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Boards Contributing to the Protection of the Environment: Looking at the Dynamics between In-groups and Out-groups

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Abstract

The inconclusiveness of previous research on the relationship between women on boards and pro-environmental initiatives calls for a reassessment of this association. Following the social identity theory, this study examines the influence of women on boards on the corporate decisions related to the emissions reduction, by distinguishing between women as out-group members and men as in-group members. Using an econometric model that employs a sample of FTSE-MIB companies over the years 2009-2018, the findings show that the ability of the board to use the women's contribution changes according to the dynamics between out-group and in-group. Specifically, when the board has only one women director, the in-group members (men) fail to consider in their decisions the woman's perspectives and her sensitivity toward the environmental consequences of the business activities. These dynamics influence the board's attention towards the protection of the environment. When the out-group reaches a considerable size (three women) the dynamics between in-group and out-group change and the board becomes more engaged in environmental issues. The results also find that there is a turning point, after which the board engagement towards a better protection of the environment does not increase with the number of women directors, showing an inverted U-shaped relationship.

Keywords: Corporate Governance, Environmental Protection, Board Dynamics, Women on Boards.

1. INTRODUCTION

Pollution is considered as of one of the main negative consequences associated to the business activities. Examples of the impacts that an organization might have on the environment are pollutant emissions coming from the production processes; water and energy consumption; waste produced after the end of the product's life etc. It is argued that one of the main challenges that the society today has to manage is how firms respond to the environmental issues and how they deliberately develop environmentally friendly strategies, such as the introduction of green innovation practices or the adoption of environmental technologies to reduce the impact of the business activity on the environment [1]; [2].

In this regard, the board of directors plays a relevant role. In performing its strategic tasks, it takes important decisions related to the environmental strategies and the practices that the company should take [3]; [4]. However, putting in place pro-environmental initiatives aimed at the protection of the environment such as the reduction of pollutant emissions is not trivial: it requires investments that are costly and that might not be in line with the maximization of shareholders' wealth.

Board gender diversity is considered a key variable in directing the board towards sustainable and environmental friendly actions [5]; [6]; [7]. Women have leadership style, attitude, values that are relevant to make the boards more engaged in pro-environmental activities and sustainable development. They can improve the board decision-making, bringing multiple alternatives [8] and enhance ethical organization behaviour [9].

Prior empirical research about the relationship between women on boards and pro-environmental initiatives reports inconclusive results [10]; [11]; [12]; [6]; [13]; [14]; [15]; [16]. I revisit the association between women on boards and pro-environmental initiatives such as the reduction of pollutant emissions in the light of the social identity theory. I argue that a possible reason that can explain the mixed results is related to the contribution that women bring to the boards. This contribution depends on the women's self-confidence to express their opinion. According to the social identity theory, the influence of women on the board activities varies according to how similar people consider themselves to other group members. Specifically, individuals with similar characteristic such as gender, form sub- groups within the board. Conventionally, men, who numerically dominate the board, create an in-group, whereas the minority (women) creates an out-group. People that belong to the in-group tend to do not trust and do not accept alternative views coming from the out-group members [17]. The dynamics between the in-group and the out-group explain how the board uses the values and the perspectives coming from the women sitting in the board.

Drawing on this theory, I empirically test the effect of women on boards on the environmental protection proxied as the reduction of pollutant emissions. In order to measure the contribution of women that results from the dynamics between in-group and out-group I consider three different situations: (1) the mere presence of women on boards, (2), reaching three women on boards (the so called critical mass), and (3) going beyond the turning point of three women on the boards. Using a sample of FTSE-MIB companies over the years 2009-2018 and employing an econometric model, the results show that having a solo women director is not enough to push the board toward a greater consideration of the environmental impact of the business activities. Boards with three women directors are more likely to exploit the benefits coming from the board gender diversity. Going beyond this threshold of three women and checking for the nonlinear U- shaped relationship between women on boards and the reduction of pollutant emissions, the findings also document that the board does not strengthen the engagement towards a better protection of the environment. Considering the ongoing debate on the women on boards and environmental issues, to my best knowledge this is the first study looking at the contribution of women directors for the environmental decisions such as the emissions reduction considering the dynamics between in-group and out-group. This study sheds light on the inconsistent results in the literature about women on boards and corporate sustainability. By showing the different effect of women on boards according to the size of the out-group they form, I move forward the discussion about gender diversity and environmental performance. In addition, I give insights about the contribution of women on boards for the reduction of pollutant emissions, showing when and how their impact on the board is visible and positive.

