How green is you board? Board structure and corporate environmental performance

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Abstract

Objectives. *The present paper aims at exploring the relationship between firms' board structure and their green performance, within the agency theory and resource dependence theory frameworks, in order to outline if particular types of board directors could act as a stimulating driver for firms' environmental performance.*

Methodology. *The theoretical analysis is completed by an empirical exploration, performed by two linear regression models, on a sample of Italian and Spanish firms included in the CSRHub database in 2015.*

Findings. *Our findings provide nuanced evidence that boards do affect firms' environmental performance. We reported in fact a positive relationship between the presence of non- executive directors in the board and companies' environmental performance; while the critical mass of women directors and the percentage of independent directors, together with board size, do not seem to be related with firms' green performance.*

Research limits. *The study employs a sample with a limited number of observations. Moreover, a longitudinal analysis will probably provide more confidence in the findings.*

Practical implications. *The results allow to identify the characteristics of the board that may foster and enforce firms' environmental performance. Moreover, socially responsible funds could find useful, for their portfolio allocation strategy, to know if there are types of directors more oriented to green issues.*

Originality of the study. *There is a lack of literature on the theme. The study is one of the few attempts that is not focused on Anglo-Saxon countries or single developing countries and that concentrates on environmental issues, instead of CSR.*

Key words: *environmental performance; board of directors; independent directors; non-executive directors; gender diversity*

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1. Introduction

Environmental sustainability is a prominent, rapidly growing trend in modern business. It is well known that the natural environment and a firm's operations are reciprocally related (Boutilier, 2011). In particular, companies may play a crucial role in order to reduce the global environmental impact of the present society (Carballo-Penela and Castromán-Diz, 2014); that's why the commitment to the natural environment has become an important variable within the current competitive scenarios (Gonzales-Benito and Gonzales-Benito, 2006) and environmental performance is increasingly considered a strategic issue for firms. Organizations may reduce environmental impact and manage the interface between business and nature beyond imposed compliance changing their strategies in a proactive manner, in order to prevent any potential negative impacts on the organizations' products and services, physical assets, facilities, design, delivery, and production processes (Aragon- Correa and Sharma, 2003; Busch, 2011; Delmas *et al*., 2011; Gonzales-Benito and Gonzales-Benito, 2006¸ Sharma, 2000). As there is a growing evidence that a proactive environmental strategy may lead to better financial and economic performance, and thus potentially to gain a competitive advantage, as well as perceived gains in reputation and risk management (Barnett and Salomon, 2012; Fisher-Vanden and Thorburn, 2011; Flammer, 2013; Kassinis *et al*., 2016), such strategy, and in particular its drivers and impact on business performance, has been object, in the last few years, of an ongoing debate.

The Organizations and Natural Environment (ONE) literature has, in fact, extensively developed on the drivers of firms' environmental performance, focusing on a variety of antecedents. The shift towards greener practices may be in fact stimulated not only by contextual, or external factors, such as regulations, customers and other stakeholders, but also by organizational, or internal drivers, such as resources and capabilities, managerial attitude and motivation.

Several studies focused on organizational drivers have recently explored the influence of corporate governance mechanisms on firms' environmental performance and proactivity (Earnhart and Lizal, 2006; Berrone and Gomez-Mejia, 2009; Kock *et al*., 2012; Walls *et al*., 2012; Ortiz-de-Mandojana *et al*., 2012; Ortiz-de-Mandojana and Aragon-Correa, 2015; Calza *et al*., 2016), trying to understand if and how these mechanisms may direct managers towards increasing environmental performance.

A large portion of this research considers board structure and composition as a possible driver of the firm's environmental stance (de Villiers *et al*., 2011; Kock *et al*., 2012; Post *et al*., 2015), but the few studies addressing the relationship present fragmented and partially contradictory empirical evidence (Ben-Amar *et al*., 2015; Li *et al*., 2017), highlighting the need for additional research in this area.

