Subscription

Economics and Business Review (E&BR) is published quarterly and is the successor to the Poznań University of Economics Review. The E&BR is published by the Poznań University of Economics and Business Press.

Economics and Business Review is indexed and distributed in ProQuest, EBSCO, CEJSH, BazEcon and Index Copernicus.

Subscription rates for the print version of the E&BR: institutions: 1 year – €50.00; individuals: 1 year – €25.00. Single copies: institutions – €15.00; individuals – €10.00. The E&BR on-line edition is free of charge.

Correspondence with regard to subscriptions should be addressed to: Księgarnia Uniwersytetu Ekonomicznego w Poznaniu, ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland, fax: +48 61 8543147; e-mail: info@ksiegarnia-ue.pl.

Payments for subscriptions or single copies should be made in Euros to Księgarnia Uniwersytetu Ekonomicznego w Poznaniu by bank transfer to account No.: 96 1090 1476 0000 0000 4703 1245.

ISSN 2392-1641

Economics and Business Review

Volume 3 (17) Number 1 2017

Economics and Business Review Volume 3 (17) Number 1 2017

CONTENTS

Poznań University of Economics and Business Press

Paper based publication

ISSN 2392-1641

POZNAŃ UNIVERSITY OF ECONOMICS AND BUSINESS PRESS
ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland
phone +48 61 854 31 54, +48 61 854 31 55
www.wydawnictwo-ue.pl, e-mail: wydawnictwo@ue.poznan.pl
postal address: al. Niepodległości 10, 61-875 Poznań, Poland

Printed and bound in Poland by:
Poznań University of Economics and Business Print Shop

Circulation: 230 copies

Aims and Scope

Economics and Business Review is the successor to the Poznań University of Economics Review which was published by the Poznań University of Economics and Business Press in 2001–2014. The Economics and Business Review is a quarterly journal focusing on theoretical and applied research work in the fields of economics, management and finance. The Review welcomes the submission of articles for publication dealing with micro, mezzo and macro issues. All texts are double-blind assessed by independent reviewers prior to acceptance.

The manuscript

1. Articles submitted for publication in the **Economics and Business Review** should contain original, unpublished work not submitted for publication elsewhere.
2. Manuscripts intended for publication should be written in English, edited in Word in accordance with the **APA editorial** guidelines and sent to: secretary@ebr.edu.pl**.** Authors should upload two versions of their manuscript. One should be a complete text, while in the second all document information identifying the author(s) should be removed from papers to allow them to be sent to anonymous referees.
3. Manuscripts are to be typewritten in **12' font in A4 paper** format, one and half spaced and be aligned. Pages should be numbered. Maximum size of the paper should be up to 20 pages.
4. Papers should have an abstract of not more than 100 words, keywords and the Journal of Economic Literature classification code (**JEL Codes**).
5. Authors should clearly declare the aim(s) of the paper. Papers should be divided into numbered (in Arabic numerals) sections.
6. **Acknowledgements** and references to grants, affiliations, postal and e-mail addresses, etc. should appear as a separate footnote to the author's name a, b, etc and should not be included in the main list of footnotes.
7. **Footnotes** should be listed consecutively throughout the text in Arabic numerals. Cross-references should refer to particular section numbers: e.g.: See Section 1.4.
8. **Quoted texts** of more than 40 words should be separated from the main body by a four-spaced indentation of the margin as a block.
9. **References** The EBR 2017 editorial style is based on the **6th editio**n of the Publication Manual of the American Psychological Association (**APA**). For more information see APA Style used in EBR guidelines.
10. **Copyrights** will be established in the name of the **E&BR publisher**, namely the Poznań University of Economics and Business Press.

More information and advice on the suitability and formats of manuscripts can be obtained from:

Economics and Business Review
al. Niepodległości 10
61-875 Poznań
Poland
e-mail: secretary@ebr.edu.pl
www.ebr.ue.poznan.pl

Economics and Business Review

Volume 3 (17) Number 1 2017

CONTENTS

BOOK REVIEWS

Economics and Business Review, Vol. 3 (17), No. 1, 2017: 127-148
DOI: 10.18559/ebr.2017.1.7

Gender diversity impact on corporate social responsibility (CSR) and Greenhouse Gas emissions in the UK[1]

Renata Konadu[2]

Abstract: This study provides further evidence on the relationship between the Corporate Social Responsibility (CSR) Committee and corporate environmental performance in the United Kingdom. For the purpose of exploring corporate environmental performance, the study uses Greenhouse Gas (GHG) scopes of emissions as the proxies. In the UK, listed companies report their GHG emissions under the three main emissions categories (i.e., Scope 1, Scope 2 and Scope 3) as developed by GHG protocol standards. Using Scopes 1 and 2 GHG emissions, the study proposes a negative relationship between the CSR committee and Scope 1 emissions, whereas, a positive link is proposed between CSR committee and Scope 2 emissions. The findings in this study support the hypotheses that scope 1 emission and CSR committees are negatively associated while a positive relationship was found between Scope 2 and CSR committee. Also, this research reveals the significant roles played by the presence of an environmental team and female gender diversity in moderating the CSR committee and GHG emissions relationship. Though, the CSR committee was found to have a positive effect on reducing GHG emissions, the presence of the environmental team had a much significant influence on reducing corporate GHG emissions. The findings are relevant for decision making and corporate governance measures to reduce corporate GHG emissions.

Keywords: Corporate Social Responsibility Committee, environmental team, GHG emissions, corporate governance.

JEL codes: Q5, Q0, L2.

Introduction

Greenhouse Gases (GHG) and global warming related issues have become a major issue for discussion by heads of states and governments all over the world over the past three decades. Such concerns led to the Conference of Parties (COP) 21 in Paris, 2015 and the recent ratification at COP22 in Morocco, 2016,

[1] Article received 6 February 2016, accepted 5.March 2017.

[2] Bournemouth University, Faculty of Management, Department of Accounting, Finance, and Economics, Executive Business Centre, Bournemouth University, 89 Holdenhurst Road, BH8 8EB; rkonadu@bournemouth.ac.uk.

where most countries agreed to work towards reducing their GHG emissions (UN, 2016). It is undisputable that the economic growth and development of every country to some extent depends on companies' expansion and activities. These companies, no matter the business sector, may in one way or another have an impact on the environment as a result of their operations. To ensure a reduction in a number of environmental impacts and most importantly GHG emissions, most firms have adopted environmental strategies and policies. The relevance of corporate governance in implementing, developing and proposing such environmental strategies and policies cannot be overlooked. A number of studies have investigated the relationship between corporate governance and environmental performance using variables such as the board of directors, institutional ownership, gender diversity and board independence (e.g., Graves & Waddock, 1994; Berrone & Gomez-Mejia, 2009; Liao, Luo, & Tang, 2015; Dixon-Fowler, Ellstrand, & Johnson, 2015).