In the remainder of this paper, I review the literature and I develop the hypotheses. Then, I present the sample and describe the empirical results. In the last section, I discuss the implications of the research and present the conclusions.

2. LITERARURE REVIEW

2.1 Women on Boards and the Environmental Protection

Corporate law around the world states that the decision-making power of the company is vested in the shareholders' meetings and in the board of directors. Despite some differences across countries, the shareholders' meeting traditionally appoints the board which is responsible for managing the company and implementing projects aimed at the achievement of the corporate purpose [51]. Specifically, the board of directors performs a set of tasks that includes the definition of the strategic context, the monitoring of the company performance and the management of the relationship between the company and its stakeholders [45]. Discussing the environmental impact of the business activities and its consequences for shareholders and stakeholders is part of the board agenda. Although the environmental consequences of the business activities vary across industries, this kind of discussions is applicable across all sectors.

Many studies have pointed out that the board composition is a key driver that influences board decisions and the decision-making process. In particular, board diversity can lead to better decisions, since it increases the pool of information and knowledge that the board can use. In principle, diverse board would be less likely to incur in the phenomenon of group-think which leads the board members to agree with the main common viewpoint. In this vein, women directors are considered to be particular relevant to avoid group-think and induce the board to make decisions aimed at a better protection of the environment and a sustainable corporate development. There are three main reasons that explain that statement. Firstly, women are more sensitive to the stakeholders' needs than men [19]; [20]; [4]. They are more likely to go beyond the monetary results, looking also at the non-financial results. Secondly, women are more long-term oriented than men and they are more likely to acknowledge outcomes such as the protection of the environment [25]; [20]; [26]. This attitude might be the results of their job role, since they are more likely to serve positions that deal with the environmental protection and sustainable development [19]; [27]. Thirdly, women have a leadership style that is more prone towards open debates and participative decision-making [21]; [22]. [23] document that women are more committed and involved, which help them to create a good atmosphere in the board. This approach contributes to develop lively discussions and a more comprehensive consideration of different perspectives [24]. Taken together, women on boards are likely to provide firms with values and points of view to get the board more engaged in pro-environmental initiatives such as carbon strategies and innovations; reduction of pollutant emissions and compliance with sustainability-related regulations.

Previous studies focusing on the effect of women directors on environmental issues report mixed results. Some research does not find significant relationship between women directors and environmental issues. [16] show that a greater number of women on boards does not necessarily lead to more socially and environmental responsible corporate behavior. Similarly, [15] report no significant difference between women and men on boards regarding the adoption of corporate activities related to the environmental quality. Other studies instead document the role of women on boards as an important driver to increase the company's attention towards the environmental consequences of its business activities [7]; [6]. They show that women are associated to better environmental strategies and sustainable practices [11]; [18].

One of the possible reasons that explain these inconclusive results is related to the definition of environmental performance. Previous studies consider the environmental agenda as a dimension of the complex sustainability engagement construct, because it might be difficult to distinguish between social and environmental performance or within the different environmental dimensions [28]; [6]; [29]. Isolating the unique impact on environmental performance and on its single components is needed to better understand the effect of women on environmental protection. In this vein, there are calls asking for more research [30]; [31]; [32]; [20]. Papers investigating the effect of women on boards on a specific environmental issue are scant. [19], [33] and [34] analyze the impact of gender diversity on the voluntary disclosure of greenhouse gas (GHG) emissions in the form of a carbon disclosure project report. They document a positive and significant association between the percentage of women on boards and the propensity to disclose GHG information. Looking at the carbon emission performance, [24] and [35] document a positive impact of the percentage of women on boards on carbon reduction initiatives and on biodiversity reduction. In a recent study, [5] show that women directors are more likely to formulate corporate policies aimed at promoting cleaner production and reducing the negative consequences for the environment. However, there are other studies that show opposite results. Using an international sample of the largest companies, [36] find that board gender diversity, measured as the percentage of women on boards, does not influence carbon emission disclosure. Their results suggest that the effect of women directors on emissions reductions might be influenced by other factors. The contradicting empirical results calls for a deeper investigation of the effect of women on boards for environmental protection.

