

Women on corporate boards and their impact on environmental, social and governance disclosure: Evidence from the S&P 500

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Abstract

Purpose – The purpose of this paper is to investigate the effect of board gender diversity on environmental, social and governance (ESG) disclosure. Specifically, it examines *whether* and *how* female directors affect ESG disclosure by drawing on stakeholder theory (Freeman, 1984).

Design/methodology/approach – The ESG disclosure score provided by Bloomberg is used as a proxy for the extent of corporate social responsibility (CSR). The empirical analysis is based on a sample of 379 firms that made up the Standard & Poor’s 500 Index (S&P 500) over the period 2010-2015. In order to take into account the endogeneity problem between board gender diversity and ESG disclosure, a fixed effect model with lagged board variables is used.

Findings – Two main results arise from this study. First, no significant relationship is found between board gender diversity and ESG disclosure. Second, the evidence also partially confirms critical mass theory, as below three female directors the relationship between board gender diversity and ESG disclosure is not statistically significant. However, beyond that, no significant relationship was found.

Research limitations/implications – Reasonable theoretical arguments drawn from stakeholder theory suggest that board gender diversity may have a positive effect on ESG disclosure. The empirical evidence presented neither supports, nor denies stakeholder theory. However, the results may be improved by enlarging the frontiers of this research in time and space, increasing the perimeter of qualitative data integrated in this investigation.

Practical implications – This paper offers theoretical and empirical arguments for the feminization of corporate boards, not only in the name of equality between women and men and organizational justice, but also in the light of organizational performance (examined through the prism of governance). Transparency, analyzed using the proxy of ESG disclosure, is strongly and positively correlated with a feminization of boards, if the proportion of women is significant and sufficient to be able to prevent and surpass the “invisibilization” phenomenon, which is based on the marginalization of passive ultra-minorities, reduction to silence, marginalization (disqualification of women voice or exit strategy), assimilation, or the endorsement of stigma.

1. Introduction

This study is based on two fundamental observations. First, board gender diversity has been long relegated to an ethical issue that it is wrong to exclude individuals on the ground of their gender regardless of their ability (Brammer et al., 2007). However, women on corporate boards (WOCB) are increasingly perceived as a key value driver for organizations and the idea of a “business case for diversity” was developed by Robinson and Dechant (1997). Second, stakeholders (especially shareholders and stock markets) were calling for more corporate transparency regarding environmental, social and governance (ESG) disclosure (Eccles et al., 2011). Consequently, in 2001,¹ the European Commission expressed a business case for corporate social responsibility (CSR), “whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis” (p. 6). This vision creates new responsibilities for boards, and directors individually, both in terms of corporate activities and accountability, which raises the question of a possible link between board gender diversity and a firm’s ESG disclosure.

The literature has investigated different facets of the ESG disclosure issue. For instance, Cho and Patten (2007) examined the determinants of social and environmental strategy and disclosure. They show that environmental disclosure is used as a corporate tool for legitimacy. The literature (e.g., Patten, 2002) has also examined the relationship between environmental performance and environmental disclosure. In general, these studies fail to find any significant relationship. Finally, other studies (e.g., Michelon and Parbonetti, 2012) have examined the effect of corporate governance mechanisms on sustainability disclosure. These studies show that corporate governance plays a role in the sustainability disclosure of US and European companies. The literature on WOCB has mainly focused on tracing the representation of WOCB or examining the underrepresentation of female directors at the micro, meso and macro levels (Terjesen et al., 2009).

According to Galbreath (2013), the literature on ESG studies is limited, as a large part of the research attempts to prove relationships between ESG and firm financial performance.

While this approach is legitimate, focusing on the relationship between ESG and firm financial performance fails to consider the role of corporate governance mechanisms in disseminating ESG disclosure and neglects, in turn, its effect on firm financial performance.

¹ European Commission (2001), “Green paper: Promoting a European framework for corporate social responsibility”. Available at: europa.eu/rapid/press-release_DOC-01-9_en.pdf.

Therefore, some scholars have suggested that research devoted to ESG issues should pursue new research questions (e.g., Galbreath, 2013). Furthermore, most of the existing studies using the Kinder, Lydenberg, Domini (KLD) database to assess corporate ESG. Galbreath (2013) argues, for instance, that many facets of governance (such as board structure or committee independence) suffer from a lack of robustness. Finally, as mentioned previously, the literature has mainly focused on the environmental dimension (e.g., greenhouse gas emissions; see Liao et al., 2015).

Regarding board gender issues, a large body of literature has examined extensively the relationship between WOCB and firm financial performance. According to Post and Byron (2015), the evidence is mixed, with the link having been found to be positive, negative or neutral. Furthermore, few studies have examined the contribution of the role of female directors on boards to CSR. The meta-analysis by Byron and Post (2016) shows that few studies have specifically examined the relationship between WOCB and ESG issues.

