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What Impact Does Corporate Governance Have on Corporate Environmental Performances? An Empirical Study of Italian Listed Firms

Franco Rubino [1] and Francesco Napoli [2,*]

[1] Department of Business and Law, Università della Calabria, 87036 Arcavacata di Rende (CS), Italy; franco.rubino@unical.it
[2] Faculty of Economics, Università degli Studi e-Campus, 22060 Novedrate (CO), Italy
* Correspondence: francesco.napoli@uniecampus.it

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Abstract: In this paper, we first build a multi-theoretical framework through which we hypothesise that the governance mechanisms of a board of directors, on the one hand, and the ownership structures of family and nonfamily firms, on the other, can have an impact on corporate environmental performances. We then test this hypothesis against a sample of 83 Italian listed firms, noting the characteristics of their governance and ownership structures over the five years from 2013 to 2017. We also take note of data from the firms' Sustainability Reports on emissions of greenhouse gases over the 2014–2018 five-year period. The results we obtain support the prediction, made in line with the Agency-Theory perspective, that there is a positive relationship between board independence and the adoption of environmentally responsible practices. Only partial support emerges for the hypotheses, made in line with the Resource Dependence Theory, according to which better corporate environmental performances can be obtained by increasing the resource provision of board members. In particular, we discover a positive effect of a large-size board on corporate environmental performances, but no significant effect arising from the presence of interlocked board members. Finally, our study provides support for the theoretically-based hypothesis according to which the non-economic utility (socioemotional wealth) of family ownership makes family firms likely to have better environmental performances than non-family firms.

Keywords: corporate governance; environmental impacts; family firms; empirical study

1. Introduction

This paper attempts to evaluate the influence which certain governance mechanisms may exert on corporate social responsibility (CSR) outcomes in terms of good environmental performance. In particular, we look at the different characteristics of a firm's board of directors and the various categories of firm owners. Subsequently, we analyse the effect such mechanisms might have on corporate environmental performance. Agency theory, institutional theory, resource dependence theory and, finally, stakeholder theory are the theoretical frameworks which are most frequently used by scholars to analyse the interactions between corporate governance and CSR.

Interests, risk tolerance, capacities and information are not the same thing for shareholders (principals) and managers (agents), according to agency theory [1]. Jensen and Meckling [2] suggest that, when driven by egotism and guile, opportunistic agents may, given the opportunity, adopt behaviour which does not serve the best interests of external investors. Shleifer and Vishny [3] indicate that shareholders might make use of a series of Corporate Governance practices, including incentives, contractual relations and board monitoring structures, to counter this managerial opportunism. Where the agency view of

corporate governance is adopted, the primacy of shareholder interests is assumed and economic (financial) efficiency is emphasised [4]. With regard its influence on Corporate Social Responsibility (CSR), that is firms' non-financial performance, agency theorists suggest that the designing of corporate governance mechanisms be carried out in such a way as to guarantee that CSR activities are only adopted if they bring about benefits in terms of efficiency [5,6].

On the other hand, from the point of view of institutional theorists, informal institutions influence managerial behaviour. These institutions are perculiar to each country, for instance, as traditions, norms and customs and also appear in formal institutions, e.g., as financial practices, regulations and policies [7,8]. Such institutions emerge with the passing of time and determine the forms of behaviour that particular societies permit [9]. In terms of CSR, institutional theory claims that firms within corporate governance contexts which are shareholder-centric, such as those in the US, will emphasise the greater importance of shareholder interests than those of other stakeholders. In these contexts then, proactive CSR action will be carried out if it leads to an improvement in the firm's financial performance [10,11].

Resource dependence theory (RDT) maintains that firms undertake business with each other in order to acquire the resources which are necessary for their continued activity [12]. The board may have an important role in improving a firm's performance since its members can provide direction based on their experience and knowledge [13] and (via their social networks) valuable connections with assets and influential social capital [14]. This will permit managers to enhance the firm's value by making use of specific pro-social strategies [15–17]. This may occur in a firm which appoints a director who also has influential roles with other companies, as well as significant experience on boards.

To conclude, stakeholder theory is based on the notion that a firm does not only answer to its shareholders, but interacts with numerous other stakeholders, such as its clients and employees, governments and environmental agencies [18]. According to stakeholder-agency theory [19], a firm is obliged to consider all its stakeholders and, due to the fact that they control the decision making process directly, managers are central to this system of relationships. Therefore, a basic requirement of a corporate governance system should be that it helps in the running of a firm in such a way that all of its stakeholders, both financial and nonfinancial, will benefit [20,21], with an essential role in this process being played by managers. With regard CSR, this position has great repercussions in terms of the broader range of foreseen managerial responsibilities [22].

Measuring CSR outcomes is a complex activity since there are many aspects of CSR which can be investigated and there is usually a great variety of measuring methods for each of these.

One example of this is that CSR outcomes may refer to the firm's responsible behaviour in relation to the requirements expressed by a majority of its stakeholders, its making of philanthropic contributions, its assuming of ethical codes, its respecting of the law, the extent to which it makes corporate social disclosures, the importance that third parties give to its rankings and ratings or, as in this paper, to its environmental impact.

