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CORPORATE GOVERNANCE (CG) AND ENVIRONMENTAL REPORTING (ER): EVIDENCE FROM CHINA'S FINANCIAL AND NON-FINANCIAL SECTORS

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Annotation. This article empirically investigates the relationship between corporate governance (CG) and environmental reporting (ER) in financial and non-financial sectors of China for the period of 2015-2021. A self-generated environmental reporting index (ERI) is used with the help of manual content analysis. Moreover, the reporting frequency comparison (RFC) and paired sample t-test are applied to compare the environmental reporting in both sectors and report the potential change after and before the revision of Corporate Governance Guidelines in 2018 by the China Securities Regulatory Commission (CSRC). The results from multiple regression analyses suggest that foreign national directors significantly influence environmental reporting in the non-financial firms, while in the financial firms, the elements of corporate governance are found to exert no impact on environmental reporting. Parallel to this, the paired sample t-test and RFC show that environmental reporting is significantly greater in the non-financial firms than in the financial ones. This article offers novel contributions to the extant studies on CG and ER by employing a self-generated ERI to assess the ER in both financial and non-financial firms of China using the stakeholder theory as a theoretical lens. The policymakers and regulatory authorities in China and abroad should focus on the suggested governance framework to fulfil stakeholders' needs and improve corporate environmental reporting.

Keywords: environmental reporting (ER), corporate social responsibility (CSR), corporate governance (CG), stakeholder theory.

JEL classification: G30, G34, M14, Q50, Q56.

Introduction

Environmental reporting (ER) is a noticeable feature of corporate social disclosure across the world. It discloses the influences of corporate operations on the surrounding environment to all concerned parties such as shareholders, regulatory authorities, media, customers and employees, (Belas *et al.*, 2023; Rozsa *et al.*, 2022; Chelli *et al.*, 2018; Post *et al.*, 2011). Due to social, economic, and environmental concerns, the regulatory authorities in China and other countries have taken a series of ecological initiatives by legislating different guidelines and regulations that promote the adoption of sound environmental activities. For instance, in 1979, the state of China imposed the first trial version of Environmental Protection, and in 1989, the first official version of the same law (Chang *et al.*, 2015). In

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2014, China's authorities published a new updated version of the Environmental Protection Law. This was followed by the Regulation on Environmental Information Disclosure imposed by the Ministry of Environmental Protection of China in May 2008 (Du *et al.*, 2014). Meanwhile, the Chinese stock exchanges also have issued guidelines on environmental reporting for listed enterprises (Weber, 2014), specifically Shanghai, Shenzhen, and Hong Kong stock exchanges have published several guidelines for ER among listed firms. Regardless of these countermeasures and initiatives, the moderate enforcement of regulations has contributed to poor incorporation of such ecological codes and guidelines (Khan, Chang, 2018). In this context, the quality of environmental reporting is expected to be affected by CG elements (Jizi, 2017). Thus, this paper holds that strengthening the CG structure in the shape of having independent boards as well as foreign board members, can assist in fostering the integration of environmental reporting guidelines.

In China and across the globe, corporate sectors are under constant pressure and more scrutiny than ever before to offer information on their ecological performance. A large number of researchers emphasise for the value of enterprises taking into account their impact on the environment (Kathy Rao *et al.*, 2012). The decision to report on ecological concerns is most often made within a wider context, and decisions must not be taken in isolation. It is crucial to consider the degree of corporate environmental reporting from the governance perspective of the company. Although corporate governance is well researched in China's context, only recently has this research been expanded to assume the association between the governance mechanism and environmental reporting. For instance, Lakhal (2005) believes that a strong corporate governance generally increases the level of corporate reporting, but such research has not been extensively conducted to ascertain whether this also holds true for ER. Sound CG enhances transparency, accountability, and eventually contributes to more environmental reporting, both mandatory and voluntary. On the one hand, the growing concern for the global environment necessitates active corporate participation in environmental reporting, while, on the other hand, the significance of inclusive corporate governance assemblies has triggered the investigation of ecological reporting from the stakeholders' perspective and its integration into corporate governance (Yook *et al.*, 2017).