The present paper tries therefore to contribute to extant literature by analyzing the relationship between corporate board's structure and firm's environmental performance, in order to visualize if some types of directors could act as a stimulating driver for such performance. In particular, founding on the agency and resource dependency theory, we focused the attention on the size of the board, together with its gender diversity and independency.

Using a sample of 87 Italian and Spanish firms, this study highlights the importance of a firm's board in the development of companies' environmental conducts, advancing knowledge in the understanding of the antecedents of such strategies. ONE literature may therefore be enriched by the study, identifying other important internal drivers of firms' environmental performance.

Moreover, while most of the studies investigating this issue are focused on Anglo-Saxon countries, in particular U.S. (Berrone and Gomez-Mejia, 2009; de Villiers *et al*., 2011; Kock *et al*., 2012; Ortiz-de-Mandojana and Aragon-Correa, 2015; Cowden *et al.*, 2015; Post *et al.*, 2015) or single developing countries (Meng *et al*., 2013; Earnhart and Lizal, 2006), our analysis is focused on companies belonging to different European non Anglo-Saxon countries (in particular Italy and Spain), where majority ownership structures prevail. Controlling shareholders influence board member selection and may use their power to meaningfully influence the board to advance their preferences, so we can expect to have different results from previous studies which are mostly

dedicated to firms without controlling shareholders, in particular as regards the benefits of board independency. Our results could be therefore relevant also for corporate governance literature on board dynamics and influence on corporate strategies.

Finally, as our measure of environmental performance covers other countries all over the world, our findings on the relationship between firms' board and environmental performance may have implications in other countries and could stimulate future comparative analyses.

The remainder of the paper is organized as follows: the next section reviews prior studies on the relationship between board structure and environmental performance, and it develops the research hypotheses. Section 3 presents the data and the adopted methodology. Section 4 shows the results of the analysis, while in the final part of the paper a formal discussion of the implications of the results and the main findings and limitations of the study are summarized.

2. Boards of directors and firms' environmental performance: conceptual foundations and research hypotheses

The Organizations and the Natural Environment literature has already recognized that the introduction of environmental friendly activities may be used by companies to gain competitive advantage toward competitors, enhancing their position in the market and developing the resources and capabilities useful for building a long term profit potential (Bansal and Roth, 2000; Buysse and Verbeke, 2003; Aragon-Correa and Sharma, 2003). Such benefits are especially visible when firms are trying to anticipate future regulations and trends, in order to prevent (instead of simply correct) negative environmental impacts, following proactive environmental strategies (PES) (Aragon-Correa and Sharma, 2003). Firms with high environmental performance may in fact reduce operating costs, improve access to resources and take advantage of market opportunities created by an increasing demand for environmental friendly goods and services (Berrone and Gomez-Mejia, 2009), in addition to managing risk, including reputational risk.

Consequently, a number of scholars from different fields of study, have tried to identify and analyze the drivers that may encourage a company to develop and sustain its environmental performance.

Prior studies have classified environmental drivers in organizational, or internal, and contextual, or external (Ghobadian *et al*., 1998; Gonzales-Benito and Gonzales-Benito, 2006; Claver *et al*., 2007). Essentially, environmental regulation (Ambec and Barla, 2006; Bansal and Roth, 2000; Majumdar and Marcus, 2001) and stakeholder pressure (Buysse and Verbeke, 2003; Henriques and Sadorsky, 1999; Garcés-Ayerbe *et al*., 2012) represent the external factors, while companies' structural features, together with organisational resources and capabilities (Hunt and Auster, 1990; Gonzales-Benito and Gonzales-Benito, 2006), managerial attitude and motivation (Fernández *et al*., 1996; Hunt and Auster, 1990), leadership capability (Azzone and Noci, 1998) and intellectual capital (Claver *et al*., 2007) constitute the internal ones, all moderated by the presence and strength of ethical attitude (Husted, 2005).

Among the antecedents, a recently growing stream of literature has examined the linkages between corporate governance issues and firms' environmental performance, challenging the role of ownership structure as well as board composition, but the few studies on the issue have provided fragmented and contradictory evidence, which makes theory building difficult and asks for other studies on the theme.

