioning, which considers the number of board meetings (LOG_NUM_MEE), measured through the logarithm of the number of meetings held annually by the compensation committee.

Focusing on the compensation of top managers, the reports of firms' corporate governance do not provide the details of the compensation received by each manager. Thus, it is logical to assume that the fixed and variable pay applies primarily to top manager (executive) directors, given that external directors usually receive only benefits and perks. For this reason, the variable pay of top manager directors has been used as a measure of monitoring using two proxy variables. The first consists of the amount of variable component of the pay package and the share options divided by the number of top managers (executives) board members (VAR_PAY_EXE_DIR), and the second is the proportion of variable pay to total compensation received by them (PER_VAR_PAY).

Finally, two control variables have been included, the size of the company (SIZE) calculated as the logarithm of the number of workers, and firm performance (ROE) measured through the return on equity as net profit divided by equity.

Descriptive statistics are shown in Table 1. We emphasize that the percentage of women on boards of directors is very low, an average of 5.1 %. However, there has been a significant change since 2004, the starting year of our sample, when the number of board members stood at just over 2 % moving to almost a 9 % in 2009.

Regarding external board members, only 0.3 % of them are women, and only 4.5 % of them act as top managers or board members on other companies. Moreover, 42.1 percent of Spanish listed firms have one or more women on their boards. With regard to the compensation, only 14 % is variable, and thus tied to company performance. It is also noteworthy that more than 79 % of board members are external, complying with the Spanish governance recommendation, with 32 % also being independent. Finally, in 58 % of the companies, the position of CEO and chairman of the board are occupied by the same person and 86 % of boards comply with the governance recommendation of the number of board members comprised between 5 and 15.

Considering the above variables, the following dynamic panel data model is presented in equations below. Equation (1) is used to test hypothesis 1 about the main effect of gender diversity on the proportion of top managers' compensation linked to company performance. We also analyse the marginal effects of the gender diversity depending on board characteristics.

Table 1 Descriptive statistics

	Mean	Median	SD	Minimum	Maximum
VAR_PAY_EXE_DIR	247.347	61.000	448.751	0.000	2,844.000
PER_VAR_PAY	0.144	0.063	0.192	0.000	0.910
PER_WOM_BOA	0.051	0.000	0.079	0.000	0.440
PER_EXT_WOM	0.003	0.000	0.018	0.000	0.200
WOM_PRES	0.421	0.000	0.494	0.000	1.000
PER_WOM_OTH_FIR	0.045	0.000	0.185	0.000	1.000
PER_EXT_DIR	0.794	0.818	0.118	0.333	1.000
PER_IND_DIR	0.321	0.307	0.177	0.000	0.857
DUAL	0.580	1.000	0.494	0.000	1.000
DUM_NUM_DIR	0.860	1.000	0.347	0.000	1.000
LOG_NUM_MEE	1.208	1.386	0.704	0.000	3.000
SIZE	5.628	5.749	2.192	0.690	13.380
ROE	0.156	0.101	0.907	−4.790	17.900

VAR_PAY_EXE_DIR variable pay per executive director, *PER_VAR_PAY* amount of the variable as a proportion of total compensation, *PER_WOM_BOA* percentage of women on the board of directors, *PER_EXT_WOM* percentage of female external board members, *WOM_PRES* binary variable that takes a value of 1 when there is at least one woman on the board of directors, and 0 otherwise, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms, *PER_EXT_DIR* percentage of external directors on the board, *PER_IND_DIR* percentage of independent directors on the board, DUAL: binary variable that takes a value of 1 when the same person occupies the roles of CEO and Chairman of the board and 0 otherwise, *DUM_NUM_DIR* binary variable that takes a value of 1 when the number of director is between 5 and 15, and 0 otherwise, *LOG_NUM_MEE* logarithm of the number of meetings held annually by the compensation committee, *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity

$$\begin{aligned}\text{VARIABLE}_{\text{PAY}_{\text{it}}} &= \beta_0 \text{VARIABLE}_{\text{PAY}_{\text{it}-1}} + \beta_1 \text{GENDER}_{\text{it}} \\ &+ \sum_{j=2}^{5} \beta_j \text{BOARD}_{\text{it}} \\ &+ \sum_{j=6}^{9} \beta_j \text{GENDER} * \text{BOARD}_{it} \\ &+ \sum_{j=10}^{12} \beta_j \text{CON}_{it} + \psi_{\text{t}} + \eta_i + \varepsilon_{\text{it}},\end{aligned} \tag{1}$$