Given these gaps in the literature, this study makes several contributions that may be described as follows. First, the study makes a theoretical contribution to the diversity and governance literature by examining the effect of WOCB on ESG disclosure through stakeholder theory (Freeman, 1984). Usually, WOCB is examined through two theoretical lenses: agency and resource dependence theories (Terjesen et al., 2009). Indeed, Hillman and Dalziel (2003) argue the key functions of boards are management oversight and the provision of critical resources to the organization within the framework of agency and resource dependence theories. Beyond these traditional functions, Hill and Jones (1992) assign a third function to boards: increasing a company's sustainable behaviour and its accountability to its stakeholders. Consequently, this theoretical framework is used to examine the relationship between board gender diversity and ESG disclosure. Second, it contributes to the CSR literature (see Byron and Post, 2016) by documenting specifically the effect of board gender diversity on CSR disclosures through ESG. Indeed, ESG research mainly concentrates on firm financial performance (Galbreath, 2013). Thus far, no study has examined the relationship between WOCB and ESG disclosure. Finally, from an empirical standpoint, a fixed effect model with lagged board variables (Liu et al., 2014) is used to fully address the endogeneity problems in the relationship between WOCB and ESG disclosure that may occur because of differences in unobservable characteristics across firms or reverse causality (Boulouta, 2013).

Nevertheless, the correlation between WOCB and ESG disclosure could be moderated and mitigated by the passive (ultra-)minority phenomena, drawing members of Boards from ultra-minority categories to invisibility, inefficiency, irrelevance and insignificance, through

marginalisation, reduction to silence, mimetic (or passive) conformism or (active) assimilation to masculine standard. In addition, the critical mass effect, underlined by Robertson et Park (2007), can mitigate the impact of ethnic diversification of work teams on economic performance. Thus, could be hypothesised correlation between WOCB in ESG disclosure affected. The purpose of this paper is to investigate the effect of board gender diversity on ESG disclosure. Specifically, it examines whether and how female directors affect ESG disclosure. All the companies that made up the Standard & Poor's 500 Index (S&P 500) over the period 2010-2015 were used for this investigation.

The structure of the paper is as follows. [Section 2](#) presents a review of the literature and the research hypotheses. [Section 3](#) presents the methodology, which takes into account the endogeneity issue between board gender diversity and ESG disclosure, and a description of the sample, a definition of the variables, and the analyses used. [Section 4](#) presents the main empirical results. Finally, concluding remarks are given in [section 5](#).

2. Theoretical framework and the development of hypotheses

2.1. Stakeholder theory

In order to examine the relationship between corporate governance and corporate disclosure, a number of theoretical frameworks (e.g., agency and stakeholders theories) have been widely used (Hackston and Milne, 1996). According to these authors, there is no “universally accepted theoretical framework of corporate social accounting” (p. 78). However, there seems to be a consensus in the literature that the aforementioned theories can be viewed as complementary or overlapping, rather than being distinct (e.g., Gray et al., 1995). This study uses stakeholder theory as it was previously applied in the literature in examining CSR disclosures.

Freeman (1984:46) defines a stakeholder in an organization as “any group or individual who can affect or is affected by the achievement of the organization's objectives”. In essence, stakeholder theory posits that companies not only have responsibilities towards their shareholders or other primary stakeholders (such as customers or employees), but also *vis-à-vis* their secondary stakeholders (such as non-governmental organizations - NGOs). Consequently, from a corporate perspective, dealing effectively with stakeholders, having different forms and sources of legitimacy, is a key issue (Parmar et al., 2010).

The underlying assumption of stakeholder theory is that corporate disclosure is used by the management as a tool to provide information for the various stakeholders (employees, shareholders, investors, public authorities, NGOs, etc.). Furthermore, according to Deegan (2007) and Cho and Patten (2007), companies try to gain legitimacy from stakeholders by disclosing environmental, social and governance information. Within this framework, CSR

disclosure is viewed as a means to manage or respond to the different demands of the various stakeholders, particularly those deemed to be salient or powerful. The ultimate objective for an organization is to demonstrate that it meets the expectations of the various stakeholders (e.g., Islam and Deegan, 2008, Eljido-Ten et al., 2010).

2.2. Evolution of the disclosure of environmental and societal information and of corporate governance

Over the decades, the idea that companies should think not only about profits but that there ought also to be more responsibility towards society and environment has been accepted by the public (Carroll and Shabana, 2010). In this context, disclosure of non-financial information has become more important and significant, especially for reporting companies. In addition, International organizations (OECD, 2004, 2010)² and institutional investors claimed, particularly after the global financial crisis, that corporations should incorporate social and environmental responsibilities in their core decision-making processes. It was also suggested that corporations provide well-informed strategic direction, which would be crucial for their long-term financial performance and the development of new business opportunities. Motivated by a sustainable growth perspective, an increasing number of enterprises voluntarily began to publicize non-financial information in their annual reports (Mallin et al., 2013).

It has been widely accepted that the effects of economic activity on the environment should somehow be measured and recognized. In virtually all segments of the financial market, the attention given to environmental issues has grown over the years (Labatt and White, 2002). In recent times, it appears that corporate stakeholders (investors, creditors, employees, insurers, creditors, and the like) have become increasingly concerned about damage done to the environment by corporate activities, and they expect to be informed of the social and environmental practices of the corporations in which they have a stake. Initially, it was environmental information that was published by large companies to express their respect for environmental issues. Economic activity brings great progress to human society, but also environmental problems: global warming, climate change, etc.