Most of the papers have their roots in the agency problem caused by the separation between management and ownership (Jensen and Meckling, 1976; Shleifer and Vishny, 1997) and are focused on "how some corporate governance mechanisms resolve the divergence of interests between firm owners (principal) and managers (agent) with respect to environmental practices" (Kock *et al*, 2012, p. 493).

In particular, the linkages between board structure and composition and corporate environmental performance (de Villiers *et al*., 2011; Kock *et al*., 2012; Ortiz-de-Mandojana and Aragon-Correa, 2015; Cowden *et al*., 2015; Post *et al*., 2015) have been exploited, based on the idea

that boards are responsible for decisions related to CSR and sustainability (Ingley, 2008) that usually require important investments and have long term strategic implications (Walls *et al*., 2012); a corporate board, in fact, develops stakeholder oriented corporate policies, approves annual budgets for sustainability related spending and may create separate standing committees dealing with CSR matters (Chang *et al*., 2017).

A more developed literature is focused on the effects of corporate governance issues on corporate social responsibility and performance (Johnson and Greening, 1999; Dam and Scholtens, 2012; Fernandez Sanchez *et al*., 2011; Ibrahim and Angelidis, 1995; Setò-Pamies, 2015), but in these studies the environment represents only a single dimension of the complex nature of CSR, leading the researchers to narrow the attention on environmental issues.

As regards the relation between boards and firms' environmental performance, the debate is still open, with most of the studies focused on Anglo-Saxon countries, in particular U.S. (de Villiers *et al*., 2011; Kock *et al*., 2012; Ortiz-de-Mandojana and Aragon-Correa, 2015; Cowden *et al*., 2015; Post *et al*., 2015).

Several studies are concentrated on the board's ability to create ties and relations with the external environment through board interlocks. The influence of director interlocks on the value generated by the social capital of the board may, in fact, improve corporate environmental performance (Ortiz-de-Mandojana and Aragon-Correa, 2015). Ortiz-de-Mandojana *et al.* (2012), in particular, reported that board interlocks may enhance or inhibit the adoption of PES: director interlocks with firms providing knowledge-intensive business services are beneficial for the adoption of PES, while those with fossil fuel suppliers and financial institutions are found to be negatively related. Moreover, such mechanisms seem positively connected also with the environmental performance, especially when a firm is linked to a larger parent company and in case of low and high levels of interlock diversity (Ortiz-de-Mandojana and Aragon-Correa, 2015). Less attention has, instead, been given to the analysis of corporate board structure and composition. Kassinis and Vafeas (2006) found that board size and the presence of executive members on the board are positively related to environmental litigation, while Kock *et al.* (2012) reported a positive association between the environmental performance of a firm and the presence of pro-stakeholder directors in the board. A direct relationship was also found in case of presence of independent directors, legal experts and board size (de Villiers *et al*., 2011). Post *et al.* (2015) reinforced the previous results finding a positive relation between the representation of women and independent directors on a firm's board and sustainability-themed alliances. Such alliances, in turn, positively contribute to corporate environmental performance. In the same direction, the analysis of Rao *et al.* (2012) found a significant positive relationship between the extent of environmental reporting and the proportions of independent and female directors on a board.

Our aim is, therefore, to extend previous literature, trying to understand if board size and different types of director could influence the orientation of a firm towards environmental issues and testing our hypotheses on a sample of Spanish and Italian firms, with ownership structures which are more concentrated than Anglo-Saxon firms. Thus, employing the hypotheses used by previous studies on the topic, our paper wants to provide a greater view on the effectiveness of board of directors on sustainability.

As Hillman and Dalziel (2003) and de Villiers *et al.* (2011) pointed out, the resource dependence theory and the agency theory provide the general theoretical frameworks for analysing how the size and the composition of the board can affect firms' environmental performance. Boards, in fact, have usually two functions, namely: providing information and other resources (asserted by the resource dependence theorists) and monitoring the management and aligning its interests to those of shareholders (followed by the agency theorists). Integrating the two perspectives will contribute to a complete understanding of how they may affect firms' proactive environmental strategies and "can help overcome a current myopia within the two streams of research" (Hillman and Dalziel, 2003, p.383).