where ψ_t, η_i and ε_{it} represent the temporal effects, individual effects and the random disturbance, respectively. VARIABLE_PAY includes the variable pay for the top managers (executive) directors and the percentage of variable pay to total compensation. GEN represents the percentage of women on the board and the percentage of external board members. BOARD represents the different variables of board characteristics, related to the board composition—percentage of independent and external directors—, duality, board size and number of compensation committee meetings. Finally, CON provides different control variables: the percentage of women directors that also have positions on the boards of other companies, firm size and profitability.

Equation (2) is used to test hypothesis 2 about the effect of gender diversity on the board effectiveness of monitoring.

$$\begin{aligned}\text{BOARD}_{\text{it}} &= \beta_0 \text{BOARD}_{\text{it}-1} + \beta_1 \text{GENDER}_{\text{it}} \\ &+ \sum_{j=2}^{4} \beta_j \text{CON}_{\text{it}} + \psi_{\text{t}} + \eta_i + \varepsilon_{\text{it}}\end{aligned} \tag{2}$$

Finally, we extend our analyses with Equation (3) where we explore the board characteristics as determinants of the presence of the women on board.

$$\begin{aligned}\text{GENDER}_{\text{it}} &= \beta_0 \text{GENDER}_{\text{it}-1} + \sum_{j=2}^{6} \beta_j \text{BOARD}_{\text{it}} \\ &+ \sum_{j=7}^{9} \beta_j \text{CON}_{\text{it}} + \psi_{\text{t}} + \eta_i + \varepsilon_{\text{it}}.\end{aligned} \tag{3}$$

Two stages of generalized method of moments estimation (GMM) were employed for all models, following the methodology of Arellano and Bond (1991). This methodology is appropriate when the number of years (T) is small. These authors propose the use of GMM to instrumentalize the explanatory variables by using lagged values of the original regressors, thus solving the endogeneity problem. Furthermore, this methodology provides controls for the correlation of errors over time, the heteroskedasticity among firms, the simultaneity and the measurement errors caused by the use of orthogonal conditions of the variance matrix. For this estimation, dichotomous variables were

Table 2 GMM Estimation of influence female directors on pay

Variable	VAR_PAY_EXE_DIR			PER_VAR_PAY		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged dependent variables						
$VAR\_PAY\_EXE\_DIR_{t-1}$	1.054*** (0.050)	1.215*** (0.151)	0.859*** (0.289)			
$PER\_VAR\_PAY_{t-1}$				0.049*** (0.016)	−0.207*** (0.109)	−0.283 (0.413)
Gender diversity						
PER_WOM_BOA	53.331*** (3.513)	77.727* (43.564)	85.176* (43.681)	0.255*** (0.008)	0.163** (0.065)	1.547* (0.870)
Control variables						
PER_WOM_OTH_FIR	−2.761 (0.276)	6.383 (6.896)	−32.722 (26.984)	−0.023** (0.005)	−0.024 (0.019)	−0.034 (0.030)
SIZE	23.691*** (3.605)	44.916* (26.822)	122.280 (113.621)	0.336*** (0.007)	0.216*** (0.043)	0.323** * (0.057)
ROE	−0.127** (0.057)	−1.366*** (0.502)	−0.696** (0.347)	0.001 (0.001)	−0.0003* (0.0001)	0.00002 (0.0004)
Board characteristics						
PER_ EXT_DIR		2.577*** (0.263)	4.101 (2.782)		0.0006 (0.001)	0.001 (0.002)
DUAL		−15.970 (9.936)	1.762 (33.618)		0.003 (0.030)	−0.115 (0.075)
DUM_NUM_DIR		−83.659*** (28.464)	47.805 (37.409)		−0.104*** (0.021)	−0.240*** (0.079)
LOG_NUM_MEE		5.285 (4.894)	−9.382 (6.685)		−0.006** (0.031)	0.047 (0.083)
Marginal effects						
PER_EXT_DIR·PER_WOM_BOA			−23.8221 (21.298)			−0.046* (0.023)
DUAL·PER_WOM_BOA			741.030** (320.602)			1.327** (0.660)
DUM_NUM_DIR·PER_WOM_BOA			−715.128* (406.183)			−0.962** (0.454)
LOG_NUM_MEE·PER_WOM_BOA			−162.474 (257.304)			−1.336 (0.862)
Diagnostic test						
Hansen Test	8.214	6.532	0.595	5.528	6.803	7.721
M_2	−1.381	−0.693	−0.661	−1.316	−0.195	−0.674
χ^2	450000***	6881.68***	49814***	15,329.66***	129,699***	50,608***