The first governance mechanism whose effects on environmental corporate performance we analyse refers to the board of a firm. Agency theory affirms that boards are structures that control managers in order to prevent agency disputes. On the other hand, in institutional theory, boards bring together a range of stakeholder interests within the managerial decision-making process. These two aspects are extended by resource dependence theory, which suggests that a firm's directors will have their own series of social contacts and, thus, will be able to refer to external connections so as to administer the firm's resource dependencies [12,13]. We especially focus on certain characteristics of the board of directors, such as size, independence and the role of interlocked board members, which may have an impact on environmental corporate performance. One of the tenets of agency theory is that that, beyond problems of communication and coordination [23] larger boards frequently have to deal with that of free-riders [24]. From this perspective, it is very likely that boards will be manipulated by managers whose primary interest is in short-term profit and will attempt to have firms lower their investments in CSR [25]. However, in the neo-institutional and stakeholder theories, larger boards represent a variety of interests, so CSR investments

can be gathered better by large boards [26,27]. With regard the Resource Development Theory (RDT), improved social and human capital, which may lead to a better CSR performance, are implied by larger boards. Moving on to the examining of boards' level of "independence", it has been said that a board with a high degree of independence may lessen any discord within the firm and guarantee that management will respect a broad range of stakeholder responsibilities [28]. On the other hand, financial awareness is one of the qualities for which independent directors are appointed, so [29] states that independent directors represent shareholders better than they do stakeholders. Even though, some authors consider the existence of a positive association between board size and board independence on the one hand and CSR outcomes on the other [30,31], some research indicates that they are negatively related, particularly with regard environmental performance [32]. The final aspect of boards that we look at is whether there are interlocked board members. An interlocked board member is one who also serves as a board member of another organisation, a situation known as an interlock [33]. Analysis of board composition has revealed that interlocked members act as vital providers of industry information and can stimulate organisational innovation [34,35]. According to resource dependency theory, interlocking directors have a broader range of experiences and network connections, and this renders the manager–board interaction even more valuable [36]. This may all help a firm to sustain the complexity of change that an improvement in environmental performance requires. Substantial extra effort is needed from management for the complex reorganisation of a company's internal processes and the evolution of its environmental faculties to be successful [26,37–40].

Other governance mechanisms refer to various types of firm owners. In Italy, firms' property is mostly concentrated under the control of a dominant family. A high level of concentration can be found in the ownership structures of all firms, not excluding those quoted on the Milan stock market. Indeed, the most sizeable set of blockholders on the stock market is made up of families, while the next largest set is constituted by the state or other public bodies [41–45]. As families differ from other categories of concentrated owners in that they risk losing their own assets in their business activities, they generally take decisions that lead to good long-term results and have an interest in maintaining good stakeholder relationships [46]. The link between family ownership and CSR outcomes can be explained by three key theories. Institutionally, family firms may be expected to make a more normative response to responsible action to maintain the prestige, esteem and trust that the family enjoys in the community [47,48]. In terms of RDT, the support of stakeholders represents a crucial source of the social capital required in order to prevent juridical difficulties connected with subsequent plans for succession [49]. The final link between family ownership and CSR outcomes is provided by agency theory, which says that the powerful position of family-centric interests might lead to agency conflicts and deter CSR in order to guarantee or promote the financial interests of the family rather than the interests of other stakeholders. A review carried out by Jain and Jamali [50] found contradictory results as family firms appeared to favour environmentally friendly behaviour, sometimes over financial interest, so upholding arguments of institutional theory. On the other hand, some researches [51,52] uphold agency claims and show that family-run firms have a negative relationship with CSR.

Predictions are made in Section 2 regarding governance practices that may lead to improvement in corporate environmental performance.

Section 3 presents the empirical research and a description of the methodology, variables and data. The research focuses upon a sample of 415 firm-year observations. Our findings suggest that a larger-sized board and greater independence of its members coincide with a firm's superior environmental performance. Moreover, it appears that the likelihood of adopting environmentally responsible practices is not significantly affected by the presence of interlocked members of the board. Finally, family firms achieve a better environmental performance than non-family firms. The results of the empirical analysis are reported in Section 4. The conclusions that can be drawn are discussed in detail in Section 5.

2. Framework and Hypothesis

Today, a firm's "green credentials" are of social importance and many stakeholders require disclosures of corporate responsibility [53–55]. As society demands that firms take greater' environmental responsibility for their activity, strategic opportunities are emerging which relate to environmental performance [11,56]. In its 2019 annual report, the Italian Institute of Statistics (ISTAT) shows that the productive capacity of a significant sample of Italian firms increases as those firms' environmental and social sustainability grows [57]. In particular, the ISTAT study shows that the most virtuous Italian firms are to be found in the North-East of the country and that Italian companies could receive some of the 31 trillion dollars put aside for socially responsible investment if the ESG (Environment, Social and Governance) parameters were communicated according to international standards. The greater expectations that society now has mean the possibility of having to pay for some environment-related misdemeanours has also increased. The Exxon Valdez and BP oil spills (of 1989 and 2010 respectively) are 2 examples of how environmental disasters may incur enormous costs for the parties involved in the shape of cleaning up expenses, fines and settlement payments. It has been estimated that the cleaning up process after the Gulf of Mexico cost BP over $40 billion. Therefore, adopting environmentally responsible business practices ought to be a primary consideration for a firm's board of directors and owners as a result of the close ties between such practices and shareholder interests, not to mention other non-financial benefits.

Our investigation begins with an examination of corporate governance mechanisms relating to characteristics of the board of directors, such as independence, size and interlocked board members, and concludes with an analysis of the various types of firm owner. Therefore, hypotheses are formulated about how these governance mechanisms may influence a firm's corporate environmental performance.

2.1. Board Characteristics

As a consequence of the greater attention which is nowadays given to environmental issues and the corresponding strategic opportunities, attending to environmental strategy is a necessary function of a board of directors [53,58]. Thus, we consider those characteristics of the board that regard its roles as monitor (i.e., its independence) and resource provider (i.e., number of members and presence of interlocking directors) as a proxy for how it performs environmentally. Hillman and Dalziel [14] state that boards have two typologies of tasks: the tasks of monitoring (based on agency theory) and resource providing (based on resource dependence theory). According to agency theory, managers initiate and execute a strategy, while directors monitor the process [59]. From this perspective, the more independent directors are (i.e., the less non-executive directors are involved in a financial relationship with the firm), the more rigorous the monitoring will probably be. RDT underlines the role of directors in helping the firm find the resources it needs and which it may have difficulty gaining access to [13,14,60]. From this perspective, directors have a greater influence on strategies and programmes as they participate in their initiation and execution [14]. The firm's environmental performance might be improved through the appointing of an appropriate expert to the board. Innovation of the firm's productive processes so as to render them more environmentally friendly is difficult, since knowledge and business contacts are required. The more resources a director has at his command, the better the assistance and advice he can provide [61]. Directors who are resource-rich will work in order to allow their firm access to necessary environmental resources, so having a positive impact upon how the firm performs environmentally. Thus, our hypotheses are divided in order to reflect the two aspects; on the one hand, director monitoring and, on the other, resource provision.