In terms of the environment, the recent dynamic variations in the world have been a notable factor for the corporate sector of China. The proposed variations point to an innovative path in scrutinising the accountability and responsibility in operation of these enterprises and the influence of their operations on the environment (Rouf, Al-Faryan, 2024). A variety of means have been employed in different countries to offer information on ecological performance. Therefore, different communication means are used for this purpose such as newsletters, magazines, annual reports, press release, and sustainability reports (Rafique *et al.*, 2017). Strong CG not only opens the door to external equity, but also plays a pivotal role in refining the enterprise value. In emerging economies such as China, sound CG meets different objectives such as reducing interest on the lent capital, reducing transaction expenses and political turmoil, and developing capital markets (Song, 2018). Similarly, CG practices lead to a strong affiliation among the board members, management, shareholders, suppliers, customers, personnel, and regulatory agencies (Larcket, Tayan, 2020). Meanwhile, the key objective of corporate governance is the wealth maximisation of shareholders, and effective environmental reporting is an ethical way of conducting business with a core focus on shareholders.

Furthermore, several environmental reporting standards have noticeably emerged over the past few decades due to the growing environmental concerns among international institutions, professional researchers, and the general public across the world (Hussain *et al.*, 2018; Ho, Taylor, 2007; Deegan, Gordon, 1996). Firms voluntarily perform and report their environmental practices (Gibson, Donovan, 2007; Patten, 2002). It assists the companies in not only moderating their negative impact on the natural environment, but also helps them to gain the confidence of stakeholders and avoid potential environmental legislations (Naseer, Rashid, 2018) and reduce information asymmetry (Brammer, Pavelin, 2006). In the context of an international forum, the 4th assessment report of the UN on the IPCC explicitly emphasises the significance of enterprise ER (Chen, Bouvain, 2009). Similarly, the award of the 2004 Nobel Peace Prize to Wangari Maathi, Kenyan environmental activist and Al Gore, former US Vice President, for their contributions toward sustainable development further highlights the global importance of environmental reporting (Post *et al*., 2011). Consequently, environmental reporting has become an important phenomenon in China and globally over the last few decades (Hussain *et al*., 2020; Ullmann, 1985). Nevertheless, the degree of ER in Chinese companies is very low (Noronha *et al*., 2013). Therefore, there is a substantial need to identify the key obstacles preventing Chinese corporations from exercising environmental reporting. One prominent domain for this concern is to examine how firms are governed. As a result, business enterprises in China and other developing countries could integrate an essential set of actions to foster their environmental reporting. Sound CG mandates the creation of healthy returns for their shareholders and maintains organisational transparency, accountability, and high ethical standards (Ruangviset *et al*., 2014).

The notion of corporate governance requires that firms to be counted not only for their economic or financial performance but also for their ecological concerns (Odoemelam, Okafor, 2018; Buniamin *et al*., 2011). A wide range of theoretical spectrum has created a reasonable consensus suggesting that CG has a pivotal role in ensuring that enterprises fulfil their CSR obligations (Katmon *et al*., 2019; Samahaa, Hussainey, 2015; Rao, Tilt, 2016b). Most previous studies on CSR in China are limited to corporate image, state ownership, financial performance, and regulatory pressure (He *et al*., 2019; Yang *et al*., 2019; Yu, Rowe, 2017; Cheng *et al*., 2016; Weber, 2014). Nonetheless, much less attention is paid to how governance characteristics affect environmental reporting from the Chinese perspective (Zhou, 2019; Nguyen *et al*., 2021). The regulatory framework of China is more inclined to target the disciplinary behaviours of the companies rather than establishing better social and ecological standards. The existing literature suggests there is no empirical literature in China that empirically examines the potential correlation between corporate governance and environmental reporting in both financial and non-financial corporations. Thus, this empirical paper is meant to fill this gap by investigating the influence of CG on environmental reporting in both sectors from the perspective of stakeholder theory.