M_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as $N(0,1)$ under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi squared

VAR_PAY_EXE_DIR variable pay per executive director, *PER_VAR_PAY* amount of the variable as a proportion of total compensation, *PER_WOM_BOA* percentage of women on the board of directors, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms, *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity, *PER_EXT_DIR* percentage of external directors on the board, *DUAL* binary variable that takes a value of 1 when the same person occupies the roles of CEO and Chairman of the board and 0 otherwise, *DUM_NUM_DIR* binary variable that takes a value of 1 when the number of director is between 5 and 15, and 0 otherwise, *LOG_NUM_MEE* logarithm of the number of meetings held annually by the compensation committee

χ^2 test of combined significance

*, **, *** Significant at 10, 5 and 1 %, respectively

Table 3 GMM Estimation of influence female directors on pay

Variable	VAR_PAY_EXE_DIR			VAR_PAY_EXE_DIR		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged dependent variables						
$VAR\_PAY\_EXE\_DIR_{t-1}$	3.173** (1.3010)	1.7442*** (0.247)	4.390** (1.745)			
$PER\_VAR\_PAY_{t-1}$				0.061*** (0.014)	0.010 (0.999)	−1.398* (0.752)
Gender diversity						
PER_EXT_WOM	2214.583* (1163.971)	2278.761*** (224.315)	7384.136** (3275.179)	2.872*** (0.419)	1.533*** (0.490)	3.097* (1.685)
Control variables						
PER_WOM_OTH_FIR	−2.444*(1.450)	10.433 (9.358)	−10.567 (24.047)	−0.006** (0.003)	−0.002 (0.023)	−0.024 (0.027)
SIZE	20.266*** (5.914)	40.467*** (6.406)	−208.142 (163.825)	0.302*** (0.005)	0.250*** (0.060)	0.309*** (0.056)
ROE	0.237 (0.186)	−0.870*** (0.231)	−1.430* (0.710)	0.001 (0.001)	−0.0001 (0.0002)	−0.0003 (0.0003)
Board characteristics						
PER_ EXT_DIR		2.714*** (0.284)	7.942* (4.394)		0.0006 (0.001)	0.012** (0.005)
DUAL		−17.929* (9.296)	41.083 (26.621)		−0.002 (0.022)	−0.0236** (0.113)
DUM_NUM_DIR		−85.571*** (9.448)	27.934 (71.360)		−0.103*** (0.025)	0.008 (0.147)
LOG_NUM_MEE		4.581 (4.880)	6.007 (7.112)		−0.075* (0.036)	0.072 (0.087)
Marginal effects						
PER_EXT_DIR·PER_EXT_WOM			−33.087 (27.867)			−0.086* (0.045)
DUAL·PER_EXT_WOM			554.264*** (179.926)			1.584** (0.784)
DUM_NUM_DIR·PER_EXT_WOM			−900.682* (480.069)			−0.592 (0.831)
LOG_NUM_MEE·PER_EXT_WOM			425.283 (354.271)			−1.794 (1.053)
Diagnostic test						
Hansen test	7.461	5.996	2.483	5.973	7.037	3.012
M_2	−1.453	0.936	−0.382	−0.953	−0.091	−1.014
χ^2	3497.34***	12927***	32002***	3.91e + 06***	91805***	1.13 + 06

M_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as $N(0,1)$ under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi squared

VAR_PAY_EXE_DIR variable pay per executive director, *PER_VAR_PAY* amount of the variable as a proportion of total compensation, *PER_WOM_BOA* percentage of women on the board of directors, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms, *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity, *PER_EXT_DIR* percentage of external directors on the board, *DUAL* binary variable that takes a value of 1 when the same person occupies the roles of CEO and Chairman of the board and 0 otherwise, *DUM_NUM_DIR* binary variable that takes a value of 1 when the number of director is between 5 and 15, and 0 otherwise, *LOG_NUM_MEE* logarithm of the number of meetings held annually by the compensation committee