2.1.1. Monitoring

According to agency theory [2,62], disagreement between managers and shareholders over the firm's goals is common given that managers often profit from the fact that they control the firm's activities to further their own short-term interests rather than those of the shareholders in

the long term. Directors who observe management more closely will tend to require more detailed explanations of the strategic initiatives managers take and to be more critical when they believe the initiatives are inappropriate [63,64]. This idea is backed up by the powerful evidence to be found in the literature of a positive relationship between monitoring by the board and corporate strategic decisions [59,65]. On the other hand, the process through which a powerful board can have an impact upon environmental activities is still little understood. Attaining an environmental performance of a respectable level is not always a priority for management even though it is strategically important. A relevant level of investment (in new technology, production processes and the coordination of workers from different sectors) may be necessary for new environmental strategies [16]. Furthermore, a tangible benefit from responsible environmental activity might only emerge over time [66]. Risk-averse managers will find these aspects of environmentally responsible strategies unappealing [67].

Managers frequently adhere to conventional strategies that will further their short term financial and reputational interests rather than face costs which have no immediate benefit [68].

Managers and shareholders do not hold the same utility functions [19]. Therefore, managers' utility, but not that of shareholders, is lowered by the increased difficulty involved in planning and executing new environmental initiatives, while managers are more adversely affected than shareholders if they put a substantial amount of high quality time into the reorganising of the firm's internal processes in order to reduce its levels of pollution. Indeed, previous studies have shown how the lowering and avoidance of waste emissions requires managers to provide a large amount of extra effort in the complicated redesigning of production processes and the accrual of environmental know-how [39]. This means that in order to improve its environmental performance, the firm will not only have to support new operational expense, but will also have to face the costs of the greater effort from managers. On the other hand, the difficulties of planning and executing improved green practices will all be covered within this extra managerial effort and, so, it might be considered reasonable to expect shareholders to recognise the value of this increased managerial effort and to support the greater costs it entails. This extra effort on the part of managers cannot, however, be observed or verified due to its subjective nature [16].

As the monitoring of the firm and its managers' activities, as well as the potential costs of environmental strategies, should be among the board's principal occupations, that board should also scrutinise the green policies of top management [58]. Indeed, results of studies based upon agency theory show that the more independent board members are of the firm, the more attentive they are when performing their monitoring responsibilities [14]. The function of directors in the boardroom is to keep a check on the CEO's initiatives and the general consensus is that independent boards perform this function more effectively as they observe and evaluate the performance of the firm and its management more objectively [69,70]. Moreover, independent boards tend to attribute more value to how the firm respects its corporate social responsibilities [71].

According to McKendall et al. [58], it is more probable that an independent board will realise what the long-term potential is of environmental investments and oppose any pressure managers might apply to ignore this potential. Independent boards are, therefore, inclined to support expensive green-friendly strategies. We consider the proportion of independent directors on boards to be a positive proxy of a board's independence. By increasing this proportion, a board will probably behave objectively in applying its experience and expertise to its scrutiny of the firm's environmental practice and pursuit of appropriate green opportunities. Such directors will also seek to protect their own reputations in order to guarantee that, in the future, they will continue to serve as directors and will benefit from serving firms that have a positive environmental reputation. Therefore, our first hypothesis is the following:

Hypothesis 1 (H1). *Firms will tend to perform better environmentally as they increase the proportion of independent directors on their boards.*

2.1.2. Resource Provision

It has been shown that larger boards are a source of greater value for those firms which are most in need of access to expert knowledge [72]. There is a tendency for directors of greater prestige to be found on larger boards [73], so providing a valuable dependence-related resource [13]. Larger boards of directors will have a greater tendency to include members with a greater experience of particular areas, such as green strategies, who can, therefore, provide more knowledge and more appropriate direction [74]. Firms might be encouraged to look for expert advice by recruiting new directors due to the uncertainty involved with the risks and opportunities of green strategies. According to Booth and Deli [75], firms attempt to gain access to any knowledge that will help them deal with uncertainty over environmental strategies by having a large board.

Consequently, there is a higher probability of finding directors with more experience and expertise of dealing with environmental issues on large boards. It is also more probable that larger boards will include directors whose areas of expertise and interest vary. Therefore, it is easier to find a director with knowledge of how an environmental strategy has an impact on stakeholders on a larger board. These directors will tend to be the source of advice for other board members on the opportunities and difficulties they face, as well as being in a good position to offer green expertise and help acquire any necessary resources or knowledge.

Given that the result of any environmental strategy is unknown, direction of this sort regarding green responsibility is vital. There is also greater probability that larger boards will be able to access essential financial resources and, so, acquire greater financial flexibility to follow green strategies. Consequently, the following hypothesis is formulated:

Hypothesis 2 (H2). *Presence of independent directors on boards has a positive impact on the environmental performance of firms.*

'Human capital' is defined as the skills, knowledge, experience and reputation possessed by an individual (e.g., director) or group of individuals (e.g., board of directors). 'Relational capital' or 'social capital' is defined as the sum of all of the relationships of an individual (e.g., director) or group of individuals (board of directors). An individual (director) or group of individuals (e.g., board of directors) has the ability to secure resources through membership of social networks [76].

We consider board directors' membership of more than one board to be an indication of those board members' social and human capital. As a consequence of their particular expertise and great experience, resource-rich directors, indicated by the fact that they perform important functions for other companies, are able to provide the firm with superior direction, knowledge and access to resources [13,14]. Furthermore, directorate ties to external organisations are valuable 'relational capital' which the firm turns to in order to acquire any necessary resources or knowledge.