Most studies investigated the effect of corporate governance on environmental/social responsibility found significant evidence of the major role played by directors in improving performance (Tonello, 2011; Nelson, Zollinger, & Singh, 2001; Elkington, 2006). An overarching argument in these studies is that board of directors have the greatest responsibility to make corporate decisions such as those related to investment in socially responsible projects. From the same line of argument, the directors would have to approve of any environmentally related strategy or policy before passing it down to managers and supervisors. In order to better implement and enforcement environmental polices directors often delegate to sub-committees. The most popular among the many committees set up to deal with environmental related issues is the Corporate Social Responsibility (CSR) committee. The CSR committee is created specifically to handle the environment, sustainable development, health and safety and ethics related issues (Harrison, 1987). Though many studies investigate the effect of the CSR committee on environmental performance using GHG disclosure (see Liao et al., 2015) and environmental score (see Dixon-Fowler et al., 2015), there has not been much focus on GHG emissions.

The aim of this study is to assess whether there is a relationship between GHG emissions and the inclusion of a CSR committee. A sub aim of the paper is to assess the impact of both female gender diversity and the use of an environmental team to moderate the relationship between CSR committee and GHG emissions. The investigation results and findings in this study make a number of contributions to the corporate governance and environmental scholarship. First, examining the association between the CSR committee and the individual scopes of GHG emissions will enlighten and guide managers and decision makers when developing strategies to reduce emissions. This study is the first to explore this relationship by using scopes 1 and 2 emissions, definitions given below, as proxies for environmental performance. Second, the research will indicate to corporate boards of directors the relevance of the environmental team

in addition to the CSR committee as the committee does not only deal with environmentally related issues. Thus, for companies to successfully improve their environmental performance and reduce GHG emissions, a dedicated environmental team would play a crucial role compared to a CSR committee. Finally, the study will provide evidence to stakeholders, especially shareholders on the importance of female directors on corporate boards with regards to initiating and encouraging environmentally management. By implication, a significant moderating effect of female gender diversity on the CSR committee and GHG emissions relationship will direct the attention of significant shareholders towards the need for gender diversity in corporate boards. The paper is structured as follows: First, the underlying theory and extant literature on corporate GHG emissions and corporate governance are explored. Second, the paper goes on to provide hypotheses of the study. Third, the research design, results and analyses are presented. Finally, the paper concludes with suggestions on areas for future studies and presents the study's limitations.

1. Literature review and hypotheses

1.1. Stakeholder theory

Stakeholders have either direct or indirect interests and expectations of their corresponding organisations and as a result, bestow societal legitimacy on those companies. Due to the different classifications and groups of stakeholders, their interests are known to be different from each other and therefore the quest to satisfy these expectations and demands would place a cost burden on companies. Freeman (1984) for instance, emphasised the need for firms to minimise these costs while trying to satisfy the demands of their stakeholders. This is because there is no certainty that satisfying stakeholders' demands would necessarily cause a company to have a competitive advantage especially in the case where all firms in the same industry have the same types of stakeholders. Nonetheless, it is pertinent that businesses realise that it is in a contract with multiple stakeholders and therefore understanding their interests before making corporate decisions is vital. Consequently, stakeholders' interests in corporate social responsibilities and environmental management matters cannot be avoided by management before arriving at a conclusion.

Researchers have used stakeholder theory to explain the relationship between environmental performance and financial performance. For instance, Kassinis and Vafeas (2002) investigated the relationship between stakeholder pressure and corporate environmental performance by studying 5043 distinct plants in the USA and found evidence that stakeholder pressure has helped reduce toxic emissions. Their findings also indicate that local communities and regulatory bodies exert more pressure on organisations to improve their

environmental performance compared to other stakeholders. Sharma and Henriques (2005) also examined how perceptions of different stakeholder groups by managers influence the sustainability practices of the forestry industry in Canada. They found out industries and their respective stakeholders were concerned with advanced techniques and technologies that redefine treatment processes instead of relying on pollution control and eco-efficiency measures only. A further study by Murillo-Luma, Garcés-Ayerbe, and Rivera--Torres (2008) explored the relationship between firms' efforts to protect the environment and stakeholders' demand for environmental sustainability. They discovered that pressure from stakeholder groups causes firms to become more proactive environmentally.

Stakeholder theory is the main theoretical underpinning of this study. For example, considering the increased attention given by the different classes of stakeholders to global warming and GHG emissions related issues, the hypotheses and findings of this study will be discussed by taking into account stakeholders' influence. With the knowledge of diverse stakeholder interests, there is also the possibility of one stakeholder group favouring the reduction in a particular scope of GHG emissions. Consequently, this study emphasises the influence of specific stakeholder groups on the reduction of GHG emissions.

1.2. Reducing corporate greenhouse gases (GHG) emissions

The GHG Protocol Corporate Standards have grouped GHG emissions into Scope 1, Scope 2 and Scope 3 emissions. Scope 1 emissions are those direct emissions related to a firm's operational activities such as the generation of electricity, fugitive emissions and chemical processing from manufacturing. These emissions are known to be indirect because firms have to first of all either buy or import these forms of energy before their consumption would lead to emissions. The final scope of emissions is the Scope 3, which are also categorised as indirect. Scope 3 emissions could either be from upstream activities (e.g., employee commuting, business travel, waste generations) or downstream activities (e.g., use of sold products, end of life treatment of sold products, franchise). Considering the adverse effects of Greenhouse gases to the whole globe, many companies have adopted several means of reducing emissions from their operations. In order to effectively reduce the total quantities of corporate emissions, identifying and understanding the sources of the emissions is vital. A study by Borland and Paliwoda (2011) found evidence that increased usage of fossil fuel (i.e., non-renewable resource) will lead to an upsurge in GHG emissions. Based on their findings, they made recommendations for firms to extract less natural resources while resorting

to the use of renewables in order to sustainably improve their environmental performance.

Despite the need to reduce emissions, a question of whether companies who engage in these reduction activities do benefit financially in terms of cost reduction or revenue increase has been explored in many studies. The results from existing literature, however, have been inconsistent. Notwithstanding, two main schools of thoughts have underpinned extant literature on corporate GHG emissions and financial performance relationship. (Bioral & Henri, 2012). Both viewpoints appear to be popular in international debates and seem to be pulling equal weights. One major argument in support of the win-lose standpoint in literature, for instance, is the evidence that GHG emissions reductions rather cause firms to incur more costs in the short run with no financial improvements which tend to undermine business competitiveness (Horváthová, 2010). On the other hand, Stubbs and Cocklin (2008) Pulver (2007) argued that GHG emission reduction improves firms' competitiveness.

In relation to energy consumption, Tanaka (2011) found significant empirical evidence linking reduction in energy consumption to corporate cost savings. For example, the use of energy saving electrical appliances would consume fewer kilowatt-hours (kWh) of electricity, thereby, causing a reduction in electricity bills. Since energy consumption is a major source of Scope 2 GHG emissions, one can say that reducing energy use would contribute to improving environmental performance and save costs. Apart from an imminent reduction in cost as seen in the case of electricity above, other environmental management activities like investing in technical and technological equipment, have been argued to yield financial benefits in the long term.