2.2 Measuring the Contribution of Women for the Protection of the Environment

Another possible reason of the inconclusive evidence of the effects of women directors on environmental activities might be the inadequate measure of women on boards. This paper builds on the social identity theory [37] which argues that individuals define themselves according to their membership in certain groups. This self-identification, which is based on salient demographic characteristics such as gender, segments the board between in-groups and out-groups. As a minority, women on boards are categorized as out-group. This categorization changes the behavior of the people creating a process of board depersonalization because "people are not viewed as unique and multifaceted individuals but as matches relevant to the in-group and out-group prototype" ([22], pag. 93). This depersonalization process influences people's perceptions, attitudes and esteem about one another. In-group members share trust and cohesiveness. They pay great attention on the opinion and perspectives coming from the in-group members. They tend instead to devaluate opinion coming from out-group members [46]. Out-group members are more likely to be perceived as less competent [38], and hence their perspectives are considered not important and less credible. Previous studies document that out-group members are blamed for negative company's results and are less likely to be appreciated for the positive performance [39]. In this situation, out-group members may choose to stay silent and do not challenge the main viewpoints during the decision-making. [52] show that an individual is more likely to conform to the in-group when he/she faces unanimous opinion. However, if he/she eventually speaks-up, it will be very likely that his/her opinion will not be considered. Consequently, the board of directors will not exploit the benefit coming from the board gender diversity, failing to accept the woman's pro-environmental perspectives. As a consequence, this attitude removes the advantages deriving from gender diversity [15]. Following the above reasoning, I hypothesize the following:

Hypothesis 1. When there is a solo women director, the board does not exploit her environmental protection attitude, failing to put in place initiatives to reduce pollutant emissions.

Empirical results about women on boards suggest that it exists a dynamics between in-group and out-group that might influence the board outcomes [40]; [7]; [41]. [42] study the behavioral effect of different numerical representation of women on boards. They show that when the number of women on boards reach the threshold of three, women creates a "normalization": gender is not considered a barrier to communication anymore and women directors are more likely to express their opinion and raise questions. Specifically, interviewing fifty women directors, they show that boards with at least three women change their dynamics and their style, increasing the likelihood that the women's opinion is heard. Similarly, [41] document that women directors' contribution to the level of firm innovation becomes evident when the board reaches the number of at least three women directors. Drawing on these previous studies, I argue that when the out-group has three women, the out-group members are able to gain trust, and as consequence they are more likely to influence and challenge the opinion of in-group members. This means that in this situation the different knowledge, experiences and values that women bring to the boards are more likely to be used by the in-group members in an effort to satisfy stakeholders' needs [43]; [30]. Based on that, I posit the following hypothesis:

Hypothesis 2. When women on boards reach the threshold of three, the board uses the women's contribution, becoming more engaged towards environmental protection which results in a reduction of the pollutant emissions.

[42] analyze the effect of having three women directors or more on the board outcomes. Their study suggests that the incremental influence of adding a new women on board might result in an higher commitment toward the protection of the environment. In theory, a more equal balance between in-group and out-group would relax the conflict among them. It would enhance the perceptions of male directors about women who would be considered equally colleagues. In order to test this effect, I go beyond the turning point of three women by including a quadratic term of the percentage of women directors on the board. Based on these arguments, I hypothesize as follows:

Hypothesis 3. After reaching the minimum number of three women, board continues to be positive influenced by women directors, which results in the enhancement of pro- environmental initiatives such as the reduction of pollutant emissions.