This paper differs from previous studies in a number of ways. For instance, this is the first study that offers a preliminary argument into the impact of corporate governance on environmental reporting in both sectors (financial and non-financial) of China in the lens of stakeholder theory. Based on the governance characteristics of the enterprises, this study elaborates on the theoretical motives behind practicing ER. Furthermore, this article also contributes to ascertaining the extent of ER in China before and after the revision of the Corporate Governance Guidelines by CSRC in 2018. Additionally, a self-generated ERI based on 10 different provisions of environmental reporting is adopted to evaluate the influence of corporate governance on the environmental reporting. Lastly, a comprehensive analysis of each construct of ERI is conducted to attain a detailed insight into the ecological performance of enterprises from different viewpoints. As a result, this empirical study offers a role model on corporate governance and environmental reporting that can also be incorporated by several other emerging economies with socio-economic conditions similar to China.

Primarily, this study aims to investigate the impact of corporate governance on environmental reporting in financial and non-financial sectors of China. This research also endeavours to rank the Chinese enterprises in terms of their environmental reporting and compare financial and non-financial companies in the context of environmental reporting. Lastly, this study intends to determine potential changes in the extent of environmental reporting before and after the revision of Corporate Governance Guidelines in 2018 by the China Securities Regulatory Commission (CSRC).

1. Literature Review

Scholars have emphasised exploring why certain business entities are more profitable than others (Barney, Clark, 2007). the stakeholder school is the main approach to studying this trend that underscores seeking competitive edges through the fulfilment of the stakeholders' needs. The term *stakeholder theory* was first coined by Freeman (1984), who argued that the firm is required to fulfil the needs of all groups of stakeholders who have a direct or indirect stake in the business to maximise the corporate value (Freeman *et al*., 2004). In the light of stakeholder theory, the firm communicates its environmental concerns to all relevant stakeholders through environmental reporting (Buniamin *et al*., 2011; Michelon and Parbonetti, 2010). The proposed theory posits that a wide range of social requirements are also fulfilled through voluntary social disclosure such as altering the social and general perception regarding the corporate strategic performance. Furthermore, any strategy that opposes the stakeholder's value puts the economic success of the business at stake, as stakeholders are more likely to react negatively to the corporation and vice versa (Maurer *et al*., 2011). The investors consider the worst scenario and bid down the share prices in the absence of CSR disclosure (Cormier, Magnan, 1999). Therefore, corporations lower the information asymmetry by reporting voluntary ecological information to all stakeholders (Brammer, Pavelin, 2006). Environmental disclosure can also be used to raise awareness of vital non-market influences that contain the long-term interests of shareholders (Patten, 2002). The concept of stakeholder theory is aligned with the CG principles. Modern codes of CG dictate that firms must assume all stakeholders' interests while maximising shareholder value (Michelon, Parbonetti, 2012). The CG codes also hold that enterprises should secure all stakeholders' interests (Miles, 2017). This shows that the stakeholder theory represents the narratives of both CG and ER.

Although the existing literature also highlights several other CG and CSR theories supporting the social and environmental reporting of the firms[1], among all, the stakeholder theory (Freeman, 1984) represents the most prominent CG and CSR theories (Freeman *et al*., 2004). The dimensions of the stakeholder theory are more comprehensive as the concept of the principal is broadened to all stakeholders rather than other just shareholders. From the perspective of the stakeholder theory as well as in light of the above discussions, this study implies that the stakeholder satisfaction associated with the enterprise ecological policies depends on the sound corporate governance. Consistent with this, this article scrutinises the influence of CG on the ER of corporations from the standpoint of the stakeholder theory.