Ziegler, Busch, and Hoffmann (2009) emphasised that the contradictory results in literature could be due a number of reasons which includes conducting research in different countries. All countries are known to have different economic policies regardless of international associations, unions or income levels. Following the same line of thought, it is undeniable that climate change regulations, targets and focus sectors would be different across countries. For instance, in the UK, a report by DEFRA (2007) showed that the power generation sector and transport industries are the largest contributors of GHG emissions with 37% and 22% emissions respectively. However, in Italy, the agricultural sector is the second largest contributor of GHG emissions following the energy sector.

In order for the UK to limit all sectoral emissions, most especially those from the largest contributors, all large listed companies in the UK were mandated to report their GHG emissions from 2012 (DEFRA, 2013). With the exception of scope 3 emissions which are optional, both scopes 1 and 2 emissions are to be reported by the listed firms. In this study, the relational impact of the presence of a CSR committee on the individual scopes 1 and 2 emissions in companies are investigated.

1.3. Board of directors and environmental performance

Research has indicated that boards of directors play a vital role in satisfying stakeholder demand and in making decisions including those that affect environmental performance (Kassinis & Vafeas, 2002; Walls, Berrone, & Phan, 2012). The popular characteristics of the board of directors used and emphasised in most studies are the board size and board independence (Agrawal & Knoeber, 2012). Walls et al. (2012), found evidence to support that companies' environmental performance suffers when the board size becomes larger, thus, implying the problem of delay in decision making and possible bias. A similar relationship was established by Kassinis and Vafeas (2002) who argued that large boards are incoherent and unable to make decisions on time compared to smaller boards. Other studies have, however, found evidence that board size is positively related to CSR practices and environmental performance (Frias-Aceituno, Rodriguez-Ariza, & Garcia-Sánchez, 2012; Osemeke, 2011).

The argument for the positive relationship is based on the assertion that adopting and implementing environmental strategies may be expensive, thus, bigger board sizes would exercise due diligent when making such strategic decisions. Besides the number of directors on corporate boards, the freedom to make impartial judgements and decisions without attaching personal interests is another vital aspect. However, due to principal-agent problems, it is difficult for some directors, especially those who work directly in the company to be objective. Consequently, appointing independent and non-executive directors on corporate boards has become a common practice of companies. Existing literature has emphasised that independent directors tend to be responsive to social demands due to their concern for prestige and reputation. In other words, these directors are not interested in financial and material benefits from companies but rather to assist in making strategic decisions that favour stakeholders and the society at large (Coffey & Wang, 1998; Ibrahim and Angelidis, 1995). By implication, the greater the percentage of independent directors on a board, the bigger the tendency for firms to disclose their CSR and environment practices in addition to environmental performance (de Villiers, Naiker, & van Staden, 2011; Chau & Gray, 2010).

1.4. CSR/environmental committee and environmental performance

Setting up board committees and sub-committees is a popular modus operandi used by corporate boards to delegate tasks and responsibilities to improve effectiveness and efficiency in corporate performance (Fuente, García-Sánchez, & Lozano, 2017). Among these committees is the CSR committee set up mainly

to handle sustainability, health and safety, ethical and environmental issues. According to Fernandez, Luna Sotorrio, & Baraibar Díez (2011), the presence of the CSR committee is relevant for monitoring and implementing quality CSR practices. However, since, CSR committees cover a broader spectrum of issues and not just environmental issues, some listed firms specifically establish environmental committees (EC) to handle and focus on firm's environmental practices/performance (Micheals, 2009). Due to the cost involved in setting up committees, not all companies have both CSR and EC committees, as such; CSR committees are quite common because they deal with more than one aspect of corporate performance. Where an environmental committee is present, it is expected of directors on the committee to advise and guide the board in developing tactical environmental policies and strategies (Dixon-Fowler et al., 2015).

Inferring from the resource dependence theory perspective, directors on environmental committees are more likely to approve their company's collaboration with other firms that are environmentally friendly. Such alliance could lead to exchange in environmental expertise, skills and resources to both businesses while pursuing effective environmental initiatives for improved performance. Also, one can say from a stewardship theory perspective that, directors on environmental committees would develop deeper concern for corporate environmental issues. Thus, these directors could motivate other board of directors to make proactive strategies that would improve performance and build a better corporate social reputation (Dixon-Fowler et al., 2015; Fama, 1980). In addition, the presence of a CSR or an EC committee could increase the awareness of employees on the negative impacts and consequences of some the company's operational activities on the environment. By so doing, setting targets and incentives for the employees would be straightforward and benefit both employees and the company at large. According to Michelon and Parbonetti (2012), the existence of environmental or CSR committees would most likely encourage businesses to account and report for GHG emissions while making efforts to reduce such emissions. From the viewpoints, the following hypotheses are developed:

Hypothesis 1a: *The existence of CSR committee is negatively and significantly related to Scope 1 GHG emissions.*

Hypothesis 1b: *The existence of a CSR committee is positively and significantly related to Scope 2 GHG emissions.*

Realistically, engaging employees in the enforcement of corporate environmental management practices would be more effective than having some few managers and members of the CSR committee. A group of employees could be selected from all departments of the company to help ensure that environmental regulations and policies are adhered to throughout the company. This group of staffs may be referred to as the Environmental Team (ET). From a logical reasoning, one can say that a company with both an environmental committee and environmental team would have a higher

possibility to improve its environmental performance than a company with only an environmental committee. The feasibility of the mentioned better environmental performance would not be far-fetched when the responsibilities are decentralised across various departments with the assistance of the environmental team. There is currently no study in the environmental management scholarship that has investigated the possible relationship between the corporate environmental team and environmental performance. This study presumes that the presence of an environmental team would influence the relationship between the CSR committee and GHG emissions. The study therefore hypothesises:

Hypothesis 2: *The presence of an environmental team will moderate the relationship between the CSR committee and GHG emissions.*

1.5. Female gender diversity and environmental performance

Female and gender equality activists have emphasised the relevance of having more female directors on corporate boards (Dawar and Singh, 2016). A number of studies have investigated the relationship between gender diversity and corporate performance (Daniel et al., 2015). One school of thought opines that women directors are likely to improve overall board performance as women tend to participate and monitor committee performance vividly. Some previous research also highlights female board directors as very committed, diligent and innovative during board discussions (Harjoto, Laksmana, & Lee, 2015). In addition, studies have explored the influence of corporate boards gender diversity and corporate social responsibility and environmental performance (Walls et al., 2012; Fernandez-Feijoo et al., 2014). Though some studies found evidence of a positive influence of female directors on corporate social responsibility, others, however, are fuzzy on the significant role played by female directors on making environmental related decisions (Rodriguez-Dominguez, Gallego-Alvarez, & Garcia-Sanchez, 2009; Hayes, 2001; Galbreath, 2011).