The resource dependence theory (Pfeffer, 1972; Pfeffer and Salancik, 1978) views organisations as operating in an open system and needing to exchange and acquire certain resources

to survive, creating a dependency between firms and external environment. In this framework, boards are seen positively, as they may provide valuable expertise and capabilities, influence and aid in strategy formulation and help in connecting the firm with stakeholders (Ortiz-de-Mandojana and Aragon-Correa, 2015). In this way, larger boards, with a variety of directors, may expand existing board member networks and contacts and help firms to better understand and respond to their stakeholders (Boyd, 1990), also in case of natural environmental issues. Moreover, boards with a high number of members are more likely to include experts on specific topics such as environmental problems (de Villiers *et al*., 2011): such directors could provide the expertise to manage environmental efforts and take advantage of environmental opportunities that may arise.

Therefore, following the results of de Villiers *et al.* (2011), that showed how environmental performance tends to be higher in firms with larger boards, we hypothesize that:

H1: Larger boards are positively related with firms' environmental performance.

Pfeffer and Salancik (1978) asserted that boards may provide four benefits: advice and counselling, legitimacy, channels of communication with the external organizations and preferential access to outside elements. To maximize the performance of these functions, Hillman *et al.* (2000) suggested that boards should include a diversity of directors.

Hence, within the resource dependence theory, diversity in general, and differences in gender in particular, may very likely enrich the resources and capabilities of a board, providing unique information, experience and knowledge to management for better decision making. That's why the issue of the board's diversity, in particular, gender diversity, has become increasingly important, and the pressure to enhance the presence of female directors on the board seems to constitute a global issue, that many countries have started to solve adopting either a coercive, enabling or *laissez-faire* approach (Labelle *et al*., 2015).

Female directors are likely to have different educational and professional backgrounds from those of male directors, providing broader perspectives and encouraging open discussions which may enhance the board to more effectively perform its tasks, especially related to CSR and stakeholders (Bear *et al*., 2010). In this sense, women directors may help consider the implications of strategic decisions for a wider range of stakeholders (Byron and Post, 2016). Women on boards tend to be more democratic and participative in decision making processes, leading the board to achieve better decisions (Bear *et al*., 2010).

A large body of research suggests that women's values are more closely aligned than men's with corporate social responsibility (Zhang *et al.*, 2013; Setò-Pamies, 2015) and, as corporate directors, they tend to possess certain psychological characteristics that may make them more sensitive to different stakeholders' claims (Rao and Tilt, 2016), especially in the case of environmental CSR. According to Ibrahim and Angelidis (1994), female directors exhibit greater responsibilities: in their analysis they found that women are more philanthropically driven and less concerned with economic performance. Environmental, ethical, and caring values are likely to affect the decision-making process when women assume the power positions usually held by men (Post *et al*., 2015). Further, women are more likely to have a deeper knowledge of soft managerial issues (Rao and Tilt, 2016), as they usually hold positions in soft areas, such as human resources, marketing and CSR (Zelechowski and Bilimoria, 2006).

Following the studies on CSR in general, some researchers found that women have a more protective attitude towards the environment in particular (Wehrmeyer and McNeil, 2000) and are more likely than males to be ecologically conscious (Park *et al*., 2012); subsequently, corporations with a higher proportion of women on the board showed better environmental performance (Walls *et al*., 2012; Post *et al*., 2015; Kassinis *et al*., 2016; Li *et al*., 2017) and higher levels and quality of environmental reporting (Rao *et al*., 2012; Liao *et al*., 2015; Ben-Amar *et al*., 2015).