χ^2 test of combined significance

*, **, *** Significant at 10, 5 and 1 %, respectively

Table 4 GMM Estimation of influence female directors on board composition

Variable	PER_EXT_DIR		PER_IND_DIR	
	Model 1	Model 2	Model 3	Model 4
Lagged dependent variables				
$PER\_EXT\_DIR_{t-1}$	−0.094* (0.055)	−0.108* (0.053)		
$PER\_IND\_DIR_{t-1}$			−0.164*** (0.031)	−0.1387*** (0.053)
Gender diversity				
PER_WOM_BOA	−4.071** (1.823)		−12.174*** (3.269)	
PER_EXT_WOM		−38.096*** (2.327)		−104.358*** (25.289)
Control variables				
PER_WOM_OTH_FIR	0.859*** (0.205)	0.592** (0.231)	1.485 (1.290)	−0.168 (0.950)
SIZE	7.696*** (1.964)	6.720*** (2.015)	−2.667 (2.408)	−0.416 (1.730)
ROE	0.066* (0.038)	0.059* (0.036)	0.081 (0.059)	−0.176*** (0.037)
Diagnostic test				
Hansen test	3.531	1.409	5.665	8.690
M_2	−0.819	−1.500	0.226	−1.567
χ^2	123.44***	192,301.22***	3,516.14***	944.55***

M_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as $N(0,1)$ under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi squared

PER_EXT_DIR percentage of external directors on the board, *PER_IND_DIR* percentage of independent directors on the board, *PER_WOM_BOA* percentage of women on the board of directors, *PER_EXT_WOM* percentage of female external board members, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms), *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity

χ^2 test of combined significance

*, **, *** Significant at 10, 5 and 1 %, respectively

used to control time effects and first difference transformation to eliminate unobservable effects.

Results

The results of the empirical study are shown in Tables 2, 3, 4, 5 and 6. Tables 2 and 3 show the relationship between gender diversity within the board of directors and compensation design derived from Eq. 1. Tables 4 and 5 analyse the relationship between the female presence on the board and the board effectiveness of monitoring from Equation 2. Concretely, board composition is analysed in Table 4 and board size, duality and compensation committee meetings in Table 5. Finally, Table 6 shows the board characteristics as determinants of the presence of the women on board from Equation 3.

Table 2 shows a positive and significant relationship between the percentage of women on the board of directors and the variable pay of the top managers. As expected, the results in columns 1-3 indicate that, after including board characteristics and marginal effects through interactions, we continue to find a statistically significant relationship between the percentage of women on the board of directors and the variable pay received by top managers. In columns 4-6, results remain when we use the proportion of variable pay. In general, we do not find significant the main effect of board characteristics on the variable pay. The positive relationship between the percentage of women on the board of directors and the variable pay is larger in the presence of duality and in oversized or downsized boards, indicating a positive and substitute effect of gender diversity on board in terms of top managers' compensation monitoring. Moreover, the fact of increasing the representation of women on boards, as well as the oversizing and downsizing of boards, increases the variable pay. The same happens with duality: when there is not duality, the effect on the variable pay of women on the board is larger.

In Table 3, we employ the percentage of female external board members as a measure of gender diversity. Results are robust, and a positive relationship with variable pay is also found. We also obtain a low level of significance of board characteristics on variable pay depending on the model. Significant marginal effects in model 3 and 6 point out a positive and substitute monitoring effect of board diversity as in Table 2.

Results from Tables 2 and 3 confirm the positive relationship between gender diversity and the variable pay,

Table 5 GMM Estimation of influence of female directors on board size, DUM_NUM_DIR; on duality, DUAL, and on the logarithm of the number of meetings held annually by the compensation committee, LOG_NUM_MEE