There is clear evidence of a correlation between the presence of interlocked directors and increased firm growth [77], together with there being a lower incidence of indictments for the flouting of environmental legislation [53]. Despite the suggestion that interlocked directorships might ultimately bring about a poorer performance by directors, the argument based upon resource dependence theory is decidedly positive: the external experiences of directors provide them with important know-how. As a proxy of the board of directors' human capital, interlocks' experience may function as a valuable yardstick in a series of circumstances [78]. Indeed, when investigating the influence interlocked board members have on corporate audits, Johansen and Pettersson [79] discovered that interlocked directors often furnish firms with valuable information about how the auditing process can best be navigated. In other words, interlocked directors who have auditing experience with another firm may bring with them valuable, reliable knowledge that can help our focal firm deal with its auditing appropriately. Interlocked directorships mean that directors gain experience of a wide range of governance and strategic questions, such as green strategies and implementation. Given that firms' green initiatives will probably vary in their nature and breadth, being a member

of more than one board should furnish a director with greater green resources. The experience of participating on more than one board will probably provide directors with knowledge of environmental difficulties and their consequences for stakeholders, as well as for the firm's reputation and financial performance. As a consequence, interlocked directors will have greater tendency to reveal essential aspects of environmental management and recognise the green opportunities associated with such aspects as product stewardship practices, the limitation of pollution, recycling and so on. We foresee interlocked directors' aiming for better green performances as a result of their experience of other firms' environmental practices. Therefore, we hypothesise the following:

Hypothesis 3 (H3). *The greater the number of interlocked directorships firms share, the greater the probability that firms will perform well environmentally.*

Researchers have looked at the influence of interlocks on a firm's social responsibility and green strategy as a proxy of social capital represented by interlinked board members. The appropriate, reliable which network connections provide is especially valuable in terms of the environmentally sustainable strategies to be assumed due to the fact that adopting these strategies involves substantial investment while returns are uncertain [25]. According to Webb [80], firms which can be considered as socially responsible have more interlocked directors than those that are considered non-socially-responsible. In the study, De-Mandojana [81] made of US electric firms, they discovered that firms with interlocked board members were more inclined to assume environmentally responsible behaviour.

According to a study carried out to understand how this relationship functions [82], decisions about green investment frequently indicate a process of longitudinal learning, through which subsequent more advanced investments are a consequence of previous successful experiments. An important aspect of this is that firms often take note of the activities of other firms in the same sector and base their decisions regarding which sustainable green strategies to adopt on these observations [9]. As it is more probable that interlocked board members will have worked on the boards of firms that seek to adopt successful green practices, they will be able to provide advice on appropriate investment practices and opportunities, so reducing the uncertainty and risk involved in altering a firm's strategy [83].

2.2. Family and No-Family Firms

Margolis and Walsh [84] review empirical analyses of the relationship between the firm's performance and its social behaviour and find that the majority of studies discover a negative or neutral connection, not a positive one. In particular, this review indicates an unpredictable relationship between a firm's green strategies and its financial result. Thus, companies take a serious financial risk, with no guarantee of any significant gain, when they embrace any green strategies which are more radical than those of other firms or those dictated by regulation. This means that strategic choices will probably be highly influenced by non-economic considerations. Alas, as Delmas and Toffel [85] (p. 210) indicate "despite burgeoning research on companies' environmental strategies and environmental management practices, it remains unclear why some firms adopt environmental management practices beyond regulatory compliance" However, a possible explanation is the great variation of owner utilities. As family-firm owners use their own money to finance their business projects and as they exercise control over the board, they run counter to other types of concentrated owners [86]. This difference leads to a consequent divergence in business outlook in the long-term and a greater interest in relationships with stakeholders [46].

A company is considered to be a family firm if a controlling family is in a position where it can choose the components of the board and can, either directly or through financial holdings, make use of family members' equity holdings relative to those of other shareholders to make sure that a family member will become the CEO and/or board chairman (where there is non-CEO duality). Therefore, when we talk about a family firm, we are thinking about the same type of company Casson [87],

More and Grassby [88] Dyer and Lansberg [89] were referring to when they found that if a firm is run by a family CEO or chairman, it is to be expected that there will be greater incentive for a long-term evaluation to be made when planning investment.

According to most of the literature on family firms, families are often driven by considerations which are not economic [90,91]. Although, self-interest guides everyone within a firm, this may be non- financial self-interest within family firms and, therefore, objectives might not coincide with those of external investors, who are simply interested to financial returns [92]. For some time, the particular aspects and peculiarities of family firms have been emphasized by research into family business. As opposed to other equity holders, family owners tend to have a marked preference for a whole series of utilities which are not strictly economic. One aspect of this is that family owners often identify with the firm and get a feeling of belonging [93], meaning that, among other things, they feel it important to maintain and improve the family's reputation through the firm's activity [94], have its social initiatives appreciated [95], and accumulate social capital, while enjoying a position of prestige in society and enjoying the support of friends and the community [96,97]. Gomez-Mejia et al. [48] (p. 13) refer to all these non-economic utilities as "socioemotional wealth" or "affective endowments". It is clear that socioemotional wealth is highly important within organisations that are family-controlled and financial gains are often sacrificed in order to preserve it [48]. In over 300 in-depth interviews with family-firm owners, de Vries [98] discovered that, as well as the firm's financial goals, satisfying the affective needs of the family through the firm (in the sense of feelings of gratification and "the preservation of the family's good name for future generations") was given priority. Gomez-Mejia et al. [48] confirmed this discovery when they carried out research in which they compared olive oil mills in Spain, 1237 of which were family-controlled and 549 non-family-controlled, over a period of 54 years. The probability of the family-controlled mills' participating in a cooperative (a financially interesting choice) was a third of that of the nonfamily-controlled ones because of the notion that, through such participation, the family might lose its socioemotional wealth, for instance how the community sees the family and the family's good name, as well as an idea that the company is a part of the family. Lubatkin, Schulze, and Ling [99] reiterate these findings and say that the firm becomes an extension of family owners' lives, while nonfamily shareholders and professional managers have a more distant, individualistic, utilitarian and transitory attitude towards the firm. According to this rationale, given the importance they give to socioemotional wealth, owners of family-firms will be more likely than those of non-family-firms to adopt green practices in order to build and/or maintain a reputation as responsible corporate citizens. Any social criticism for being irresponsible may sully the family's good name and this might prove to be emotionally unbearable within the family [100]. The family is not anonymous and its identity is also that of the firm [101]. Therefore anything that clearly tarnishes the family reputation has a negative impact on each family member [94]. Consequently, inappropriate green behavior which results in the firm gaining a negative reputation, so diminishing the family's socioemotional wealth, is internalised and becomes personal.