Post *et al.* (2011), addressing different boards diversity characteristics, reported that firms with boards composed of three or more female directors received higher KLD environmental strengths scores, reinforcing the research based on the critical mass theory (Konrad *et al*., 2008; Torchia *et al*. 2011). Minorities in the boards are easily marginalized and considered as tokens, if their presence in

larger groups is modest, but, as the size of the minority groups increases, they are able to gain trust, influence and challenge majorities' decisions (Bear *et al*., 2010; Torchia *et al*., 2011). This effect could be more relevant in firms with controlling shareholders with a high influence on board selection and composition. A positive relation between a group of at least three women directors appointed on a board and environmental disclosure was also reported by Ben-Amar *et al.* (2015).

Therefore, following the extant literature in this area, we hypothesize that:

H2: The presence of a critical mass of women directors is positively related to firms' environmental performance.

Following the agency theory framework, the board of directors is an internal control mechanism used to ensure that management behaviour is consistent with the owners' interests (Jensen and Meckling, 1976; Shleifer and Vishny, 1997). Such instrument should not only fulfil its responsibility in monitoring agents and protecting shareholders, but also, more importantly, in managing stakeholders. Board's directors may, in fact, exert pressures over managers in order to have strategies and actions that satisfy shareholders (and stakeholders) interests. Therefore, they should be able to influence executive managers to adopt environmental strategies that could help firms to obtain a sustainable competitive advantage. An effective control depends, in particular, on whether the directors are non executive and independent (professional managers with expertise in monitoring activities, who have incentives to exercise control in order to maintain their reputational capital), thus able to indeed act on the shareholders' behalf. Independent directors should be, in fact, primarily interested in aligning with stakeholder interests, being more responsive than insiders to stakeholder pressures, in order to maintain and enhance their reputation and obtain, in this way, new directorships.

de Villiers *et al.* (2011) and Post *et al.* (2015) found, in fact, a positive relation between the presence of independent directors and firms' environmental performance, following other studies focused on corporate social responsibility (Ibrahim and Angelidis, 1995).

Johnson and Greening (1999), instead, showed that outside director representation was positively related to corporate social performance, while Rao *et al.* (2012) showed that independent directors' representation is positively related to corporate environmental reporting.

The effects of such types of directors could be visible also in firms with controlling shareholders, where large shareholders typically have control in excess of their cash flow rights (Claessens *et al*., 2000; Faccio and Lang, 2002) and in these situations they might try to expropriate wealth at the expense of minority shareholders, causing what it is called a secondary agency problem (Young *et al*., 2008).

Thus, following the mainstream literature, we hypothesize that:

H3: A higher percentage of non executive directors in the board is positively related with firms' environmental performance.

H4: A higher percentage of independent directors in the board is positively related with firms' environmental performance.

3. Data and methodology

Data on environmental performance, for selected companies in 2015, was obtained from the CSRHub database that represents the world's largest CSR database providing social, environmental, community, and governance ratings on around 16,891 companies from 200 industries in 133 countries.

While not as widely used in management as the KLD database, the CSRHub has recently been used in the context of social responsibility both in academic (Cruz *et al*., 2014) and practitioner environments (Gidwani, 2013).

Combining data from five of the leading socially responsible investment analysis firms and over 120 influential nongovernmental organizations, CSRHub database is relatively objective and is not based solely on self-reported measures. CSRHub provides data on a number of CSR performance dimensions including: environment, customer, community, and governance. To calculate each category ranking, CSRHub takes information from its data sources and transforms it into a 0 to 100 scale. The higher the rating the better, with 100 as the best rating.

In particular, in the present research we used the *Environment* category[1] of CSRHub, which focuses on data on resource management, energy and climate change, and environmental policy and reporting as a proxy of environmental performance.

As regards, instead, the independent variables related to firms' board structure and composition, we collected the data from the companies' annual reports and corporate governance reports 2014, together with Thomson Reuters Datastream Database.

In particular, we considered the board size (SIZE), as the total number of directors appointed in the board, and the percentage non-executive directors (NON-EX) and independent directors (IND) present in the board. Gender diversity, in particular women directors' critical mass, is instead measured as a dummy variable assuming value 1 if boards had at least three women directors, 0 otherwise.