Variable	DUM_NUM_DIR		DUAL		LOG_NUM_MEE	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged dependent variables						
$DUM\_NUM\_DIR_{t-1}$	−0.223** (0.0293)	−0.270*** (0.082)				
$DUAL_{t-1}$			−0.042** (0.020)	0.061*** (0.121)		
$LOG\_NUM\_MEE_{t-1}$					−0.173** (0.078)	−0.471* (0.280)
Gender diversity						
PER_WOM_BOA	−0.416*** (0.129)		−0.565*** (0.081)		0.986*** (0.297)	
PER_EXT_WOM		0.055 (0.197)		−0.028 (0.085)		3.259* (1.969)
Control variables						
PER_WOM_OTH_FIR	0.039** (0.01E9)	0.014 (0.014)	0.137*** (0.040)	0.060 (0.048)	−0.104** (0.041)	−0.172*** (0.049)
SIZE	−0.026 (0.061)	0.005 (0.051)	−0.012 (0.039)	0.056 (0.056)	−0.044 (0.050)	0.004 (0.107)
ROE	−0.003 (0.006)	−0.006 (0.005)	0.001 (0.002)	−0.004 (0.003)	−0.019*** (0.003)	0.001** (0.001)
Diagnostic test						
Hansen test	4.420	5.229	1.061	2.271	5.229	7.062
M_2	−1.096	−0.968	−1.630	−1.576	1.114	1.455
χ^2	12259.35***	85.76***	120.00***	210.40***	320.84***	62.85***

M_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as $N(0,1)$ under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi squared

DUM_NUM_DIR binary variable that takes a value of 1 when the number of director is between 5 and 15 and 0 otherwise, *DUAL*: binary variable that takes a value of 1 when the same person occupies the roles of CEO and Chairman of the board and 0 otherwise, *LOG_NUM_MEE* logarithm of the number of meetings held annually by the compensation committee, *PER_WOM_BOA* percentage of women on the board of directors), *PER_EXT_WOM* percentage of female external board members, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms, *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity

χ^2 test of combined significance

*, **, *** Significant at 10, 5 and 1 %, respectively

giving support for Hypothesis 1. Furthermore, the lower level of board effectiveness the larger positive relationship between gender diversity and the variable pay. Therefore, the gender diversity on the board leads to a more appropriate compensation design, with a greater percentage of the compensation linked to company performance and to a substitution effect.

Table 4 examines the relationship between the board diversity and the percentage of external directors (model 1 and 2) on the one hand and independent directors (model 3 and 4) on the other hand. Model 1 and 2 show a negative effect for the variables related to the percentage of women and the percentage of female external board members on the ratio of external directors. The fact that women directors may exert a better influence on the firm than men on tasks related to strategic control, could drive to more alternative solutions to a problem proposed by a gender diversified board; being not so necessary to maintain a high percentage of external directors. Focusing on independent directors (model 3 and 4), very similar results are observed. Thus, we find a significant negative effect of the different variables of diversity on the ratio of independent board members, confirming Hypothesis 2a.

Table 5 analyses the link between gender diversity and the power structure of the board (model 3 and 4), the size of the board (model 1 and 2), and the number of compensation committee meetings (model 5 and 6). The presence of duality, the size of the board and the number of compensation committee meetings have a significant negative relationship with the percentage of external female board members (however, relationships with the percentage of female external board members are not significant), confirming Hypothesis 2b, 2c and 2d, respectively. The lack of significance of the percentage of female external

Table 6 GMM estimation of the presence of female directors on board

Variable	PER_ WOM_BOA		WOM_PRES	
	Model 1	Model 2	Model 3	Model 4
Lagged dependent variables				
PER_WOM_BOA $_{t-1}$	−0.764*** (0.133)	−0.920*** (0.159)		−0.491* (0.260)
WOM_ PRES$_{t-1}$			−0.934*** (0.140)	
Board characteristics				
PER_EXT_DIR	−0.005*** (0.001)		−0.018** (0.009)	
PER_IND_DIR		−0.005*** (0.001)		−0.062*** (0.016)
DUAL	0.055*** (0.015)	0.016*** (0.008)	0.038* (0.049)	0.179** (0.072)
DUM_NUM_DIR	0.005 (0.033)	0.024 (0.016)	−0.024 (0.061)	−0.029 (0.116)
LOG_NUM_MEE	0.005** (0.002)	0.019*** (0.004)	0.217*** (0.057)	0.153*** (0.050)
Control variables				
PER_WOM_OTH_FIR	0.038*** (0.011)	0.008 (0.007)	0.0003 (0.133)	0.143 (0.159)
SIZE	−0.017 (0.038)	−0.023 (0.021)	−1.336*** (0.507)	−0.370*** (0.124)
ROE	0.002*** (0.0007)	0.0005** (0.0002)	0.001*** (0.0003)	0.003 (0.002)
Diagnostic test				
Hansen test	4.736	5.056	3.171	6.733
M_2	−1.836	−1.279	−1.186	1.227
χ^2	1278.32***	100505***	6367.04***	1185.97***