Furthermore, there are four interconnected reasons why owners of family firms are more likely than those of non-family firms to adopt appropriate green practices. Firstly, the family enjoys greater freedom of control and decision making due to its dominant position on the board [91]. Secondly, long-term planning and dedication are necessary in order to satisfy society's green demands [56,66] and it is more probable that these will be provided by family owners as they are more interested in the long-term future of the business and prepared to make choices that will benefit future descendants and stimulate a "generational investment strategy that creates patient capital" [49], p. 343. Generational investment is possible because top executives in family-owned firms usually have much greater tenure [92] and, consequently, are less concerned about short-term financial outcomes or the risk of losing their employment [91,102]. Thirdly, the fact that family firms usually have a more long-term outlook can be expected to encourage them more to adopt better green practices because it is probable that a great deal of time will need to pass before any legitimacy earned from having shown environmental

responsibility emerges [103]. Finally, as a consequence of executives' greater tenure in family-controlled firms, is probable that they will enjoy any socioemotional benefits for a long period of time. Therefore, the following fourth hypothesis is formed:

Hypothesis 4 (H4). *Better environmental strategies will be adopted by family-controlled firms than by non-family firms.*

3. Method

3.1. Sample Selection

In Italy, all of the firms listed on the stock market exhibit a high degree of concentration in their ownership structures [43,104]. From 2017, the 2014/95/UE directive, of 22nd October, 2014, made the drafting of the Sustainability Report obligatory for certain large-scale groups and businesses. This directive was implemented in Italy through the 254/2016 legislative decree, which, starting from 2017, obliged some large companies to deposit a non-financial declaration together with their balance sheets. This declaration was to explain the measures the company had adopted over the year to care for the environment, manage its personnel correctly, guarantee respect for human rights and combat corruption. This non-financial declaration was made under the responsibility of the board of directors and was, like the financial statement, subject to revision. This obligation applied to firms with at least 500 employees which, at the closure of their financial statement, declared at least one of the following requisites:

- having exceeded 20 million euros on the balance sheet;
- having exceeded 40 million euros in total net revenue from sales and services.

Today, there are just over 300 listed firms that are subject to this obligation in Italy. Many firms fulfil this obligation by drawing up a separate document, the so-called "Sustainability Report", while others include this non-financial declaration within the management report that accompanies the financial statement. However, even before this obligation came into force, many firms voluntarily produced a sustainability statement or provided information on their environmental impact in their management report. Consequently, we were able to obtain significant data on the environmental impact of listed firms from 2014. In order to select the listed firms and analyse data of use for the testing of the formulated hypotheses, we used the following method. First of all, we used data on firm activity included in the AIDA databases (Bureau van Dijk) and in the sections dedicated to Investors on the listed firms' institutional sites. In particular, by using AIDA filtering functions, we excluded financial and insurance companies from the sample. By using data published on the listed firms' institutional sites, we included in the sample just the listed firms that had provided information about their greenhouse gas emissions for each of the five years from 2014 to 2018 in their annual reports. Only 83 firms could be included in the sample and so considered useful for all our investigation.

3.2. Dependent Variables

The literature measures corporate environmental performance by using various proxy variables. For example, some studies carried out in the USA make use of data on firms' toxic emissions, held by the Environmental Protection Agency (EPA), which American firms are obliged to communicate. With reference to these data, some authors [16,47,105] use firms' emissions of the toxic substances, benzene and toluene, as a negative proxy of the quality of their green performance. Other authors like [26,39] make use of EPA data to formulate a toxicity-weighted evaluation of waste, which, for example, is measured as a sum of the kilogrammes of chemicals emitted by the firm, weighed for a coefficient of toxicity equal to the inverse of the corresponding 'reportable quantities' (RQ). RQ is defined by the EPA as thresholds of accidental spills of chemicals above which the spills have to be reported. Spills of just a pound of the most toxic substances, for example heptachlor, the chemical

war agent, have to be reported, while spills of those chemicals such as methanol which are considered to be the least toxic only have to be reported if they are greater than 5000 pounds. Firms in Italy are inclined to communicate the data on their greenhouse gas emissions since, unlike in the USA, Italy has ratified the Kyoto protocols on limiting these emissions. Therefore, we choose to measure the total of greenhouse gas emissions released into the atmosphere, which is a negative proxy of the sampled firms' environmental performances. In particular, we measure the ***environmental performance*** variable as the natural logarithm of the quantity (Kg) of CO_{2eq} (CO_2 equivalent) released multiplied by −1. As a consequence, higher values are seen as indicative of a better green performance. For example, the total greenhouse gas emissions by Enel S.p.A. in 2018 was 104.29 million tonnes of CO2eq, giving an *environmental performance* of −25,370 ($= -\ln 104.290.000.000$). The quantity of CO_{2eq} is one of the most commonly used points of reference in environmental studies, besides being one that is revealed in our sampled firms' annual reports. This quantity takes into consideration the weighted sum of the capacity to produce climate change of each of the 6 different gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) taken into consideration by the Kyoto Protocols (in force since 2005).