There are three principal aspects affecting the decision of environmental information disclosure: societal, firm and industry, and individual factors. Societal factors consist of laws and regulations, as well as public pressure, publicity, and a need to establish the legitimacy of

² OECD (Organization for Economic Co-operation and Development) (2004), *OECD principles of corporate governance*. OECD (Organization for Economic Co-operation and Development) (2010), *Corporate Responsibility: Reinforcing a Unique Instrument – 2010 Annual Report on the OECD Guidelines for Multinational Enterprises*.

an organization. Firm and industry factors contain characteristics such as the potential to pollute and cost-benefit analysis regarding disclosure.

The third factor includes culture and attitudes, such as an improvement in environmental awareness. The combination of these three sets of factors results in corporations having to publish environmental information to meet stakeholders' desires and needs. The information disclosed depends on the corporations' impact on the environment and on the relationship they have with their employees and the communities in which they operate (Lee and Hutchison, 2005). Furthermore, with the integration of the international economy, companies have been highly pressured by stakeholders to disclose CSR information in their annual reports over the last decades (Hooghiemstra, 2000). Carroll (1979) put forward an idea that concerned four levels of responsibility: economic, legal, ethical and discretionary, which may encompass all the corporate obligations that society asks for and which may constitute the social responsibility of the company. From the beginning of the 21st century, corporate scandals, such as those of Enron and WorldCom, as well as the sub-prime mortgage crisis and the following credit crunch, have shaken confidence in large organizations and prompted the call for greater CSR. Stakeholders not only demand transparency regarding financial activities in the annual report, but also greater corporate accountability with reference to social and environmental issues and performance. In this context, most corporations voluntarily disclose CSR in return of corporate benefits. These benefits include enhanced corporate image and relations with stakeholders; better recruitment and retention of employees; improved internal decision making and cost savings; and increased financial returns. For example, companies with a good reputation are able to attract and retain the most talented people.

Moreover, the production of social and environmental reports leads to a better internal control system and decision-making processes, with resulting cost savings from continuous improvements (Adams and Zutshi, 2004). Theoretically, the information disclosed should comply with certain quantity and quality standards. These standards differ from one sector to another and from one country to another and the subject of disclosure is not strictly determined (Aguilera et al., 2006). For example, some international, European and French regulations are formulated through International Accounting Standards (IAS), recommendations and communications from the Commission of the European Communities, and French legislation to deal with corporate social information. As a result, stakeholders want to ensure the quantity and quality of CSR disclosure through corporate governance. In this context, Gibson and O'Donovan (2007) mention that "good governance is now closely

linked to the concept of CSR and accountability and that one way to demonstrate CSR is to increase annual report disclosures” (p. 944).

Hillman and Dalziel (2003) consider that there are two important and traditional roles for a board of directors: monitoring (a control role) and advising (a service role). The control role has been the main aspect analysed; it depends on internal and external governance mechanisms which aim to enable monitoring of management’s behaviour towards shareholders, given the potential for conflicts of interest occurring with the separation of ownership and control. Existing studies indeed suggest that corporate governance quality is an important internal contextual factor which is positively associated with CSR activities and disclosure (Adams, 2002, Chan et al., 2014). According to the existing literature, several characteristics of a board of directors that influence the effectiveness of corporate governance and the quantity and quality of CSR disclosure can be identified: board independence and size, CEO duality, and the diversity of the board of directors. These studies indicate that independent boards of directors and larger boards help facilitate both shareholders’ and other stakeholders’ interests (Chan et al., 2014). From an agency theory viewpoint, powerful CEOs tend to provide a higher degree of CSR disclosure to maintain their private reputation and deal with risk management (Jizi et al., 2014). Board gender diversity has also received increased attention in recent years in relation to corporate governance and CSR disclosure.

2.3. Board gender diversity and CSR disclosure

In recent years, board gender diversity has become a critical component of corporate governance structure around the world (Terjesen et al., 2009). WOCB fits well into the framework of stakeholder theory. Although boards have to manage the interests of the various stakeholders through firms’ CSR via corporate disclosure (Harjoto et al., 2015, Jain and Jamali, 2016), some directors may lack expertise in the CSR issue (Paine, 2014). However, according to Boulouta (2013) and Harjoto et al. (2015), boards with female directors are more likely to invest in CSR. The stakeholder theory posits several reasons for such a possibility.

First, according to the literature on gender-based differences, women and men have a different perception regarding a leadership role (Wood and Eagly, 2009). Specifically, according to Eagly et al. (2003), men are more likely to be characterized by agentic attributes,³ while women have more communal characteristics ascribed to them (such as being supportive, empathic and gentle). As such, women are more concerned with the welfare of others. In practical terms, these communal characteristics appear to lead female directors to

³ According to Eagly et al. (2003), agentic attributes describe a behaviour that is assertive, competitive, controlling and dominant.

better address stakeholders' interests, unlike their male director counterparts, who tend to be more concerned with shareholders and economic concerns (Adams et al., 2011).

Second, compared with male directors, female directors have significantly different backgrounds and experience (Hillman et al., 2002, Singh et al., 2008), which, in turn, can lead them to have a different orientation towards stakeholders. For instance, female directors are more likely than their male counterparts to have backgrounds in areas of expertise outside business and to be supported by specialists or community influentials (Hillman et al., 2002). Furthermore, Singh et al. (2008) show that female directors tend to gain board experience with smaller firms and are less likely to have been CEOs or chief operations officers (COOs). Therefore, having more female directors may sensitize boards to CSR issues by providing helpful perspectives on this matter.