Furthermore, Lu (2016) investigated the association between gender diversity and environmental performance of firms in the USA from 2009 to 2012 and found significant proof that women present different skills and interests on corporate boards. Her results suggest that the greater the percentage of female directors, the better the firm's environmental performance. Similarly, Kassinis, Panayiotou, Dimou, & Katsifaraki (2016) found evidence to support that demographic and structural gender diversity are all significant to improving environmental performance. Other researchers have argued that such positive influence of female directors on CSR could stem from the belief that women mostly reject unethical business behaviours and activities. In other words, wom-

en directors would advocate for responsible corporate practices such as those related to CSR and the environment (Huse, Nielsen, & Hagen, 2006; Boulouta, 2013). Biggins (1999) further posits that women are better at managing complex relationships and dealing with uncertainties no matter the diversity and complex network stakeholders. Based on the supporting literature, the study further hypothesises that:

Hypothesis 3: *Board female gender diversity moderates the relationship between the CSR committee and GHG emissions.*

1.6. Control variables

Three groups of control variables (i.e., corporate governance, company characteristics and prior financial performance) which have been supported by extant studies to influence the dependent variables (i.e., Scopes 1 and 2 GHG emissions) were used in this study. Firm size, has been in academic discourse over decades and started gaining firm grounds in research in the 1960s. Studies investigating the impact of firm size on corporate performance have yielded contrasting results. While some suggest a positive relationship with firm performance (e.g., Hall and Weiss, 1967; Majumdar, 1997; Doğan, 2013), others suggest a negative relationship (e.g., Shepherd, 1972; Vintila & Duca, 2013) and some could not establish any specific relationship (e.g., Whittington, 1980; Khatap, Masood, Zaman, Saleem & Saeed, 2011). Nonetheless, the studies in support of a positive relationship have pointed out that large firms have a greater tendency of adopting environmental management practices and investing in technologies to improve their performance compared to smaller firms who may have a small capital base (Dixon-Fowler et al., 2015). One could also argue that small firms may put in extra efforts to avoid engaging in emissions-related activities in order to avert regulatory fines and charges due to their financial constraints. However, the tendency of an increase in GHG emission as firm size expands is very likely and cannot be disregarded. This paper supports the assertion of the possible increase in emissions with expansion in firm size.

The study also controls for capital intensity. A business can be described as capital intensive when it requires large amounts of financial resources in producing its products and services (Sen and Farzin, 2000). A firm's capital intensiveness can help highlight its efficiency in utilising assets when producing goods and services (Sen and Farzin, 2000). Lubatkin and Chatterjee (1994), for instance, stressed that capital intensity may enhance a firm's performance and reduce related risks based on the rational of those firms enjoying cost savings from a capital commitment to tangible fixed assets. Thus, an increase in capital intensity such as those invested in advanced technological

assets may lead to a reduction in GHG emissions. Another variable controlled in this study is the board independence. Pfeffer (1972) emphasised in his earlier research that, independent directors contribute greatly to developing environmental strategies and policies and help to reduce GHG emissions eventually. Prado-Lorenzo, Gallego-Alvarez, & Garcia-Sanchez, (2009) also found empirical evidence that firms with high CSR disclosure do have quite a sizeable number of independent directors represented on the corporate board. The argument is that independent directors are mostly socially responsible and because they do not have a specific financial interest in the business itself per se, they would most likely push for a reduction in emission to save their reputation and integrity.

Lagged financial performance is controlled for in this paper as existing studies have argued that it may influence environmental performance (Waddock and Graves, 1997; Dixon-Fowler et al., 2015). The current study lagged return on assets (ROA) up to 3 years to represent financial performance in the analysis. Besides lagged financial performance, emissions are controlled where firms are grouped into heavy and light emitters. Companies with more than 1 million tonnes of CO_2 equivalent emissions were grouped as heavy emitters while those who emit less than one million were grouped as light emitters. The decision to segregate the emissions at 1 million tonnes is because the companies with larger emissions report in millions while those with smaller emissions report in thousands. A dummy variable was created for this, where 1 is for heavy emission sectors and 0 for light emission sectors.

2. Research design

Sample and data sources

The data used in this paper sourced from FTSE All Share as the population comprising of over 600 listed firms on the London Stock Exchange from 2011 to 2014. Unlike most studies that exclude financial firms due to varying operational and reputational reporting regulations, the researcher posits that all firms should be included in this analysis despite the sector since the DEFRA (2013) guidelines on mandatory GHG reporting does not exclude financial firms. Because of limited access to environmental related data, all environmental data were collected from ASSET4 ESG, a database for environmental and social responsibility data. The researcher employed two main criteria before arriving at the final sample for analysis. First, only firms with data on CSR committees, environmental teams, Scope 1 and Scope 2 GHG emissions were sampled. Out of 690 firms, only 144 firms met the first criteria as most firms either reported on one or two of the environmental data over the 4-year period. For the second criteria, only firms with data on corporate governance

variables and the other firm characteristics required in this study were sampled. All 144 firms passed the second sampling stage indicating the difficulty in accessing environmental related data and not the others. The breakdown of the sample size and sectors are presented in Table 1.

Table 1. Sample distribution by ICB sectors (FTSE All Share)

Sectors	Emission Category	No. of Firms	Frequency	
			Absolute	Relative (%)
Consumer Services	Light	24	82	16.6
Consumer Goods	Heavy	17	50	11.8
Financials	Light	33	114	22.8
Industrials	Heavy	34	117	23.6
Basic Materials	Heavy	20	65	13.7
Telecommunications	Light	2	8	1.3
Utilities	Light	3	11	2.1
Health	Light	5	20	3.4
Oil & Gas	Heavy	6	24	4.1
Technology	Light	1	3	0.6

Source. Author's sampled firms taken from London Stock Exchange.

10 business sectors are represented in the study using the industrial classification benchmark (ICB) though the number of firms represented under each sector was not equal to enable support of sectoral comparison. Out of those 10 sectors, four (i.e., Oil & Gas, Basic Materials, Industrials and Consumer Goods) are classified as heavy emission sectors while the remaining are categorised under light emission sectors. From Table 1, the industrial sector is the most dominant with 34 firms followed closely by the financial sector with 33 firms. The technology sector was the least represented with 1 firm followed by telecommunications with 2 firms.

Variables measurement

GHG emissions scopes 1 and 2 are the main dependent variables used in this study. According to the GHG Protocol Standard (2001), GHG emissions are to be grouped into Scopes 1, 2 and 3. Scopes 1 and 2 GHG emissions are required to be reported by listed firms in the UK (DEFRA, 2013), and therefore difficult to get data on Scope 3 which is voluntary. The CSR committee is the independent variable used in the study to explore its relationship with GHG emissions (Dixon-Fowler et al., 2015; Eberhardt-Toth, 2017). The study uses environmental team and board gender diversity (Liao et al., 2015; Fuente et al., 2017) as moderating variables for the analysis. All the measurement and description of the variables are shown in Table 2.