3. METHODOLOGY

3.1 Sample and Variables

The sample consists in all FTSE-MIB companies (40 listed companies) over the years 2009 - 2018. These companies, which are selected by Italian Stock Exchange, are the largest and leading companies across all industries [54]. The total number of companies listed in Italy are 228, and the FTSE-MIB represents approximately 80% of the domestic market capitalization. The choice of the country is crucial for this study. Italy is one of the countries that introduced gender quota law in 2012. This regulation mandates listed public companies to increase the number of women on boards, by setting in the second board term a minimum threshold of one-third of women that the board should achieve. The Italian gender quota law has created a natural experiment where it is possible to study board gender diversity, overcoming the potential endogeneity problems. Data about pollutant emissions are collected by Refinitiv-Eikon database. Using publicly-reported data, this database measures a company's relative environmental performance, in terms of emissions, environmental product innovation, the use of green technologies etc. The information is transformed in scores that measure how well the company performs in terms of environmental protection. In this analysis, I focus on the protection of the environment proxied as the pollutant emissions reduction score. This measure indicates the ability of the company to reduce the pollutant emissions that come from its business activities. The pollutant emissions include carbon and other gas emissions, water discharged and waste produced. This is the dependent variable. A high value indicates excellent performance in terms of environmental protection, that results in a minimization of the environmental impact.

In order to measure the influence of women on boards according to the interaction between in-group and out-group, a set of independent variables has been used. The first independent variable is called "presence of women" and it is a dummy variable that equals to 1 if there is one women sitting on the board of directors and zero otherwise. This measure captures the situation when women is seen as a minority that creates an out-group within the board. Following the social identity theory, her opinion and perspectives are not considered by the in-group members since she is not seen as a valuable resource. The second variable is called "3 women directors". This is a dummy variable that assumes a value of 1 if the board has three women, and 0 otherwise [30]; [41]. It captures the situation when the out-group members gain trust and their opinion and values are more likely to be exploited by the in-group members. The third variable is called "women squared", that is the quadratic term of the percentage of women on boards. This variable helps to determine the threshold level after which women on the board exert an effect on environmental performance with an opposite sign [7]. I include other control variables: the variable called "%IND" that measures the percentage of independent directors on the board; the variable "CEOChairman" which is a dummy variable that assumes 1 if the CEO is also the Chairman of the board and zero otherwise; the variable "CSR_comm" is a dummy equal to 1 if the board has established also a corporate social responsibility committee (CSR) and zero otherwise; "B_SIZE" and "F_size" that are respectively the board size measured as the total number of directors in the board and the firm size measured as the logarithmic transformation of total assets. All variables are defined in Table 1.

Variable	Measurement
Environmental protection	This score measures the level of pollutant emissions created during the production and operational processes. An higher values indicates a better environmental protection
Presence of women	It is a dummy variable that assumes the value 1 if a board has at 1 woman; 0 otherwise.
% women	The percentage of women on boards reported by the company.
3 women directors	It is a dummy variable that assumes the value 1 if a board has 3 women; 0 otherwise.
Women directors squared	It is a quadratic transformation of the percentage of women on boards.
B_size	The number of members on the board.
CEO Chairman	It is a dummy equal to 1 if 1 if the CEO is also Chairman, 0 otherwise.
CSR_comm	It is a dummy equal to 1 if 1 if the board has established a corporate social responsibility committee, 0 otherwise.
% Indep	The percentage of independent directors reported by the company.
F_size	The logarithmic transformation of total assets at the end of the fiscal year.

TABLE 1: Description of the variables.

3.2 Data Analysis

The analysis tests the added value of women on boards for the environmental protection by regressing the dependent variable Y (the environmental protection proxied as the reduction of pollutant emissions) on a vector of the independent variables X (that includes: (1) the presence of women; (2) three women directors and (3) women directors squared) and a set of control variables Z (that includes: B_size; CEO Chairman, % Indep and F-size). The model tested is shown below:

$$Y_{j,t} = b_0 + b_1 X_{j,t} + b_2 Z_{j,t} + \varepsilon_{j,t}$$

where b is the constant, b1 and b2 are the coefficients, and ε is the residual term. Indices j and t define the firm and time dimensions, respectively. See Table 1 for detailed definitions of the variables. I test the hypotheses using panel data in order to control for omitted and unobserved variable bias. I use fixed effect method of estimation. This choice comes from the results of the tests run on all the specifications presented, which were insignificant for the Hausman tests and significant for the Breusch. Stata 15 was used to run the analysis.