To test the hypotheses we also selected a set of control variables, already identified and used in extant literature as relevant drivers for firms' environmental performance. These are: the natural log of company's total annual revenues (REV), as a proxy for size (Gonzales-Benito and Gonzales-Benito, 2006) and company's return on equity (ROE). Some differences in environmental performance may arise from these factors: we therefore controlled in order to isolate the unique contribute of board structure and composition.

The definition and measurement of all the variables used in the analysis are summarized in Table 1.

Tab. 1: Definition and measurement of variables

Group	Code	Variable	Measurement	Predicted sign
Dependent Variable				
	CSRHubENV	Environmental Performance	CSRHUB 2015	
Independent Variables				
	SIZE	Board Size	Number of board members	+
	NON-EX	Non Executive directors	% of non-executive directors in the board	+
	IND	Independent directors	% of independent directors in the board	+
	CRITICAL MASS	Gender diversity	1= if the number of woman on board >3; 0= otherwise	+
Control Variables				
	REV	Revenues in 2015	Natural logarithm of the revenues in 2015 ($)	+
	ROE	Return on Equity	Company's Return on Equity in 2015	+

Source: our elaboration

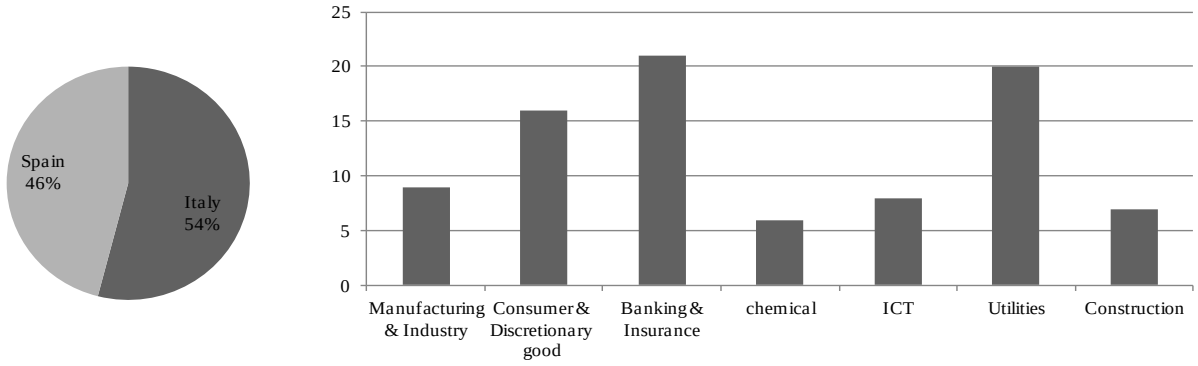
[1] As stated on the csrhub.com website: "The Environment category data covers a company's interactions with the environment at large, including use of natural resources, and a company's impact on the Earth's ecosystems. The category evaluates corporate environmental performance, compliance with environmental regulations, mitigation of environmental footprint, leadership in addressing climate change through appropriate policies and strategies, energy-efficient operations, and the development of renewable energy and other alternative environmental technologies, disclosure of sources of environmental risk and liability and actions to minimize exposure to future risk, implementation of natural resource conservation and efficiency programs, pollution prevention programs, demonstration of a strategy toward sustainable development, integration of environmental sustainability and responsiveness with management and the board, and programs to measure and engage stakeholders for environmental improvement."

The sample used in the study consists of the Italian and Spanish companies that were included in the CSRHub in 2015. We decided to focus the attention on the companies based in these countries because they belong to non Anglo-Saxon corporate governance systems, with generally one-tier systems and comparable ownership and board structures. It is in fact interesting to understand how the relationship between boards and corporate environmental performance plays out in firms with controlling shareholders.

After merging CSRHub data with companies' board information availability, we had a sample of 87 firms, 54% of them based in Italy.

The majority of these companies operate in banking, financial and utility industries, while only 21 companies operate in ICT, construction and chemical industries (Figure 1).