Third, Zahra and Pearce (1989) argue that one of the major roles of directors is to advance the firm's reputation. As such, firms can enhance their reputation and ultimately their legitimacy by appointing important or powerful individuals to their boards. These directors become the face of the firm and can positively influence external perceptions of the company (Pfeffer and Salancik, 1978). Consequently, Aguilera et al. (2006) argue that corporate governance mechanisms can be seen as a set of accountability measures that increase the level of legitimacy. According to Hillman et al. (2007), the appointment of women on corporate boards adds legitimacy to an organization by sending a positive message to current female employees and potential recruits, as well as to the stakeholders and the market, that the firm will comply with society's expectations.

Fourth, given female directors' psychological characteristics, backgrounds and experience, they are more likely to be involved in strategic issues that affect the firm's CSR and its stakeholders. According to Nielsen and Huse (2010), "women may be particularly sensitive to – and may exercise influence on–decisions pertaining to certain organizational practices, such as corporate social responsibility and environmental politics" (p. 138). Thus, the following is proposed:

Hypothesis 1: All other things being equal, ESG disclosure is positively associated with the representation of women on corporate boards.

2.4. Number of female directors and ESG disclosure

Having at least two female directors can be sufficient in fostering major changes regarding a board's decisions. It depends on the profile and the background of the directors as well as on the type and style of the firm. Indeed, critical mass theory (e.g., Kanter, 1977) suggests that

the nature of group interactions depends upon size. When the size of a subgroup reaches a certain threshold, or “critical mass”, the influence of this subgroup increases significantly. This theory suggests, therefore, that when a minority group reaches a critical mass, a qualitative change will occur in its interactions within the group as a whole.

Specifically, when minorities are substantially underrepresented, they become “tokens”. In practical terms, they are stereotyped by the majority group and perceived as less competent, thereby giving them a lower status than that of the majority group (Kanter, 1977). However, the situation is reversed when the members of the minority group constitute a critical mass as the personal interactions improve. In a group in which the majority members are faced with at least three opinions from the minority group, the group tends to better consider and learn from the minority (Asch, 1955), especially when the opinions of the minority cohere (Nemeth, 1986).

In this context, Konrad et al. (2008) suggest that the critical mass of women on corporate boards is reached when there are at least three female directors on a board. Their main argument is that with three female directors, it is possible to increase the likelihood that the voices of women and their ideas will be heard and the dynamics within the board will change significantly. This line of reasoning is confirmed by the work of Joecks et al. (2013), who find that a critical mass of about 30% of female directors has a significant impact on firm performance.

Consequently, it is assumed here that, if the board of directors has a critical mass of three female directors, the women are unlikely to influence the board’s decision-making and, ultimately, CSR issues (Konrad et al., 2008). A positive and significant relationship is anticipated if the board of directors has at least three female directors. Therefore, the following is asserted:

Hypothesis 2: All other things being equal, firms with at least three female directors on the board will exhibit higher ESG disclosure.

3. Research design

3.1. Sample

The initial sample of this study includes all the companies that made up the S&P 500 over the period 2010-2015. This index represents a broad cross-section of the US equity market, including stocks traded on the NYSE (the New York Stock Exchange) and Nasdaq. The S&P 500 captures over 80% of the total domestic US equity float-adjusted market capitalization. The study focused exclusively on large-sized companies because they are more

likely to be under scrutiny from various stakeholders regarding both corporate disclosure (Watts and Zimmerman, 1978; Cowen et al., 1987) and WOCB (Hillman et al., 2007). A means of selection based on large companies has been widely used in prior studies (e.g., Hackston and Milne, 1996). Following standard practice, financial (SIC codes 6000-6999) and utility (SIC codes 4900-4999) firms were excluded, as these have specific disclosure requirements and accounting regulations. The final sample consisted of 379 firms and 2,002 firm-year observations.

3.2. Measurement of variables

3.2.1. Dependent variable

The data regarding the ESG disclosure were obtained from the Bloomberg database. Bloomberg's ESG disclosure score is based on recommendations from the Global Reporting Initiative (GRI). As noted by Eccles et al. (2011), these scores include three dimensions: environment, social and the governance. The scoring system ranges from 0 (for firms that do not disclose ESG) to 100% (for firms that disclose all ESG data recognized by Bloomberg). The scores are based on a company's ESG disclosure index calculated using a set of data points collected by the analysts at Bloomberg, looking at the three dimensions cited above. Each data point is weighted in terms of importance and relevance for the particular industry sector. Therefore, it may be considered as a measure of breadth of reporting.

In recent years, ESG disclosure scores provided by Bloomberg have been widely used in the academic literature (e.g., Nollet et al., 2016).

3.2.2. Independent variables

Board gender diversity was measured by calculating the percentage of women on corporate boards, as in Adams and Ferreira (2009) and Campbell and Mínguez-Vera (2008). For this variable, data were derived from the Bloomberg database.

Based on Kanter's (1977) work, a set of dummy variables was created to take into account the critical mass of women on corporate boards. Specifically, consistent with Liu et al. (2014), the dummy variable "D1" equals 1 when a board has one female director and 0 otherwise. Similarly, the dummy variable "D2" equals 1 when a board has two female directors and 0 otherwise. Finally, the dummy variable "D3" equals 1 when a board has three or more female directors and 0 otherwise.