Table 2. Variable measurement

Variables	Expected sign		Measurement
Scope 1 GHG Emissions	Model 1		The natural logarithm of the reported amount of fuel combustion, company vehicles and fugitive emissions (direct)
Scope 2 GHG Emissions	Model 2		The natural logarithm of the reported amount of purchased electricity, heat and steam (indirect)
	Model 1	Model 2	
CSR Committee	–	+	The presence of a corporate social responsibility committee in the firm (1 for yes, 0 for no)
Environmental Team	–	–	The presence of an environmental team in the company (1 for yes, 0 for no)
Return on Assets	–	–	Earnings before interest and tax (EBIT) divided by total assets (TA) at the end of the financial year
Board Independence	–	–	The percentage score of the independent level of the board
Capital Intensity	–	–	The total assets divided by total sales of the company
Firm Size	+	+	The natural logarithm of capital employed by the company
Board Gender Diversity	–	–	The percentage of females on the board

Economic modelling

The study uses unbalanced panel data analysis which covers cross-sectional and time series dimensions of data due to the lack of data for all the periods under study. According to Hsiao (2003), panel data analysis provides much accurate inference which increases the efficiency of the econometric estimates where $T = 1$ or $N = 1$. It has been argued to contain a greater degree of freedom and sampling variability than in cross-sectional data (Baltagi, 2008). The estimated model can be written as:

$$GHG\_it = \alpha\_it + \beta\_0 + \beta\_1\, CSR\_it + \beta\_2\ ET\_it + \beta\_3$$
$$CSR^{*}\, ET\_it + \beta\_4\ BD\_it + \beta\_5\ CSR^{*}\, BD + \beta\_6$$
$$CI\_it + \beta\_7\ FS\_it + \beta\_8\ BI\_it + \beta\_9$$
$$ROA\_it + \beta\_10\ ED\_it + \mu\_i + \varepsilon\_t,$$

where i is 1… 494, t is the time dimension from 2011 to 2014 and stands for the variable intercept which differs yearly. *CSR* is the existence of CSR committee, *ET* represents the environmental team, *CSR *ET* is the interaction term between CSR committee and environmental team, *BD* is the female board di-

versity, *CSR * BD* represents the interaction term between CSR committee and board diversity, *CI* is the capital intensity, *FS* stands for firm size, *BI* represents board independence, *ROA* is the lagged variable up to 3 years and *ED* is the emissions dummy.

3. Results and discussions

Descriptive statistics

Table 3 shows the descriptive statistics and correlation matrix of the variables used in the study. Approximately 50% of the board were independent directors which show that about half the directors on the board are independent based on the sample size. Also, on average, 16% of the board of directors are female indicating that all the firms in the study have at least one woman on the board. The mean of the CSR committee is 0.94, firm size is 16.6 and environmental team, 0.83 respectively.

Table 3. Descriptive statistics and correlations

VARIABLE	MEAN	SD	SC1	SC2	CSR	ENV. TEAM	ROA	BI	CI	FS	BD
SC1	10.02	4.43	1.000								
SC2	9.63	4.49	0.409**	1.000							
CSR	0.94	0.24	0.074	0.143**	1.000						
ENV. TEAM	0.83	0.38	0.010	0.138**	0.288**	1.000					
ROA	10.98	27.48	0.007	0.005	–0.005	0.027	1.000				
BI	50.51	29.27	0.015	–0.059	0.065	0.004	0.043	1.000			
CI	6.54	20.77	–0.168**	–0.060	–0.018	–0.004	–0.049	–0.089**	1.000		
FS	16.06	2.30	0.199**	0.346**	0.166**	0.126**	0.051	–0.050	0.273**	1.000	
BD	16.27	9.65	–0.003	0.053	0.001	0.084	0.092**	0.010	0.017	0.184**	1.000

N = 494.
*p < 0.05 (two-tailed).

The pair-wise correlation matrix was to check for any multicollinearity among the variables. As emphasised by Bedeian (2014), a higher correlation of 0.6 or more is an indication of multicollinearity. Since the data did not show any form of high correlation there is no need to treat and modify the data.

Tests and results

The natural logarithm of Scopes 1 and 2 GHG emissions was taken to normalise the data as some firms were extremely heavy emitters and others very small to avoid dealing with outliers. The study uses hierarchical regression analysis

to test the relevance of the moderating and control variables upon inclusion in the model.

Before deciding on the model to use, the researcher first run the Durban-Wu-Hausman test on both fixed and random effect models to compare efficiency and consistency. The test strongly supporting the use of fixed effects (FE) model in the analysis as prob > chi2 = 0.000. A number of post-estimation tests were run to ensure that estimates and standard errors are efficient. For instance, the modified Wald test for groupwise heteroskedasticity showed that the errors were different across the units. Misani and Pogutz (2015) in their study resorted to using robust standard error to solve heteroskedasticity, however, the use of robust standard errors in the current study could not completely deal with heteroskedasticity. The best linear unbiased estimator (BLUE) to fit the model was feasible generalised least squares (FGLS) which have been pointed out in literature to give efficient estimators where groupwise heteroscedasticity is present (Reed and Ye, 2011).

Using a hierarchical regression analysis, control variables were entered in the first model as shown in Table 4. Variables such as capital intensity, firm size and emissions dummy were all found to be statistically significant in explaining Scope 1 emissions. Firm size, for instance, was positively related to Scope 1 emissions while capital intensity was negatively related as hypothesised. In Model 2, the CSR committee was found to be negatively related to Scope 1 emissions thus, supporting the hypothesis (H1a). The environmental team was also found to be statistically significant and negatively related to Scope 1 emissions as hypothesised. However, CSR committee was not statistically significant though a negative relationship was found. A further test of the interaction term between the CSR committee and the environmental committee was done. The findings suggest that the interaction term is statistically significant and negatively related to Scope 1 emissions supporting the study's hypothesis (H2). To test H3, board diversity was included in Model 2 which had only corporate governance and independent variable. The relationship between gender diversity was negative as predicted, but not statistically significant. A further test of the interaction term between CSR and board diversity in Model 6 indicates that board diversity is a moderating factor in the Scope 1 GHG emissions and CSR relationship.