Table 2 presents the descriptive statistics of the variables used in this study. The variable “Environmental protection”, which potentially ranges between 0 and 100%, shows a mean value of 61.33%. The average percentage of women on boards is 18.05%, ranging from zero to 53.33%. This mean value is the pooled value of the sample and it does not consider the change among the years. The average board size is 12.57 and the average percentage of independent directors is 55.87%. The variables “presence of women”, “three women directors”, “CSR_comm” and “CEOChairman” are dummy variables. The correlation matrix (Appendix 1) demonstrates correlations among variables, showing that the variable “environmental protection” is significantly and positively associated with the variables related to women on boards (the presence of women, the percentage of women; and having three women on the boards), with the presence of corporate social responsibility committee, with the presence of independent directors and with the firm size. The coefficients in the correlation matrix are less than 0.5, showing that multicollinearity is not an issue here.

Variable	Obs	Mean	Std. Dev.	Min	Max
Environmental protection	309	61.33	36.34	0.00	99.83
Presence of women	302	0.02	0.15	0.00	1.00
% women	302	18.08	14.06	0.00	53.33
three women directors	302	0.40	0.49	0.00	1.00
CSR_Comm	309	0.68	0.47	0.00	1.00
% Indep	293	55.87	22.27	0.00	100
B_size	302	12.78	4.37	7.00	25.00
CEOChairman	309	0.22	0.41	0.00	1.00
F_size	379	16.80	1.90	11.06	20.75

TABLE 2: Descriptive statistics.

4. RESULTS

Table 3 reports the empirical results of the analysis. Boards that have only one women experience a low attitude towards the environmental protection (Model 1). The variable "presence of women" is negative and statistically significant. This shows that when women are just a mere presence, the boards do not exploit the woman's sensitivity towards the environmental consequences of the business activities. This is because men, belonging to the in-group, do not consider the solo women as a valuable asset. In this "old boys club", the main view points coming from the in-group are less likely to be challenged. The solo women might follow the main idea of the in-group and even adopt male roles in order to feel accepted and conform with the in-group [45]. These results show that the potential contribution coming from the board gender diversity might be undermined by in-group-members.

Following [42] who suggest that women may influence the board when they reach the threshold of three, I test the model considering the dummy "three women directors" which identifies boards with three women (Model 2). Findings show that having three women on boards result in an enhancement of the protection of the environment. This means that when women are three, the board is engaged in the protection of the environment and makes decisions aimed at reducing the pollutant emissions coming from its business activities. At this threshold, the dynamics between in-group and out-group change. The out-group gains trust and its contribution is more likely to be employed in the board discussions. Because of the sensibility of women towards a better environmental protection, the board will increase its engagement towards environmental issues which translates in a reduction of pollutant emissions created by the production processes. At this threshold, the out-group members can therefore bring advice and resources that can influence board decisions in adopting pro-environmental initiatives and programs to mitigate global environmental challenges.

In Model 3 I include a quadratic term of the percentage of women on boards to identify the turning point in the predicted emission reductions [7]; [44]. Results report a nonlinearity between women on boards and the protection of the environment, suggesting an inverted U- shaped relationship. This means that there is a threshold level after which women on boards exert an effect on the emissions score with an opposite sign. Contrary to [42] who analyze the effect of three women or more on the board, I argue that the incremental influence of adding a women on board might not result in an incremental strong commitment towards the protection of the environment. In a recent study about women on boards, [40] document that when women represent more than 40% of the board, the board members do not change their behavior. This suggests that a more equally balance between in-group and out-group does not necessary lead to a higher influence of women (out-group) over the environmental decisions such as the reduction of pollutant emissions.

	Environmental protection		
	(Model 1)	*(Model 2)*	*(Model 3)*
Presence of women	*-18.92****		
	(-3.32)		
three women directors		*7.06****	
		(3.35)	
Women directors squared			*-0.10**
			(-1.75)
% women			*0.63****
			(2.66)
CSR_Comm	*6.71**	*5.22*	*4.70*
	(1.75)	*(1.36)*	*(1.21)*
B_size	*-0.41*	*-0.41*	*-0.34*
	(-1.34)	*(-1.35)*	*(-1.06)*
% Indep	*0.16***	*0.04*	*0.04*
	(1.91)	*(0.52)*	*(0.53)*
CEOduality	*4.09*	*4.05*	*2.89*
	(1.28)	*(1.27)*	*(0.92)*
F_size	*5.99****	*4.98**	*4.88*
	(2.07)	*(1.69)*	*(1.66)*
R^2 (overall)	*0.36*	*0.29*	*0.28*
R^2 (between)	*0.32*	*0.10*	*0.26*
R^2 (within)	*0.10*	*0.25*	*0.11*
N. Obs	*293*	*293*	*293*
N. firms	*38*	*38*	*38*

TABLE 3: Results.