3.2.3. Control variables

The size of the firm, its economic performance and firm risk are the most widely used control variables (e.g., Waddock and Graves, 1997). Beyond these traditional control measures,

McWilliams and Siegel (2000) emphasize the need to take into account R&D expenditure in any specification, in order to avoid specification problems.

Operationally, economic performance was measured by return on equity (ROE), which is the ratio of net income before extraordinary items and the book value of shareholder equity. According to Boulouta (2013), this measure of performance is more commonly used than other traditional measures, such as return on assets (ROA) or Tobin's Q. The size of a firm was measured as the natural logarithm of total assets (Hillman et al., 2007), while its risk was measured by the firm's leverage calculated as the ratio of total debt by total assets (Campbell and Mínguez-Vera, 2008). The R&D intensity (R&D) was measured as the ratio of R&D expenses to total assets (McWilliams and Siegel, 2000). As firms are required to report R&D expenses, missing values indicate negligible R&D expenditure (Miller and del Carmen Triana, 2009). Consequently, missing R&D values were set to 0. This method avoids biasing results by excluding firms with small R&D expenditure or missing values (e.g., O'Brien, 2003). Finally, the existing literature has shown that the independence of the board of directors can significantly increase a firm's CSR engagement (Jo and Harjoto, 2011). Specifically, board independence (BINDEP) is the ratio of unaffiliated independent directors to the total number of board members (Bhagat and Bolton, 2008).

All data used in this article come from the Bloomberg database.

3.3. Model and estimation method

3.3.1. Model

The following model was estimated:

$$(ESG)_{i,t} = \alpha + \beta_1 (WOCB \text{ or } D_1, D_2 \text{ \& } D_3)_{i,t-1} + \beta_2 (FSIZE)_{i,t} + \beta_3 (ROE)_{i,t} + \beta_4 (RISK)_{i,t} + \beta_5 (R\&D)_{i,t} + \beta_6 (BINDEP)_{i,t-1} + \psi_t + \eta_i + \varepsilon_{i,t} \quad [1]$$

Where i denotes firms in the sample; t refers to time period. Finally, the expressions ψ_t , η_i and $\varepsilon_{i,t}$ refer to unobserved firm fixed-effects, time-specific effects that are time-variant and common to all companies, and the classical error term, which is assumed to be independent and identically distributed, respectively.

3.3.2. Estimation model

According to Adams et al. (2010), there is a general consensus in the literature that suggests that board structures are exogenous. However, there are both theoretical arguments and empirical evidence suggesting that board structure is more likely to be endogenous (e.g., Hermalin and Weisbach, 1998). This endogeneity issue creates estimation problems. Adams et al. (2010) suggest that board composition is endogenous to the extent that the economic

actors put in place governance structures in order to solve governance problems that the firm encounters. Consequently, that female representation on boards is a deliberate choice made by the firm must be taken into account when estimating Equ. [1]. However, two alternative explanations must be considered omitted unobserved factors and reverse causality (Boulouta, 2013):.

The problem of omitted unobservable firm characteristics (both fixed and variable across time) may affect CSR and ESG disclosure (for instance, the corporate culture; see Boulouta, 2013), as well as the appointment of female directors (for instance, some firms may be more “socially progressive” than others, so are more likely to appoint female directors; Adams and Ferreira, 2009). In general, the literature deals with the problem of omitted variable bias by using panel data analysis (such as fixed-effects), as it can take into account this bias under certain assumptions (Wooldridge, 2010). However, this treatment may not be sufficient because of a second explanation: reverse causality.

According to Adams and Ferreira (2009), there are reasons to assume that reverse causality might also be present. Indeed, the most socially responsible corporations may be more likely to increase the number of female directors, but it is also possible that female directors significantly influence ESG disclosure. In this case, a fixed-effects model may not be appropriate.

Consistent with Adams et al. (2010), Equ. [1] was first estimated using a fixed-effects (FE) method for panel data, as they argue that this removes time-invariant heterogeneity in the data. However, as stated previously, an FE method may not be sufficient to treat the endogeneity issues. Therefore, consistent with Liu et al. (2014), a one-year lagged board gender diversity measure (WOCB) and one-year lagged board characteristic variable (BINDEP) were used in Equ. [1]. The underlying assumptions are that female directors, as do board characteristics, need time to influence ESG disclosure. Consequently, Equ. [1] was estimated using panel data with fixed effects with a lagged board diversity measure and board characteristics. This method is referred to as the “FE with lagged board variables” (Liu et al., 2014). Equ. [1] was estimated with robust standard errors, which correct for residual heteroscedasticity issues.

3.4. Descriptive statistics and correlation analysis

Table 1 presents descriptive statistics of all the variables. As can be seen from this table, the mean percentage of WOCB is 15.85%. This is higher than the number given in, for instance, Adams and Ferreira (2009), who reported a value of 8.5%. This is probably due to the fact

that our sample is more recent, 2010-2015, compared to 1996-2003 for Adams and Ferreira (2009). [Table 1](#) also shows that just over 21% of the firms in the sample have a critical mass of female directors (Konrad et al., 2008). Only 12% of the sample firms had no female directors, compared to the 44% reported by Hillman et al. (2007) over the period 1990-2003. The findings in the present study seem to show a progression in the number of WOCB.