Fig. 1: Composition of the sample



4. Results and Discussion

In order to test our hypotheses, we explain variations in firms' environmental performance using two regression models, conducted with SPSS 23, where board structure and composition variables constitute the primary explanatory variables. This methodology has been used to predict the relationships between several variables and different metrics of environmental engagement or performance, so it appears to be an appropriate method of analysis.

Descriptive statistics and Pearson's correlation coefficients of the variables used in our analysis are presented in Table 2.

Tab. 2: Descriptive Statistics and Pearson Correlation

	Mean	Std Dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) CSRHubENV	61.58	10.34	1.00						
(2) SIZE	12.61	3.51	-0.04	1.00					
(3) NON-EX	0.80	0.11	.302**	0.17	1.00				
(4) IND	0.48	0.16	.211*	-0.03	.228*	1.00			
(5) CRIT MASS	0.18	0.39	-0.03	.436**	.241*	0.20	1.00		
(6) REV	8.39	1.56	.344**	0.11	.299**	0.17	0.11	1.00	
(7) ROE	30.36	244.60	0.08	-0.10	0.09	0.09	0.19	-0.06	1.00
**. Significant at 0.01 (2-tails); *. Significant at 0.05 (2-tails) (Pearson's index)									

Source: our elaboration

The average value of the CSRHubENV is 61.58, with a standard deviation of around 10.34. As regards the independent variables, the average size of the board of directors is around 12 members.

Regarding board composition, the presence of non-executive directors is larger than the independent ones: the average percentage of the first typology in the board is around 80%, while independent directors cover on average 48% of the total board. Conversely, the presence of women

in the board is quite low: only 18% of the sample companies have more than 3 women on board and, as expected, it often occurs in larger board.

The Pearson's correlation reveals a significant positive correlation between the CSRHub indicator (CSRHubENV) and the percentage of non-executive directors (0.3026; p-value <0.01) and independent directors (0.211 ; p-value <0.05). The CSRHubENV is also positively correlated with revenues (0.344, p-value <0.01).

For investigating the relationship between board structure and composition and firms' environmental performance, we developed two OLS regression models (Table 3): the first model considers only the effect of board characteristics on CSRHub, while in the second model the control variables are inserted.

Tab. 3: Regression Results

		MODEL	
		1	**2**
CONSTANT	B	37.395**	27.900**
	Std. Error	9.547	10.053
SIZE	B	-0.099	-0.053
	Std. Error	0.386	0.384
NON-EX	B	25.690*	19.322*
	Std. Error	10.875	10.888
IND	B	10.940	8.584
	Std. Error	7.146	7.020
CRITICAL MASS	B	-2.522	-3.334
	Std. Error	3.268	3.282
REV	B		1.805*
	Std. Error		0.745
ROE	B		0.004
	Std. Error		0.005
R-SQUARED		0.117	0.186
F		2.525	2.815

**p < .01; *p< .05:

Source: our elaboration

Regression results for Model 1 show that board size (SIZE) has a non significant negative impact on CSRHubENV, thus Hypothesis 1 cannot be supported by the analysis. The result is therefore not consistent with the resource dependence theory and with the provisions of de Villiers *et al.* (2011). Large boards are likely to possess the bundle of competencies and expertise required to enhance corporate decisions, but if they are too big they probably loose efficiency and efficacy.

We also failed to find any relationship between firms' environmental performance and the critical mass of women on the board (CRITICAL MASS), contrary to the bulk of prior research on the relationship between women directors and CSR (Walls *et al*., 2012; Post *et al.*, 2015; Kassinis *et al*., 2016; Li *et al*., 2017). The relationship is also not correctly signed; as this result may sound quite unconventional in comparison to previous literature, future investigations will be required. Maybe, in firms with majority shareholders, the influence of blockholders on board's decisions is prevailing; this is consistent with the idea that majority shareholders may use board directors (also women directors), to help advance their agenda, at the expense of minority shareholders.