M_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as $N(0,1)$ under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi squared

PER_WOM_BOA percentage of women on the board of directors, *WOM_PRES* binary variable that takes a value of 1 when there is at least one woman on the board of directors, and 0 otherwise, *PER_ EXT_DIR* percentage of external directors on the board, *PER_IND_DIR* percentage of independent directors on the board, *PER_WOM_OTH_FIR* percentage of female board members who also serve on the boards of other firms, *DUAL* binary variable that takes a value of 1 when the same person occupies the roles of CEO and Chairman of the board and 0 otherwise, *DUM_NUM_DIR* binary variable that takes a value of 1 when the number of director is between 5 and 15, and 0 otherwise, *LOG_NUM_MEE* logarithm of the number of meetings held annually by the compensation committee, *SIZE* firm size, measured as the logarithm of the number of workers, *ROE* return on equity

χ^2 test of combined significance

*, **, *** Significant at 10, 5 and 1 %, respectively

board members could be due to the fact that women are a minority as external board members, since they represent only 0.3 %. Such a minority can be marginalized when their presence in the large group of external board members is modest.

Further analysis is performed in Table 6 with the intention of strengthening the study. We analyse the board characteristics that determine the presence of women on board. For such analysis, we use both the proportion of women on board (model 1 and 2) and the presence of women on board (model 3 and 4) as dependent variables. As it can be observed the substitution effect runs in two directions, firms with duality and lower proportion of external directors or independent directors have a higher proportion of women on the board. On the other hand, the proportion of women increases as the number of compensation committee meetings increase. Results reflect that women tend to have more ability to encourage teamwork, cooperation and active participation. Firms that need greater variety of criteria increase the frequency of meetings by increasing gender diversity.

Discussion and Conclusions

The presence of women in management positions in companies is one of the topics that most interest and controversy have generated over recent years. This has also been the case in Spain, where several legal initiatives have promoted the presence of women on decision-making bodies of companies, among them the *Código Unificado de Buen Gobierno* [Unified Code of Good Governance] (2006), the *Ley de Igualdad* [Gender Equality Act] (2007) and the *Ley de Economía Sostenible*, [Sustainable Economy Act] (2011). These important and pioneering legislative initiatives focus on the recommendation of positive

discrimination in favour of the presence of women in the management or boards of the firms. Spanish institutions justified these measures not only for reasons of ethics or social justice, but also for the purposes of efficiency and rational economic behaviour. Furthermore, the current economic crisis, in which top managers have continued to receive high pay that is independent of corporate profits has rekindled the debate about good governance practices and promoted consideration of the possibility that gender diversity can help to monitor and even strengthen the monitoring effectiveness of the board over top managers.

In the academic field, while some studies have examined the effect of gender diversity on firm performance (Francoeur et al. 2008; Mahadeo et al. 2012), no clear conclusions have been reached. We can find two reasons for these mixed evidences. First, from a theoretical perspective, given the interdisciplinarity of the subject, there are several theories using different arguments from psychology, sociology, economy, finance, and management which can lead to different conclusions in relation with the effects of women in boards on the performance of the firm. And second, from an empirical perspective, most studies have looked for a direct relationship between gender diversity and firm performance (Campbell and Minguez-Vera 2008; Carter et al. 2003) and failed to take into account other intervening variables relating to the board that may help to explain how gender diversity affects companies (Adams and Ferreira 2009).

Considering these limitations, with this research, we try to shed some lights in the open debate about how gender diversity can determine governance effectiveness using arguments from agency, social psychology, human capital and resource dependence theories (Carter et al. 2010; Terjesen et al. 2009). Specifically, starting from the premise that one of the ways in which boards of directors may positively influence the actions of top managers by way of the design of an appropriate compensation system linked to company performance (Hermalin and Weisbach 2003; Jensen and Murphy 1990). We have examined, first, how gender diversity can promote its firm effectiveness in terms of top managers' compensation and, second, how gender diversity can transform the characteristics of board of directors—composition, structure, size and functioning—which determine its level of monitoring effectiveness.