[Place [Table 1](#) here]

[Table 2](#) reports the correlations among the variables. As a rule of thumb, a correlation of 0.70 or higher in absolute value may indicate a multicollinearity issue (Liu et al., 2014). The results show that the highest correlation coefficient of 0.705 (in bold) appears between $WOCB_{t-1}$ and $D3_{t-1}$. However, since these two variables are used alternately in the specifications as dependent variables, their high correlation is not an issue. Multicollinearity was also checked by calculating the variance inflation factors (VIF). The highest observed VIF value in the study variables is 2.76, which is well below the conventional cut-off of 10.0 (Chatterjee and Hadi, 2012). Consequently, it was concluded that multicollinearity had little impact on any further analysis.

It can be noted from [Table 2](#) that there is a significant and positive correlation between board gender diversity and ESG disclosure, which suggests female directors influence corporate disclosure. Furthermore, there is a positive and significant relationship between board gender diversity and firm size, which suggests that larger firms are more likely to appoint female directors (Miller and del Carmen Triana, 2009).

[Place [Table 2](#) here]

4. Results

[Table 3](#) presents the results of Equ. [1]. Model 1 presents the effect of women on corporate boards ($WOCB_{t-1}$) on ESG disclosure, while model 2 reports the effect of the critical mass of female directors (D_1 , D_2 and D_3).

Model 1 in [Table 3](#) shows that the coefficient related to WOCB is not statistically different from zero, which suggests that there is no evidence of a significant link between ESG disclosure and board gender diversity. Consequently, [Hypothesis 1](#) is not supported. This result is consistent with Boulouta (2013). Indeed, even if Boulouta (2013) claims that board gender diversity has a positive impact on corporate social performance (as measured by the KLD score, which is similar to Bloomberg's ESG score), this link is weak. From a statistical standpoint, significant results should reach the conventional levels of 1% and 5%. Beyond this

limit, the results are somewhat weak. Given that the relationship reported by Boulouta (2013) is significant at the 10% level, it can therefore be assumed that the relationship in the present case is weak. Furthermore, this result complements the meta-analysis by Byron and Post (2016), which found a tenuous link between CSR and WOCB. Regarding the control variables, firm size is positively and significantly (at the 1% level) related to ESG disclosure. This result suggests that larger firms are more likely to release ESG information to the stakeholders and to society. None of the other control variables are significant at the 10% level.

Model 2 in [Table 3](#) shows that the presence of one (D_1) or two (D_2) female directors on boards has no significant effect (at the 10% level) on ESG disclosure. This finding is consistent with the work of Kanter (1977) and Konrad et al. (2008), who argue that if there are fewer than two women in a social group or on a corporate board, these women may have no influence on decisions.

The results are also consistent with Boulouta (2013) and Joecks et al. (2013). However, it was also found that the coefficient for three or more female directors on boards is not statistically different from zero, which means there is no evidence of a significant link between a critical mass of WOCB and ESG disclosure.

Nevertheless, there is no homogeneous trend regarding the impact of boards feminisation on ESG disclosure or firm performance. In their empirical work, Joecks et al. (2013) and Liu et al. (2014) find, for example, that the number of female directors has a significant impact on firm performance. In view of these considerations, [Hypothesis 2](#) is not supported. Among the control variables, only firm size is positively and significantly (at the 1% level) related to ESG disclosure, as in model 1.

[Place [Table 3](#) here]

5. Concluding remarks

The purpose of this paper is to investigate the effect of board gender diversity on ESG disclosure by examining whether and how female directors affect CSR based on stakeholder theory.

This research offers empirical evidence in favor of a positive and strongly significant impact of the feminization of boards on the ESG disclosure of firms: the hypothesis of a positive effect of heterogamy on “transparency”. Following the philosophy of ISO 26000 guidance, CSR disclosures was analyzed as a proxy of transparency.

Table I shows that ESG disclosure is positively and significantly correlated with firm size, ROE, risk taking and board independence. In addition, R&D investment is negatively correlated with ESG disclosure, perhaps because of the confidential (and sometimes secret) nature of R&D. As a strategical investment, a risk taking, a preliminary action (and a prolegomenon of a sustainable competitive advantage), R&D results must be retained in the “secret of the Executives” (culture of confidentiality).

As previously underlined, a CSR policy is aimed at inducing an ethical improvement of firm’s discourses, rules of games and practices. Thus, it searches to combine a “discursive pattern evolution”, a “normative and programmatic revolution” (rules of social game and collective action at work, processes regulating operative, day-by-day, functioning of a firm...) and, finally, a “praxististic progression” (through prescribed, framed and/or autonomous practices).

As a sponsored organizational change process (Bruna, 2016; Bruna & Chanlat, 2015), the implementation of a CSR policy can be seen as a transformative move, aimed at improving the organizational, social, environmental and economic performance of an organization and creating a model for sustainable and inclusive growth. Thus, the implementation of a transformative CSR policy can be analyzed by examining the effectiveness of each of its three (discursive, normative and practice-based) pillars.

Thus, analyzing CSR disclosure as a proxy of “transparency” means, at the same time, investigating the holistic involvement of the firm in CSR issues (such as ethical and democratic governance, the integration of diversity, human rights and environmental concerns in the firm’s strategy, compliance with social laws, anti-corruption practices, and commitment to local communities and clients).