On the contrary, consistent with Hypothesis 3 and the mainstream literature, we found a positive relation between CSRHubENV and the percentage of non-executive directors in the board (NON-EX), while the association with the percentage of independent (Hypothesis 4) in the board is not significant, even if correctly signed. The result follows the agency theory and provides evidence of the monitoring role of the board, as already reported by Johnson and Greening (1999). As the number of non executive directors on a board increases, the ability of directors to control

management's activities towards environmental issues tends to be higher; such directors are in fact able to fully exploit their monitoring function, even in firms with controlling shareholders.

Considering control variables (model 2), the regression fit increased (R-Squared= 0.186). Among the drivers, only firm's revenues, considered as a proxy of a company's size (REV = 1.805) and the percentage of Non executive directors (NON-EX= 19.322) positively affect environmental performance, confirming previous results. Environmental performance, in particular, seems to become an issue in larger firms, which have a greater set of stakeholders.

At the end of our analysis, some robustness checks have been carried out in order to validate the empirical results and to disclose their consistency. Firstly, we controlled for the standard and studentized residuals of regression: they fell inside the acceptable values, making us ascertain that outliers do not invalidate our statistical results. We also controlled for multicollinearity bias using variance inflation factors (VIFs) after each regression, aiming at avoiding the risk of suppressor effects in multiple regression analyses (Hair *et al*., 1998). Since the values were within acceptable limits, we ascertained that the results were free from multicollinearity bias.

5. Conclusion

The present paper addresses the nature and intensity of the relations existing between board structure and composition and firms' environmental performance.

In this regard, founding on agency theory and resource dependence theory assumptions, the manuscript investigates the role of board size and board composition (gender critical mass, non executive and independent directors) in affecting the environmental performance of a sample of Spanish and Italian firms rated by CSRHub in 2015.

Indeed, the results of the three OLS regression models provide nuanced evidence that boards do affect firms' environmental performance. Our main findings suggest in fact a positive relationship between the presence of non executive directors in the board and companies' environmental performance; while the critical mass of women directors and the percentage of independent directors, together with board size, do not seem to be related with firms' green performance. In countries where controlling shareholders prevail, large owners may use their control to appoint managers and directors that are aligned with them, making decisions in their favour and, as supervisors, not questioning their decisions in order to follow their goals. Board's independency becomes in this way an important driver for following strategies that satisfy stakeholders' interests.

Our study presents some limitations that may be ironed out in future studies. The first limitation is related to the choice of a sample with a small number of observations, related to the presence of the firms in the CSRHub database. Moreover, a longitudinal analysis will probably provide more confidence in the findings than in our cross-sectional analysis, answering a call by recent CSR scholars for more longitudinal research in this area (Rao and Tilt, 2016). Finally, female representation on boards is only one instance of board diversity: the interplay between female representation and other types of diversity such as age, for example, should also be of interest. Despite such limitations, however, this contribution provides some valuable research implications, useful for researchers and academics.

The study reveals several theoretical implications, both in corporate governance and ONE streams of research.

As regards corporate governance literature, our study provides nuanced evidence that board composition influences the direction of company's strategic path, in firms with controlling shareholders. Only outside directors seem to have a positive influence on corporate environmental performance, highlighting the crucial role of board independency in countries where such type of ownership structure prevails.

At the same time, our results suggest that in Latin countries, such as Italy and Spain, the female representation on boards does not seem to be associated to higher environmental performance: in

both countries the number of women on board is probably too low and they rarely occupy strategic positions (such as CEO or Chairman).

ONE literature may also be enriched by the study, as we identified non-executive directors as an important internal driver of firms' environmental performance, advancing knowledge in the understanding of its antecedents.

Finally, also managers and public authorities could benefit from this knowledge, as the results allow to identify the characteristics of the board that may foster and enforce firms' environmental performance. Companies, in fact, may play a significant role in the reduction of man activities' impact on natural environment and in the promotion of a more ecologically sustainable world.

Moreover, socially responsible funds could find useful, for their portfolio allocation strategy, to know if there are types of directors more oriented to green issue. Global institutional investors are, in fact, increasingly using environmental management and disclosure as a proxy for good management and long term horizons.

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