Scope 2 GHG emission was used as the independent variable for analysis as shown in Table 5. Following the same hierarchical regression steps as above, capital intensity, firm size and emissions dummy were all statistically significant control variables in Model 1. CSR committee was included in Model 2 as the independent variable and was found to be statistically significant and positively related to Scope 2 emissions which support H1b. In Model 3, the environmental team was included resulting in a positively statistically significant relationship unlike when tested for Scope 1. However, when the interaction term between the CSR committee and the environmental team was included

Table 4. The relationship between corporate social responsibility committee and scope 1(SC1) GHG emissions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Capital Intensity (CI)	–0.009**	–0.007*	–0.007*	–0.007*	–0.006	–0.008**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Firm Size (FS)	0.069***	0.069***	0.071***	0.078***	0.065***	0.084***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)	(0.021)
Board Independence (BI)	0.001	0.002	0.001	–0.001	–0.001	0.110
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Lagged ROA	0.001	0.001	0.001	0.001	0.010	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Emission Dummy (ED)	6.072***	6.101***	6.111***	6.124***	6.116***	6.127***
	(0.065)	(0.066)	(0.064)	(0.064)	(0.079)	(0.079)
CSR Committee (CSR)		–0.193	–0.094	0.633***	–0.120	0.963***
		(0.156)	(0.173)	(0.199)	(0.174)	(0.278)
Environmental Team (ET)			–0.204***	1.108***		
			(0.069)	(0.204)		
CSR * ET				–1.438***		
				(0.225)		
Board Diversity (BD)					–0.005	0.056***
					(0.004)	(0.011)
CSR * BD						–0.066***
						(0.012)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.22	0.25	0.26	0.29	0.24	0.27

*** Significant at 1% level, ** significant at 5% level and * significant at 10%.
Efficient coefficients are estimated by FGLS for GroupWise heteroskedasticity.
Standard errors in parenthesis.

in Model 4, it was found to be statistically significant and negatively related to Scope 2 GHG emissions, thus supporting the hypothesis. Board diversity was included in Model 5 and the results showed it was statistically significant and negatively related to the dependent variable. The interaction term between board diversity and the CSR committee was also significant and negatively associated with Scope 2 emissions.

For Scope 1 GHG emissions, the results show that board independence and lagged ROA were not significant in any of the models. Board independence was found to be negatively related with emissions Models 4 and 5 and not the others. However, using Scope 2 as the dependent variable, board independence was statistically significant and found to have a negative relationship in Models 2, 3, 4 and 5 but not significant in Models 1 and 6. Lagged ROA was positively related to Scope 1 emissions while negatively related to Scope 2

Table 5. The relationship between corporate social responsibility committee and scope 2 (SC2) GHG emissions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CSR		1.239***	0.677**	1.483***	1.360***	2.061***
		(0.134)	(0.287)	(0.545)	(0.180)	(0.586)
Environmental Team (ET)			0.578***	2.844***		
			(0.205)	(0.569)		
CSR * ET				–2.611***		
				(0.597)		
CSR * BD						–0.104***
						(0.029)
Board Diversity (BD)					–0.015**	0.084***
					(0.006)	(0.028)
Capital Intensity	–0.018***	–0.016***	–0.011	–0.009	–0.020***	–0.019***
	(0.006)	(0.005)	(0.007)	(0.007)	(0.006)	(0.007)
Firm Size	0.591***	0.574***	0.554***	0.564***	0.602***	0.604***
	(0.042)	(0.039)	(0.042)	(0.042)	(0.040)	(0.041)
Board Independence	–0.003	–0.004**	–0.005**	–0.005**	–0.003*	–0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Lagged ROA	–0.001	–0.002	–0.001	–0.001	–0.001	–0.001
	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Emission Dummy	3.187***	3.173***	3.179***	3.150***	3.023***	2.993***
	(0.152)	(0.149)	(0.139)	(0.143)	(0.158)	(0.157)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.27	0.30	0.31	0.34	0.31	0.32

*** Significant at 1% level, ** significant at 5% level and * significant at 10%.
Efficient coefficients are estimated by FGLS for GroupWise heteroskedasticity.
Standard errors in parenthesis.

emissions though not statistically significant. For robustness purpose, a further test on lagged ROA was carried out for three years to explore the likelihood of other lagged periods being significant. However, none was statistically significant in any of the models in explaining the relationship between CSR and GHG emissions.

Discussion and analysis

The results indicate that the presence of a CSR committee does relate to the reduction of Scope 1 emissions but has no influence on Scope 2 emission reduction. As hypothesised, it was expected that firms' CSR committees will rather focus on taking actions that will lead to the reduction of direct emissions (Scope 1) before focusing on indirect emissions. The results indicate vividly that CSR committees will develop measures and strategies to reduce Scope 1 emissions as those have to do with possible investment in energy efficient ma-

chines for production, manufacturing and delivering of some services. Though the results indicate that the existence of such a committee may not lead to a reduction in Scope 2 emissions. This could be attributed to the fact that Scope 2 emissions are those related to imported and purchased electricity, heat or steam. Consequently, since measures to reduce electricity consumption and conserve electricity such as switch-off policies, sensor bulbs, programmed boilers and radiators etc. are popular measures, the likelihood of employees already practising and adhering to these is high. As such, the CSR committee may not bother itself with those emissions because the practices to reduce emissions could already be part of company policies. In this regard, the conclusion of the CSR committee improving environmental performance as found by Dixon-Fowler et al. (2015) and Fuente et al. (2017) cannot be overruled completely because Scope 2 emissions may not necessarily be reduced but this study supports the assertion for Scope 1 emissions.

The findings also support the empirical evidence found by Walls et al. (2012) and Fernandez-Feijoo et al. (2014) that gender diversity could lead to improved environmental performance. Female board diversity was found to have a negative relationship with both Scope 1 and Scope 2 emissions. This would suggest that, as supported by existing studies, women are more conscious about social and environmentally related issues and thus their contribution affects the reduction of emissions. The relationship between gender diversity and emissions was rather significant in reducing Scope 2 emissions and not Scope 1. A possible reason could be because those policies and measures are already advocated in the media to reduce electricity consumption.

Also, since the existing literature has not investigated the effect of the environmental team on GHG emissions aside from the CSR committee, the current study suggested the need to investigate this possible influence. The findings clearly indicate that an environmental team has statistically significant effect on both Scope 1 and Scope 2 GHG emissions. From the results, a positive relationship was found between Scope 2 and the environmental team, contrary to the study's hypothesis. However, a logical interpretation may be due to the fact that measures such as those mentioned earlier to help reduce Scope 2 emissions would not influence management to establish a team as all employees could be motivated to be involved in a form of company policy.

The predicted moderation effect of the environmental team and gender diversity on the CSR committee and GHG emissions were found to be significant. This implies that, for improved measures and decentralisation of environmental strategies, it is beneficial for firms to create a CSR committee and an environmental team to handle environmentally related matters. Also since the CSR committee deals with many issues such as ethical and safety matters, emission reduction would not be the sole objective. Therefore, it is desirable to have a team specially assigned to ensure improved environmental performance, in addition, a CSR committee (Dixon-Fowler et al., 2015).

Conclusions and future research

This paper investigated the relationship between the CSR committee and GHG emissions using Scope 1 and Scope 2. Arguments by researchers such as Liao, Luo and Tang (2015), Fuente et al. (2017) and Dixon-Fowler et al. (2015) support the assertion that the presence of CSR committees could lead to an improvement in corporate environmental performance. Also, the paper investigated the possible moderation effect of female board diversity and environmental teams on the association between the CSR committee and GHG emissions. To test the validity of these hypotheses data were sourced from ASSET4 ESG and DataStream from the year 2011 to 2014 using FTSE All Share as the population. Based on the sampling criteria used 144 firms were used for the panel analysis. The findings are consistent with existing literature (e.g., Fernandez-Feijoo et al., 2014; Walls et al., 2012; Dixon-Fowler et al., 2015) who found evidence that a CSR committee helps improve environmental performance. In other words, the presence of a CSR committee could help reduce emissions and pollution. The results also support the researcher's assertion that GHG emissions should be analysed using the separate scopes of direct and indirect GHG emissions as categorised by the GHG protocol standard (2001).