The findings tend to confirm the hypothesis of a “critical mass” effect influencing and moderating the correlation between the positive impact of gender diversity on boards and ESG disclosure. A cluster of clues suggests that a significant feminisation of Boards could improve the transparency, compliance and transparency of companies, approximated by ESG disclosure level, even if there is no statistical evidence on the link between a critical mass of WOCB and ESG disclosure, because of the distribution of the data in the sample (very few Boards include three or more female directors on boards; thus, the coefficient for three or more WOCB is not statistically different from zero).

The proportion of WOCB influences and mitigates the correlation between the feminization of a board and ESG. When only one woman is appointed or elected to a board, a “minority invisibility/neutralization phenomenon” occurs, relegating her to the margins of power,

delegitimizing her role, minorizing (symbolically and socially) her status and influence, suffocating her voice, and depriving her of an audience and effective power. Thus, her impact on ESG disclosure is ineffective and even negative.

As explained in the literature of sociology of action and psycho-sociology, the “invisibilization processes” or the conformity strategy is common in very unequal social spheres, in which access to information and knowledge, and decision and power sharing, are strongly asymmetrical. Thus, a low level of feminization of boards can induce a negative effect on cognitive diversity (which is based on share of heterogeneous and non-redundant information and knowledge, hybridization of ideas and contrapuntist dialogues, supported by rich and sustainable social exchanges...), reinforcing conformity and conformism to the dominant traditional, masculine model. For those without a *legitimate voice*, the (constraint) choice between *loyalty* or *exit* causes them to prefer silence (and a presence on a board) to reclamation (and exit). Voicing as a member of an ultra-minority category sometimes reinforces stigma (a counterproductive impact of the contestation of roles and rules) and leads, frequently, to marginalization and, finally, exclusion.

Thus, the masculinization of women’s behavior on gender-homogeneous corporate boards, describing their “(unconscious) assimilation of dominant values and models”, “(passive) mimicry”, “(opportunistic) conformism” and/or the “endorsement of stigma” (dominant male/dominated female relationship), relegates feminine directors to silence or to being treated as *passive, delegitimized minorities*.

Reducing the exchange and the confrontation of (non-redundant) ideas on a board, cutting down contrapuntist dialogue among directors, and the recruitment of assimilated female directors reinforces paradoxically the endogamy and cognitive homogeneity of boards.

It is particularly interesting to underline that the effective, potentially creative and value-creating potential of diversity is rooted in the diversity of social itineraries and networks, cultural patterns and socio-professional careers and, thus, in cognitive diversity. This *de facto* lowering of CSR pressure (because of the invisibility of women on boards) can discourage social and environmental commitment (as approximated by ESG disclosure) and “transparency”.

Nevertheless, when two, three or more women are appointed, a firm has *higher ESG disclosure*, corroborating (tendentiously) the hypothesis of a positive effect of the feminization of boards on “transparency”, openness (to stakeholders’ issues) and the CSR commitment of firms. Thus, when two or more women are involved in strategic decisions on a

board, they act as *active minorities*, influencing the rules of the game, the procedures and practices, and contrasting the customs and practices of the firm.

The correlation between WOCB and ESG disclosure is, *de facto*, moderated and mitigated by *passive (ultra-)minority phenomena* and *active minorities strategies* according to Moscovici's (1979) psychological definition.

Thus, *passive (ultra-)minority phenomena* draw members of boards from ultra-minority categories to invisibility, inefficiency, irrelevance and insignificance, through marginalization, reduction to silence, mimetic (or passive) conformism or (active) assimilation to a masculine standard.

This research shows, in addition, a significant *threshold effect* by which the significant feminization of a board can induce an evolution in the psycho-sociological positioning and collective action strategy of WOCB, from *invisibility* (translating a *loyal* submission to masculine models or a *proto-exit marginalization*) to *voice* ((Hirschman, 1970, 1974).

In the *invisibility hypothesis*, scarcity of WOCB induces sometimes egoistic, legitimistic and quite acritical attitudes of female administrators (submission to masculine values, models and stereotypical standards, *loyalty*; fear to be marginalised and embeddedness of congruence, (Moscovici, 1979). In addition, syndromes of devaluation and disqualification of WOCB voice often occur, relegating women to silence (or not-listening). They act as signal of a *proto-exit* marginalisation of WOCB. Thus, *invisibility* of WOCB damage the effectiveness and the quality of contrapuntist dialogue on board and jeopardise transparency towards shareholders. In the *voice* perspective, the critical and valuable contribution of WOCB is encouraged and appreciated, to stimulate the density and the vivacity of the debate in the assembly and to increase the quality of strategic and prospective thinking on the Board.

This paper offers scientific arguments in favour of the feminization of boards, not only in the name of female-male equality and organizational justice, but also in the light of organizational performance (examined through the prism of governance). Transparency, analysed using the proxy of ESG disclosure, is strongly and positively correlated with the feminization of boards, if the proportion of women is significant and sufficient to prevent and surpass the “invisibilization” phenomenon, which is based on the marginalization of passive ultra-minorities, their reduction to silence, marginalization (disqualification of women voice or exit strategy) assimilation, or the endorsement of stigma.