3.3. Independent Variables

Independent variables have to be able to measure the values which predictions made in the framework refer to, that is the quotas of independent directors on boards, sizes of boards of directors, multiple directorships and the status of family or no-family firms among the sampled firms. We use gather the data necessary for evaluation of the independent variables from various sources. In particular, the Consob (Italian Commission for the Stock Exchange) internet site was used so as to acquire data on the sampled firms' ownership structures; the sampled firms' internet sites were consulted and the 'Relazione sulla corporate governance' (Report on Corporate Governance, which each listed company makes public on its internet site) provided data relating to board members, the CEO and/or the chairman through the annual end-of-year). For each firm in the sample and at the end of each year observed, the following variables were measured:

- ***board independence***. This is measured as the rapport between the number of independent board members and the total number of board members;
- ***board size***. This is measured as the number of board members;
- ***directors' interlocks***. This is measured as the number of directorships that directors of sampled firms have outside that specific firm (i.e., on other firms' boards). It is a proxy of social and human capital for board members. The director of the focal firm that sits on other boards is a multiple director. Increasing multiple directorships also increases that director's expertise and the board's directorate ties to external organisations that could provide resources to the focal firm.
- ***family firm status***. This is a dummy variable equal to 1 if the firm was identified as a family firm, 0 otherwise. In line with the reference framework, a family firm is a company in which a family has used its equity holding in that firm company to appoint a family member to the position of CEO or chairman of the board (in the case of no CEO duality). In the end, we identified 49 family firms and 34 no-family firms in the sample.

3.4. Control Variables

We include a number of firm-level variables to control for various factors that may affect CSR performance. In particular, by obtaining the necessary financial and market data from the AIDA and Datastream databases (Thomson Financial), we control for:

- ***firm size***. This is measured as the natural log of total assets. Clarkson et al. [106] suggested that larger firms are more likely to see green issues as a priority in itself to be managed effectively;
- ***firm age***. This is measured as the fiscal year for which the data apply minus the year of establishment. Berrone et al. [47] suggested that it is probable that older firms will have sunk

costs which make it convenient to continue making use of equipment and plant that are dated primitive and more polluting;

- ***financial performance***. This is measured by using returns on assets (Roa). Profitable firms could perform better environmentally since they are able to support large environmental compliance costs [58].
- ***Tobin's Q***. This is measured by using the price-to-book ratio. Kassinis and Vafeas [53] and Kock et al. [26] find that better market-based performances lead to better environmental outcomes.
- ***leverage***. This is measured as total debt divided by total assets. Clarkson et al. [106] suggest that firms with higher leverage have better environmental performances.
- ***internationalization***. Firms which have rendered their productive processes international have to relate to a wider range of shareholders and may have to respect different anti-pollution legislation. Therefore, we use a further, dummy, control variable, the "internationalization" varaiable, which takes a value of "1" when the firm also has centres of production outside the European Union and "0" otherwise."
- ***polluting industry***. The industrial sector can have an impact on the single firm's environmental performance [47]. We control for the firm's belonging to a given sector by using a dummy variable. When a firm operates in a sector with a great environmental impact, the dummy variable is coded 1 and 0 otherwise. In line with prior studies [30], the sectors classified as having a great environmental impact are: Forestry (SIC codes between 800–899), Metal Mining (SIC codes between 1000–1099), Coal Mining and Oil and Gas Exploration (SIC codes between 1200–1399), Paper and Pulp Mills (SIC codes between 2600–2699), Chemicals, Pharmaceutical and Plastics Manufacturing (SIC codes between 2800–3099), Iron and Steel Manufacturing (Iron and Steel Manufacturing SIC codes between 3300–3399), and Electricity, Gas and Waste Water (SIC codes between 4900–4999). When identifying the sectors to which the sampled firms belonged, we found that 49 of the firms (out of the 83 analysed) were associated with sectors with a great environmental impact. In particular, 4 firms belonged to the Metal Mining sector; 11 firms were a part of the Coal Mining and Oil and Gas Exploration sector; 1 firm was in the Paper and Pulp Mills sector; 17 firms were in the Chemicals, Pharmaceutical and Plastics Manufacturing sector; 3 firms were in the Iron and Steel Manufacturing sector; 13 firms belonged to the Electricity, Gas and Waste Water sector.

4. Results

In our analyses, the disclosures that regard the independent variables are performed one year in advance with respect to the dependent variable disclosures. Therefore, we measure dependent variables (environmental performance) for the 2014–2018 period and our independent and control variables for the period 2013–2017. The one-year time lag between the measuring of the dependent and independent variables acts as a safeguard against risks deriving from the phenomenon of inverse causality. Indeed, improved environmental performance is sometimes achieved through strategic change. Given that some time is usually necessary before the benefits of efforts at strategic change emerge, it seems opportune to introduce a substantial lag between independent and dependent variables [107]. The data, which emerge from five years of variable measuring, form a panel of 415 different combinations of variable values (environmental performance$_t$, board independence$_{t-1}$, board size$_{t-1}$, director interlocks$_{t-1}$, family firm status$_{t-1}$, firm size$_{t-1}$, firm age$_{t-1}$, financial performance$_{t-1}$, Tobin's Q$_{t-1}$, Leverage$_{t-1}$, Internationalization$_{t-1}$, polluting industry$_{t-1}$, where t indicates the end of a generic year within the period 2014–2018), one for each firm-year observation within the sample (83 firms over 5 years).

Table 1 shows the average values and standard deviations disclosed for all of the variables involved in our study. In addition, the table also shows numerous significant correlations among the variables when taken into consideration two at a time. In order to test our hypotheses, we run a hierarchical regression model. We present the results of this analysis in Table 2. As regards the governance mechanisms relating to the board of directors, we hypothesise that, on the one hand, there is a positive association between a growth in board independence (H1), board size (H2) and directorships per

board member (H3) and, on the other hand, an improvement in corporate environmental performance. With regard the governance mechanisms relating to ownership, hypothesis (H4) suggested that family firms' environmental performance was better than that of non-family firms. First of all, it was necessary to verify that there were no potential problems with multicollinearity among the variables and so we calculated the variance inflation factor (VIF) of each independent variable in each of the regression models presented below. VIF values in models A to B are within a range between 1.1–1.7 and, so, do not affect the validity of the models in question [108].