This study contributes to existing literature on environmental performance and corporate governance in a number of ways. First, the results will help management understand the extent to which CSR committees are relevant to improve environmental performance. The indication that a board committee alone does not influence Scope 1 emissions would direct management towards the decisions to take to help to reduce direct emissions. It is relevant for directors to understand that Scope 1 emissions are directly related to the operational activities of the business and that it is worth putting in extra effort to reduce such emissions.

In addition, the empirical evidence that gender diversity influences the reduction of both Scope 1 and 2 emissions can be explained from the shareholder theory perspective. With the knowledge that female representatives on corporate boards tend to advocate for better environmental performance, shareholders who are environmentally conscious will decide in that regard when electing board directors. Also, other stakeholders concerned about the firm's environmental performance and reputation may influence the number of females to be recommended on corporate boards.

Also, the study makes an emerging argument of the relevance of environmental teams in companies, especially those that only have CSR committees and not an environmental committee. The results have clearly shown that even where CSR committees are not able to affect the reduction in Scope 2 emissions, perhaps due to the huge responsibility placed on the committee, the existence of an environmental team does influence this reduction. Following this clear evidence management and decision makers would understand the need to have a team in place, perhaps one that comprises employees from all departments

to help record and monitor environmental performance. It is worth mentioning here that the interpretation of these results should be made with caution as the support is for companies with CSR committees and not those with environmental committees and thus, bearing in mind that CSR covers other issues apart from environmental sustainability.

Despite these contributions, there are a few limitations that could guide and suggest research areas for future studies. First of all, the sample size used in the study is very small due to lack of access to environmental related data. Due to the small number of firms that were represented in some sectors the researcher was unable to make a sectoral comparison for better insight. Also, because the study setting was FTSE AllShare index of firms in the UK, the findings cannot be associated with other firms in different settings. Future studies could focus on exploring the composition of CSR and environmental committees to investigate whether the skills of the members of these committees are relevant for emission reduction. In other words, it is likely that a CSR or environmental committee may have a similar impact depending on the members of that committee. Furthermore, future studies should explore lagged financial performance indicators and their impact on environmental performance. Perhaps using both accounting-based and market-based measures would give a better perspective and understanding.

References

Agrawal, A., & Knoeber, C.R. (2012). *Corporate governance and firm performance*.

Baltagi, B. (2008). *Econometric analysis of panel data*. John Wiley & Sons.

Bedeian, A.G. (2014). "More Than Meets the Eye": A guide to interpreting the descriptive statistics and correlation matrices reported in management research. *Academy of Management Learning & Education, 13*(1), 121-135.

Berrone, P., & Gomez-Mejia, L.R. (2009). Environmental performance and executive compensation: An integrated agency-institutional perspective. *Academy of Management Journal, 52*(1), 103-126.

Biggins, J.V. (1999). Making board diversity work. *Corporate Board, 20,* 11-16.

Boiral, O., & Henri, J.F. (2012). Modelling the impact of ISO 14001 on environmental performance: A comparative approach. *Journal of Environmental Management, 99*, 84-97.

Borland H., & Paliwoda S. (2011). Marketing responsibility in an era of an economic and climactic challenge. *Marketing Intelligence and Planning, 29*(1): 49-62.

Boulouta I. (2013). Hidden connections: The link between board gender diversity and corporate social performance. *Journal of Business Ethics, 113*(2): 185-197.

Chau, G., & Gray, S.J. (2010). Family ownership, board independence and voluntary disclosure: evidence from Hong Kong. *Journal of International Accounting, Auditing and Taxation, 19*(2), 93-109.

Coffey, B.S., & Wang, J. (1998). Board diversity and managerial control as predictors of corporate social performance. *Journal of Business Ethics, 1714,* 1795e1603.

Dawar, G., & Singh, S. (2016). Corporate social responsibility and gender diversity: A literature review. *Journal of IMS Group, 13*(1), 61-71.

DEFRA Environmental Reporting Guidelines (2009). Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69282/pb13309-ghg-guidance-0909011.pdf

de Villiers, C., Naiker, V., & van Staden, C.J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management, 37*(6), 1636-1663.

Dixon-Fowler, H.R., Ellstrand, A.E., & Johnson, J.L. (2015). The role of board environmental committees in corporate environmental performance. *Journal of Business Ethics*, 1-16.

Doğan, M. (2013). Does firm size affect the firm profitability? Evidence from Turkey. Research *Journal of Finance and Accounting, 4*, 53-59.

Dunn, J. (2005). Mobility contested: Ethical challenges for planners, administrators and policy analysts. In a conference on ethics and integrity of governance, Leuven, 2-.5

Eberhardt-Toth, E. (2017). Who should be on a board corporate social responsibility committee? *Journal of Cleaner Production, 140*, 1926-1935.

Elkington, J. (2006). Governance for sustainability. *Corporate Governance: An International Review, 14*(6), 522-529.

Fama, E.F. (1980). Agency problems and the theory of the firm. *Journal of Political Economy, 88*(2), 288-307.

Fernandez, J.L., Luna Sotorrio, L.L., & Baraibar Díez, E. (2011). The relation between corporate governance and corporate social behaviour: a structural equation model analysis. *Corporate Social Responsibility Environmental Management, 18* (2), 91-101.

Fernandez-Feijoo, B., Romero, S., & Ruiz-Blanco, S. (2014). Women on boards: do they affect sustainability reporting? *Corporate Social Responsibility and Environmental Management, 21*(6), 351-364.

Freeman, R.E. (1984). *Stakeholder management: framework and philosophy*. Pitman, Mansfield, MA.

Frías-Aceituno, J., Rodriguez-Ariza, L., & Garcia-Sanchez, I.M. (2012). The role of the board in the dissemination of integrated corporate social reporting. *Corporate Social Responsibility Environmental Management, 20,* 219-233.

Fuente, J.A., García-Sánchez, I.M., & Lozano, M.B. (2017). The role of the board of directors in the adoption of GRI guidelines for the disclosure of CSR information. *Journal of Cleaner Production, 141,* 737-750.

Galbreath, J. (2011). Are there gender-related influences on corporate sustainability? A study of women on boards of directors. *Journal of Management & Organization, 17*(01), 17-38.

GHG Protocol Standard (2001). Retrieved from https://www.wri.org/sites/default/files/pdf/ghg_protocol_2001.pdf

Graves, S.B., & Waddock, S.A. (1994). Institutional owners and corporate social performance. *Academy of Management journal, 37*(4), 1034-1046.