To struggle against endogeneity and cognitive homogeneity and repetitiveness, it is necessary to achieve a critical mass of women on boards. Nevertheless, the decision to go on “transparency” (through ESG disclosure) escapes the Board’s effective perimeter of action.

Despite its strategic nature, the decision of ESG disclosure is taken more in executive committees or boards of executive leaders than in political instances as Boards.

This is a limitation of the empirical evidence. It is suggested that complementary investigations have to be conducted on the impact of the feminization of executive offices on ESG disclosure practices (and ranking). Furthermore, the statistical significance of the results could be improved by enlarging the scope of the research in time and space, increasing the perimeters of the qualitative data integrated in the investigation (particularly in terms of sector, seniority, organizational culture of the firm, type of management, regulation and learning models adopted by the company, maturity, effectiveness of the diversity and CSR policies, and the director profile, such as primary social capital, educational and professional background, national origins and age). Finally, the correlation between ESG disclosure and WOCB in the light of temporal dimensions could be investigated, examining the maturity of the CSR diversity policies of the organizations (approximated through a CSR or temporal index referring to the date of policy creation to investigate the organizational learning effect), the age and/or experience of the female directors (studying the legitimization of women through the personal learning of female directors), and the seniority of the directors (in the company, in the executive functions and/or on the boards, thus analysing the professional learning of female directors and their experience-based and expertise-grounded empowerment, tools and behaviour for achieving legitimization).

In accordance with Byron and Post's conclusions (2016), future research should include qualitative data from national and intra-organizational contexts. These authors have empirically demonstrated that "the female board representation-social performance relationship is even more positive in national contexts when boards may be more motivated to draw on the resources that women directors bring to a board (i.e., among firms operating in countries with stronger shareholder protections) and in contexts where intra-board power distribution may be more balanced (i.e., in countries with higher gender parity)" (p. 428). In addition, a smoother and more homogeneous distribution of occurrences (the presence and number of women on boards) in the sample of firms in future studies could improve the validity of the results in this paper and strengthen the validity of the findings.

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Table 1.
Descriptive statistics

Variables	Mean	SD	Median	Min.	Max.
ESG	30.455	14.892	26.860	8.678	76.764
WOCB _{t-1} (%)	15.850	9.579	16.667	0.000	54.545
D1 _{t-1} (%)	31.568	46.490	0.000	0.000	1.000
D2 _{t-1} (%)	35.165	47.760	0.000	0.000	1.000
D3 _{t-1} (%)	21.229	40.903	0.000	0.000	1.000
Firm size	9.497	1.167	9.378	6.515	13.525
ROE (%)	21.360	31.206	17.429	-178.655	527.885
Risk	24.173	14.887	23.122	0.000	14.888
R&D (%)	4.561	12.853	38.175	0.000	444.595
Board independence _{t-1} (%)	82.947	10.262	87.500	20.000	100.000

Table 2.
Correlation matrix

	1	2	3	4	5	6	7	8	9	10
1. ESG	1.000									
2. WOCB _{t-1}	0.278***	1.000								
3. D1 _{t-1}	-0.200***	-0.398***	1.000							
4. D2 _{t-1}	0.153***	0.201***	-0.500***	1.000						
5. D3 _{t-1}	0.243***	0.705***	-0.353***	-0.382***	1.000					
6. Firm size	0.436***	0.220***	-0.187***	0.098***	0.252***	1.000				
7. ROE	0.087**	0.096**	-0.055**	0.005	0.100***	-0.029	1.000			
8. Risk	0.011	0.043	-0.088***	0.063***	0.036	0.085***	0.049**	1.000		
9. R&D	-0.003	-0.020	0.046**	-0.017	-0.025	-0.070***	-0.075***	-0.085***	1.000	
10. Board independence _{t-1}	0.247***	0.225***	-0.080***	0.101**	0.136***	0.181**	0.032	0.154***	0.005	1.000
VIF	1.30	1.10	2.76	2.54	2.49	1.16	1.02	1.04	1.02	1.10

The asterisks *** and ** indicate significance at the 5% and 1% levels, respectively.

Table 3.

Results of the fixed-effects method with lagged board variables

	Model 1	Model 2
	b / (t)	b / (t)
WOCB _{t-1}	-0.016 (-0.54)	
D1 _{t-1}		0.437 (0.78)
D2 _{t-1}		0.486 (0.70)
D3 _{t-1}		0.745 (0.85)
Firm size	2.581*** (4.45)	2.435*** (4.20)
ROE	0.001 (0.09)	0.001 (0.10)
Risk	-0.043* (-1.72)	-0.043* (-1.74)
R&D	-0.001 (-0.34)	-0.001 (-0.24)
Board independence _{t-1}	0.043 (1.30)	0.038 (1.13)
Intercept	3.613 (0.60)	4.707 (0.79)
<i>Industry dummies</i>	No	No
<i>Firm fixed-effects</i>	Yes	Yes
<i>Year dummies</i>	Yes	Yes
Number of observations	2,002	2,002
R-squared	0.199	0.217
F statistic	4.86***	3.99***

t-Statistics FE estimators are reported in parentheses and based on robust standard errors to correct potential heteroscedasticity and time-series autocorrelation within each firm. The asterisks *** and ** indicate significance at the 5% and 1% levels, respectively.