In Table 2, we, first of all, placed just the control variables in Model A and reported the results of ordinary least squares (OLS) regression analysis in the first and second columns of Table 2. Subsequently, by also adding the independent variables corresponding to the tests of our hypotheses to the control variables, we run a further ordinary least squares (OLS) regression analysis in Model B. We report the results in the third and fourth column of Table 2. Results for the board independence variable indicate that the quota of independent directors present on the boards of sampled firms has a positive impact on the firm's environmental performance. This result is statistically significant ($\beta = 1.15$, $p = 0.007$) and consistent with Hypothesis 1, which we formulated on the basis of agency theory predictions. Hypotheses 2 and 3 focus on variables which regard the provision of directorial resources and it is foreseen will have an impact upon the environmental performance of sampled firms. In particular, the second hypothesis predicts that board size will have a significant positive impact on the environmental performance of sampled firms. The results support this hypothesis ($\beta = 0.16$, $p = 0.013$). In addition, a positive impact of multiple directorships on environmental performance was predicted by the third hypothesis, but the results did not support this hypothesis since p is equal to 0.127. Finally, hypothesis 4 was elaborated on the basis of a theoretical perspective according to which the non-economic utility (socioemotional wealth) of family ownership renders family firms more likely to have a good environmental performance than non-family firms. Results for the family firm status variable coefficient indicate that the status of family firm has a significant correlation with the sampled firms' better environmental performance, so providing support for hypothesis 4 ($\beta = 0.39$, $p = 0.008$). Finally, full model explains about 27% of the variance in corporate environmental performance between the sampled firms. Results of F-tests applied to the control model (Model A) and the full model (Model B) are presented in Table 2 and provide a great deal of useful information.

Robustness Checks

In order to test the robustness of our model, we apply the Breusch-Pagan heteroscedasticity test to the results of the multiple OLS regression analysis (Models A and B in Table 2). The results of auxiliary regression of the Breusch-Pagan test are reported in Table 3 and show that the null hypothesis of homoskedasticity can be accepted in models A and B, both on the basis of the F-Statistic and on the basis of the test statistic $N \times R2$.

Table 1. Means, standard deviations and correlation matrix.

	Means	Standard Deviations	11	10	9	8	7	6	5	4	3	2	1
1. environmental performance	−13.412	25.141											1
2. board independence	0.612	0.124										1	0.19 **
3. board size	7.781	2.171									1	0.30 **	0.18 **
4. director interlocks	4.114	3.151								1	0.17 **	0.25 **	0.21 **
5. family firm status	0.590	0.460							1	0.02	0.18 **	−0.11 *	0.07
6. firm size	19.062	4.289						1	0.01	0.16 **	0.15 **	0.07	0.14 **
7. firm age	65,451	35,214					1	0.17 **	0.02	0.29 **	0.29 **	0.33 **	−0.08
8. financial performance	5.711	6.374				1	0.11 *	0.11 *	0.10 *	−0.07	0.19 **	0.04	0.04
9. Tobin's Q	3.114	10.976			1	0.14 **	−0.01	−0.02	0.07	0.05	0.03	−0.03	0.05
10. leverage	0.653	0.179		1	−0.17 **	−0.14 **	0.03	0.17 **	0.21 **	0.35 **	0.04	0.09	0.12 *
11. polluting industry	0.59	0.761	1	−0.19 **	−0.01	−0.04	0.19 **	0.21 **	0.02	0.20 **	0.20 **	0.15 **	−0.49 **
12. internationalization	0.770	0.541	0.21 **	0.09	0.12 *	0.16 **	0.03	0.23 **	−0.05	0.02	0.11 *	0.18 **	0.01

n = 415; 1-tailed: * $p < 0.05$; ** $p < 0.01$.

Table 2. Hierarchical regression analysis of environmental performance (n = 415).

	Model A		Model B	
Variable	**Parameter Estimate**	***p* Value**	**Parameter Estimate**	***p* Value**
Intercept	−39.29	0.21	−31.07	0.04 *
Controls				
firm size	0.13	0.002 **	0.10	0.001 **
firm age	−0.07	0.031 *	0.08	0.029 *
financial performance	0.05	0.049 *	0.04	0.035 *
Tobin's Q	0.13	0.171	0.23	0.231
leverage	0.73	0.217	0.69	0.094 †
polluting industry	−1.19	0.009 **	−1.25	0.004 **
internationalization	0.14	0.124	0.19	0.171
Main effect				
board independence			1.15	0.007 **
board size			0.16	0.013 *
director interlocks			0.97	0.127
family firm status			0.39	0.008 **
Anova				
F sign	19.191 **		13.973 **	
R2	0.248		0.276	
Adj R2	0.235		0.256	
ΔR2	0.248		0.028	
F change	19.191 **		6.210 **	

n = 415; 1-tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$. p values are in parentheses.

Table 3. Heteroskedasticity Test.

	Model A	**Model B**
F-statistic	2.654	2.499
Prob. *F*	0.011	0.005
N*R-squared	16.185	24.900
Prob. *Chi-Square*	0.023	0.009

Note: n = 415.

The regression analyses presented in Table 2 might lose their significance in the presence of endogeneity biases. For instance, there may be potential endogeneity problems with the relationship between operating in polluting industries and the status of family or no-family firms. An example of this would be if the necessity to possess high levels of knowledge in highly polluting industries were an incentive to family firms to choose certain industrial activities rather than others. However, in such circumstances, the correlation analysis of Table 1 does not show any correlation between *polluting industry* and *family firm status.* What is more, we found a homogenous distribution of the *family firm status* dummy variable in all of the Industrial sectors found in the sample examined. Therefore, family firms do not seem to show any greater preference for polluting or non-polluting industries, but are equally present across the two typologies. Instead, problems of potential endogeneity biases might emerge in the relationships between environmental performance and board attributes. This induces us to carry out a two-stage least squares incorporating instrumental variables (IV). In order

to identify which firm characteristics may explain the variation in board characteristics and obtain the instrumental variables (IV) that the two-stage least squares method requires, we use determinates of board characteristics that are identified in Coles et al. [109] and Minichilli et al. [59]. In the second stage of the method's application, we detect that the modified version of the regression equation indicates positive and significant ($p < 0.05$) parameter estimates for the fitted values of board independence and board size and, therefore, that the results of our analysis are robust even after controlling for endogeneity bias.