Using panel data methodology, all the companies listed on the Spanish stock market during the period 2004 to 2009 were studied. The choice of this sample was based on the important changes in the normative and institutional context in Spain in order to promote the presence of women in boards in management and governance positions and the ongoing debate that has arisen following their implementation. Thus, it is interesting to see how the encouragement of gender diversity on boards could help to improve the effectiveness of Spanish firms' governance.

Our results confirm the positive relationship between gender diversity and the establishment of top managers' compensation packages linked to performance, justifying the importance of the mechanisms of governance through which diversity produces this effect in economic terms. Our evidence indicates that gender diversity on boards leads to greater diversity of knowledge and skills as well as to variety of appropriate criteria for making decisions (Nielsen and Huse 2010; Zelechowski and Bilimoria 2004); thus, heterogeneous groups may help to solve the most contentious problems (Milliken and Martins 1996; Robinson and Dechant 1997). The establishment of compensation packages that are more closely link to firm performance is a way how the presence of women on the board may contribute positively to the firm (Adams and Ferreira 2009; Bear et al. 2010).

Furthermore, our results confirm that diversity on board influences—as a substitution effect—in a number of characteristics related to their composition, structure, size and functioning of boards. Previous studies argue that board effectiveness is determined by a high percentage of external directors (Conyon and Peck 1998; Sanchez-Marin et al. 2010), an independent power structure (Boyd 1995), a tight-fitting size (Core et al. 1999), and a high number of compensation committee meetings (Hahn 2007; Vafeas 1999). In this regard, we found that gender diversity improves monitoring substituting board characteristics that lead to a high percentage of external directors, with a low proportion of duality, with a medium-sized board comprises between 5 and 15 directors, and with a more number of compensation committee meetings, a finding in agreement with those previous studies (Adams and Ferreira 2009; Daily and Dalton 2003; Hahn 2007). Thus, this suggests that gender diversity on the board can compensate the potential lack of effectiveness of board monitoring in terms of non-suitable characteristics. We have also found that the substitution effect runs in two directions. That is, firms with duality and lower proportion of external directors or independent directors have a higher proportion of women on the board.

Therefore, the results obtained in this study are consistent with the arguments yielded by Spanish institutions. Gender diversity on boards may improve the effectiveness of governance of Spanish firms. The incorporation of women onto boards not only promotes gender equality but increases the effectiveness of the board by creating diversity in the decision-making process. Moreover, the reform of the composition of boards of directors by the introduction of gender diversity might be the first step to lead to a recovery of confidence in businesses after the recent financial scandals through several ways. Diversity could help to improve board effectiveness by establishing pay-for-performance compensation packages, which can

promote a better firm's reputation. Firms should not only take into account that gender diversity helps to make them socially responsible, with a view to complying with equality legislation and to improving their corporate image but that increasing diversity on boards can also help them make better corporate decisions, with a increase on quality of governance and firm value. Similarly, if, for whatever reason, a board lacks the characteristics which would promote greater monitoring and effectiveness, the existence of diversity can compensate for their absence.

In spite of all the measures taken to promote gender equality in large Spanish firms, the data show that there is still much to be done. While it is true that the percentage of female directors has risen from 2 % in the year 2004 to 9 % in 2009 (two years after the passing of the Gender Equality Act), the percentage achieved is still a long way from the objective of 40 % established by the Spanish Government for the year 2015. Furthermore, the above-mentioned law does not apply to small and medium-sized firms, which make up 99 % of all Spanish businesses and account for 80 % of employment (Observatory of European SMEs 2003). The majority of previous studies and this present one indicate that gender equality is advisable not only from the point of view of ethics and social justice but also in economic terms. Thus, the implementation of legislation on equality and the broadening of its application to firms that are not currently covered are advisable.

Finally, with regard to the limitations of this study, one of the major obstacles that had to be faced was that the corporate governance reports of firms listed on the Spanish stock market do not provide detailed information on top managers' compensation. It is for this reason that this study could only be carried out for director managers. It would be interesting to carry out additional studies considering all top managers, distinguishing between the directors and non-director managers. A similar analysis that took into account whether gender diversity among different types of firm's owners has a significant effect on the monitoring and compensation of top managers would be interesting as well. Additionally, although we have included some evidences regarding the determinants of board diversity and it is necessary to look deeply insight into the factors influencing the presence of women on the board.

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