Hall, M., & Weiss, L. (1967). Firm size and profitability. *The Review of Economics and Statistics,* 319-331.

Harjoto, M., Laksmana, I., & Lee, R. (2015). Board diversity and corporate social responsibility. *Journal of Business Ethics, 132*(4), 641-660.

Harrison, J.R. (1987). The strategic use of corporate board committees. *California Management Review, 30*(1), 109-125.

Hayes, B.C. (2001). Gender, scientific knowledge, and attitudes toward the environment: A cross-national analysis. *Political Research Quarterly, 54*, 657-671.

Horváthová, E. (2010). Does environmental performance affect financial performance? A meta-analysis. *Ecological Economics*, 70(1), 52-59.

Hsiao, C. (2003). Analysis of Panel Data, 2nd. Cambridge: Cambridge University Press. Kose, Ma, Es Prasad, & Me Terrones (2003), *Financial integration and macroeconomic volatility, Imf Staff Papers, 50,* 119-142.

Huse, M., Nielsen, S., & Hagen, I. (2009). Women and employee-elected board members, and their contributions to board control tasks. *Journal of Business Ethics, 89*(4): 581-597.

Ibrahim, N.A., & Angelidis, J.P. (1995). The corporate social responsiveness orientation of board members: are there differences between inside and outside directors? *Journal of Business Ethics, 14* (5), 405-419.

Kassinis, G., Panayiotou, A., Dimou, A., & Katsifaraki, G. (2016). Gender and environmental sustainability: a longitudinal analysis. *Corporate Social Responsibility and Environmental Management.*

Kassinis, G., & Vafeas, N. (2002). Corporate boards and outside stakeholders as determinants of environmental litigation. *Strategic Management Journal, 23*(5), 399-415.

Khatab, H., Masood, M., Zaman, K., Saleem, S., & Saeed, B. (2011). Corporate governance and firm performance: A case study of Karachi stock market. *International Journal of Trade, Economics and Finance, 2*(1), 39-43.

Li, J., Zhao, F., Chen, S., Jiang, W., Liu, T., & Shi, S. (2016). Gender diversity on boards and firms' environmental policy. *Business Strategy and the Environment.*

Liao, L., Luo, L., & Tang, Q. (2015). Gender diversity, board independence, environmental committee and greenhouse gas disclosure. *The British Accounting Review, 47,* 409-424

Lu, J. (2016). Gender Diversity, board interlocks and environmental performance (Doctoral dissertation, University of Calgary).

Lubatkin, M., & Chatterjee, S. (1994). Extending modern portfolio theory into the domain of corporate diversification: does it apply? *Academy of Management Journal, 37*, 109-136.

Majumdar, S.K. (1997). The impact of size and age on firm-level performance: some evidence from India. *Review of Industrial Organization, 12,* 231-241.

Michaels, S. (2009). Matching knowledge brokering strategies to environmental policy problems and settings. *Environmental Science & Policy, 12*(7), 994-1011.

Michelon, G., & Parbonetti, A. (2012). The effect of corporate governance on sustainability disclosure. *Journal of Management & Governance, 16*(3), 477-509.

Misani, N., & Pogutz, S. (2015). Unravelling the effects of environmental outcomes and processes on financial performance: a non-linear approach. *Ecological Economics, 109*, 150-160

Murillo-Luna, J.L., Garcés-Ayerbe, C., & Rivera-Torres, P. (2008). Why do patterns of environmental response differ? A stakeholders' pressure approach. *Strategic Management Journal, 29*(11), 1225 1240.

Nelson, J., Zollinger, P., & Singh, A. (2001). The power to change: mobilising board leadership to deliver sustainable value to markets and society: corporate governance and

the triple bottom line. *International Business Leaders Forum.* Retrieved from: http://sustainability.com/wp-content/uploads/2016/09/sustainability_powerto_change.pdf

Osemeke, L. (2011). The study of the effect of the role of board of directors bod characteristics on corporate social responsibility on CSR of public listed company PLC in Nigeria. *SSRN* Working Paper no. 1972954.

Pfeffer, J. (1972). Size and composition of corporate boards of directors: the organization and its environment. *Administrative Science Quarterly 17* (2), 218-228.

Pletzer, J.L., Nikolova, R., Kedzior, K.K., & Voelpel, S.C. (2015). Does gender matter? Female representation on corporate boards and firm financial performance-a meta-analysis. *PloS one, 10*(6), e0130005.

Prado-Lorenzo, J.M., Gallego-Alvarez, I., & Garcia-Sanchez, I.M. (2009). Stakeholder engagement and corporate social responsibility reporting: the ownership structure effect. *Corporate Social Responsibility and Environmental Management, 16*(2), 94-107.

Pulver, S. (2007). Introduction: developing-country firms as agents of environmental sustainability? *Studies in Comparative International Development, 42*(3-4), 191-207.

Reed, W.R., & Ye, H. (2011). Which Panel Data Estimator Should I Use? *Applied Economics, 43,* 985-1000.

Rodriguez-Dominguez, L., Gallego-Alvarez, I., & Garcia-Sanchez, I.M. (2009). Corporate governance and codes of ethics. *Journal of Business Ethics, 90*(2), 187-202.

Sen, S., & Farzin, R. (2000). Downsizing, capital intensity, and labour productivity. *Journal of Financial and Strategic Decisions, 13*(2), 73-81.

Sharma, S., & Henriques, I. (2005). Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal*, *26*(2), 159-180.

Shepherd, W.G. (1972). The elements of market structure. *The Review of Economics and Statistics,* 25-37.

Stubbs, W., & Cocklin, C. (2008). Conceptualising a "sustainability business model". *Organization & Environment, 21*(2), 103-127.

Tanaka, K. (2011). Review of policies and measures for energy efficiency in industry sector. *Energy Policy, 39*(10), 6532-6550.

Tonello, M. (2011). Sustainability matters: Why and how corporate boards should become involved. Conference Board. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2032230

Vintila, G., & Duca, F. (2013). A Study of the Relationship between corporate social responsibility-financial performance-firm size. *Romanian Statistical Review in its Journal Romanian Statistical Review Supplement, 61*(1), 62-67.

Waddock, S.A., & Graves, S.B. (1997). The corporate social performance-financial performance link. *Strategic Management Journal*, 303-319.

Walls, J.L., Berrone, P., & Phan, P.H. (2012). Corporate governance and environmental performance: Is there really a link? *Strategic Management Journal, 33*(8), 885-913.

Whittington, G. (1980). The profitability and size of United Kingdom companies, 1960-74. *The Journal of Industrial Economics*, 335-352.

Ziegler A., Busch T., Hoffmann V. (2009). Corporate responses to climate change and financial performance: The impact of climate policy (CER-ETH-Center of Economic Research at ETH Zurich, Working Paper No. 09/105). Retrieved from http://www.socialpolitik.ovgu.de/sozialpolitik_media/papers/Busch_Timo_uid955_pid273.pdf Google Scholar