5. Discussion and Conclusions

This paper seeks to establish whether a firm's environmental performance is influenced by its governance mechanisms in terms of its ownership structure and its board of directors. Environmental performances are one of the four points of reference according to which corporate social responsibility (CSR) outcomes are classified [50,110]. Another type of CSR outcome classified as social performance is corporate responsibility aimed at multiple stakeholders and this is measured through stakeholder involvement, philanthropic activity, respect for ethical codes and the law, and assessment of the impact on stakeholders. The final two types of CSR outcome classified as social performance are disclosures of corporate responsibility and corporate environmental performance and these are both related to, among other things how third parties rate and rank them, and the level of corporate social disclosures and stock market indicators. Our study starts with an examination of corporate governance mechanisms relating to characteristics of the board of directors. Within the monitoring and strategic tasks of the board of directors, environmental practices are an important objective. Looked at from an agency point of view, the board constitutes a mechanism of internal control that can compensate for agency problems to the degree to which its members are independent. When management seeks to follow an environmentally-friendly strategy, potential agency problems arise which boards with a high concentration of independent directors are in a position to resolve through increased monitoring. The fact that managers might not have the necessary resources and/or knowledge may mean that they will fail to emphasise environmental issues sufficiently. However, as one of the board's functions is to find and provide the firm with resources, it may be able to mitigate this problem. From the perspective of resource dependence theory, having directors with knowledge and experience on the board can provide the firm with environmental guidance and opportunities. What is more, in the case of interlocked directors, it is probable that they will possess more and better social and human capital and have access to more and better green resources. Consequently, an increase in the number of board members and/or the number of interlocks means a higher probability that the firm will perform well environmentally. We also examine corporate governance mechanisms relating to the firm's ownership structure and find that the owners of family-firms exhibit far greater interest in a wide range of non-economic utilities than do other equity holders. Due to the great importance that the owners of family-firms generally attach to socioemotional wealth, they can be expected to try to avoid acquiring a reputation for being irresponsible corporate citizens by adopting environmentally friendly policies. A sample of 415 firm-year observations regarding firms quoted on the Italian stock exchange in Milan was used in order to test our predictions. Indeed, in line with our predictions, evidence was found of better environmental performances by firms which had (1) a larger proportion of independent directors on their boards; (2) boards of a larger size and (3) family firm status. These results are in line with agency literature and show that independent members of a board of directors monitor shareholder interests more effectively and that it will be important for shareholders to guarantee that adequate attention is given by the board of directors they have appointed to the risks and opportunities involved in environmental decision making as they may have a bearing on the firm's overall well-being [37]. In line with resource dependence theory, we demonstrate that firms with large boards of directors tend to perform better environmentally. We find that there is a greater likelihood that firms with large boards will have the necessary variety and wealth of expertise to improve environmental performance. On the other hand, we find no support for that other resource dependence theory–driven prediction

which suggests that interlocked directors contribute significantly to improving a firm's environmental practices. Possibly boards are more inclined to base other policies rather than their environmental practices on interlocking directors' transfers of knowledge and resources. Our findings indicate that the green performance of family firms is better than that of their competitors and this is compatible with the burgeoning literature on the family firm's preference for strategic options that differ from those that non-family firms are interested in [91,102]. These strategic options involve such choices and characteristics as the wish to be considered positively by the community or to satisfy the family's social and interpersonal needs, which the literature on family business refers to as the research, growth and conservation of socioemotional wealth. All in all, these results are a powerful indication that a firm's green performance and control of pollution are greatly influenced by the characteristics of its corporate governance.

For the following reasons, our research represents a contribution to existing academic literature. Tanusree and Dima [111] made a systematic study of the literature relating to this area and found that insufficient studies had been made of how the environmental performance of a firm is influenced by its governance mechanisms [25,30,47,51,112,113]. Previous studies had referred to sampled firms in the USA. The Kyoto Protocols on greenhouse gas emissions have not been ratified by the USA and, therefore, unlike European companies, Us firms do not communicate these data. In this paper, the empirical analysis regards the European context, and the Italian in particular, and this gives the possibility to use the quantities of greenhouse gases released (emissions of CO_{2eq}) as a proxy of corporate environmental performance. Consequently, from an empirical point of view, this is the only study which measures the impact that variables of corporate governance have on the environmental pollution brought about by greenhouse gas emissions, which are capable of modifying climatic conditions across the entire planet. From a theoretical perspective, our study contributes by indicating how important it is to make use of a perspective which unites resource dependence and agency theories in order to evaluate how a firm's environmental performance is influenced by its board of directors. Our decision to make use of a multiple-theoretical point of view is based on the fact that boards frequently perform management monitoring functions and guarantee the firm the resources necessary for its strategic decision making. In this way, our combination of the agency and resource dependence perspectives makes a more complete appraisal than either of the single theories of the various tasks that are performed by boards of directors within the adoption of green practices. Finally, a further contribution that our study makes is that of suggesting that a more robust analytical framework for the comprehension of the way in which the majority of Italian, and world, organisations, that is family firms, respond to institutional pressure might be found in a socioemotional perspective.

We recognise that our work has its limitations. Even though an attempt was made to maintain the causal nature of the sequence by having the independent variables lag by one year, as is fairly normal in research into management behaviour, causal implications cannot be completely guaranteed. The fact that the context of the analyses is limited to Italy and the time period taken into consideration is relatively short (2013–2018) does not prevent short-term fluctuations from influencing the observed variables. An aim for future research should be that of including a greater number of firms, possibly by looking at samples of firms formed at the EU level, and extending the time period analysed.

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