5. DISCUSSIONS AND IMPLICATIONS

This paper focuses on the contribution of women directors for the board decisions related to the reduction of pollutant emissions, by analyzing the dynamics between the in-group and the out-group. The corporate sensitivity towards environmental protection depends on the values, believes and culture shared among the board members [49] [50]. Women directors pay particular attention on the stakeholders' interests which include the environmental protection. The possibility that women's values and attitudes are shared and used by the board depends on the dynamics between the in-group and the out-group. Applying the social identity theory, this paper shows that the potential contribution coming from women on boards is hampered when the board has a solo women. Results show that the board fails to use the sensitivity of women towards the environmental protection when there is a solo woman director. Boards with only one women on the boards experience worst environmental performance in terms of emissions reduction than boards with more than one women director. When the out-group reaches a considerable size (three women), the dynamics between in-group and out-group change and the women's contribution has been exploited. However, an incremental effect of having a new women director does not result in an higher commitment toward the protection of the environment.

This paper provides important implications both for the theory and the practice. The evidence that the potential contribution coming from the board gender diversity might be undermined by in-group-members, pushes forward the discussion of women on boards, Research on corporate governance and specifically on gender board diversity focuses on the consequences of having women on boards, looking mainly on the number or the percentage of women directors. This study goes beyond the surface, moving the discussion from the numerical presence of women on boards to the board dynamics that women could create.

Moreover, this study gives important suggestions about the thresholds of women directors which is needed to have a positive influence on the board decisions related to the environmental

protection. In the recent years many countries have introduced quota laws aimed at increasing the number of women on the board of directors. The main goal was to push companies to include more women into the decision-making position [53] such as the board of directors. These gender quota requirements differ across countries in terms of the minimum percentage of women directors required, the type of the actions (voluntary or mandatory) and the penalties for the non-compliance. This paper documents that the threshold of three women is needed to make the board more engaged towards environmental issues such as the pollutant emissions created by the production processes. It also shows that there is a turning point above which this board engagement does not increase with the number of women directors. This result contributes to the discussion among policy-makers about the quota law requirements that enhance the board effectiveness.

The study presents few limitations that might provide fruitful avenues for future research. The sample includes companies from one single country. This choice helps to give results which are not affected by country-specific variables that might influence and interact with the board attitudes towards a better protection of the environment. Looking at one single country overcomes the problems related to the different rules and practices to enhance the sustainability that are put in place by the governments around the globe. However, a replication of this study focusing on other countries might highlight the possible differences and the different roles of national institutions. Another possible extension of the paper is to look inside the attributes of the board members. Background, nationality, education and past experience might eventually interact with the relationship between women on boards and the environmental protection, changing the dynamics between in-group and out-group and the believes and perceptions of the board members.

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	1. *Environmental protection*	2. *presence of women*	3. *Three women directors*	4. *% women*	5. *CSR_ comm*	6. *Board size*	7. *CEO duality*	8.. *% Indep*	*9. F_size*
1.	- / -								
2.	0.01	- / -							
3.	0.10*	-0.12**	- / -						
4.	0.12**	-0.14***	0.68***	- / -					
5.	0.66***	0.10*	0.08	0.15***	- / -				
6.	0.02	0.11**	0.31***	-0.03	0.07	- / -			
7.	-0.12	0.18***	-0.04	-0.11**	-0.13***	0.09*	- / -		
8.	0.51***	0.03	0.20***	0.22***	0.42***	0.21***	-0.24***	- / -	
9.	0.35***	0.04	0.17***	0.04	0.18***	0.33***	-0.23***	0.33***	- / -

APPENDIX 1: Correlation Matrix