1.1 Industry Characteristics

There is sufficient empirical evidence to suggest that the ER pattern is based on industry characteristics (Patten, 2002; Cormier, Magnan, 2003). For instance, Nguyen *et al*. (2021) indicated that CG exerts a profound impact on ecological and social disclosure of highly polluting Chinese industries. Likewise,

[1]See resource dependency theory (Harjoto et al., 2019), resource-based view theory (Katmon et al., 2019), transaction cost theory (Majeed et al., 2015), agency theory (Chang et al., 2017).

Cowen *et al*. (1987) deemed the nature of the industry as an important determinant of ER. The corporations with a high degree of ecological impact are characterised by their relationship with prominent ecological concerns such as oil spills and global warming. The negative environmental footprint of the business stimulates the companies to publish environmental information to remove information asymmetry and legitimise their existence in the eyes of different stakeholders such as investors and the general public. Qian and Chen (2021) suggested that the ER of Chinese firms has become more politically motivated due to regulatory pressure and leadership changes.

Companies from different non-financial sectors in Germany tend to disclose greater social and ecological practices to reduce the adverse effect of further regulations and other negative consequences (Gamerschlag *et al*., 2011). Gamble *et al*. (1996) highlighted that not only does environmental reporting vary across countries, but also that companies from non-financial sectors with a high social conscience report more environmental information. Reverte (2009) concluded that the companies from non-financial sectors have an adverse influence on the atmosphere and provide more ecological information while the service sector, which comprises a larger portion of the financial sector, publishes less information on the ecological footprint as they exert a negligible effect on the natural environment.

Previous empirical studies relate a high environmental impact with several non-financial US industries such as power generation, paper industry, chemicals, and metals (Hoffman, 1999). The non-financial companies that belong to polluting industries such as fertilisers, energy, oil and gas tend to report more corporate social practices than the financial companies (Gamerschlag *et al*., 2011). Further analysis of foreign literature illuminates that the ER is documented to be the highest among the non-financial companies, including petroleum refining, blast furnaces, and steel mill industries of the US (Gamble *et al*., 1995). Similarly, the non-financial companies from the manufacturing sector of European countries are documented to have greater CSR reporting than other sectors due to extensive ecological checks (Ho, Taylor, 2007). Different non-financial US firms that specialise in petroleum, forest, and chemical products have greater motives to report and integrate more social initiatives into their mainstream policies to generate positive social profiles (Patten, 2002). Gamerschlag *et al*. (2011) documented that the German non-financial firms, such as the energy sector and consumer industries, publish greater social and environmental practices, while the service industries, which comprise a larger portion of the financial sector, provide less CSR information. By nature, most non-financial firms are more detrimental and polluting to the environment than the financial sector companies, and the financial sector companies report CSR activities merely to show that the maximisation of the business profitability is not the sole objective of the business (Giannarakis, 2014). Therefore, the researcher postulates the following hypothesis:

H1: The extent of ER is greater in China's non-financial sector than in the financial sector.

1.2 Board Independence (NEDs)

Agency theory suggests that the existence of outside directors on a board ensures autonomy within the board, and promotes objectivity and effective monitoring of the company activities (Suttipun, Bomlai, 2019; Core *et al*., 1999). The CSRC has issued CG guidelines asserting that no less than one third of board members must be independent. In the Chinese context, Nguyen *et al*. (2021) reported that board independence demonstrates a positive relationship with ecological performance. From the perspective of the US and European countries, Michelon and Parbonetti (2012) suggest that the potential conflict of interest is reduced among shareholders due to board independence. From the Malaysian perspective, the non-executive directors (NEDs) are considered custodians of the board accountability mechanism

(Haniffa, Cooke, 2005) as they safeguard the interests of all stakeholders (Prado-Lorenzo, Garcia-Sanchez, 2010). The boards comprised of more NEDs require the business managers to take measures necessary to protect the natural environment (Ienciu, 2012; Rao *et al*., 2012; Wang, 2016). Independent directors seem to be more attached to the social performance of business (Webb, 2004). Husted and Sousa-Filho (2019) and Lone *et al*. (2016) posited a positive correlation between NEDs and environmental reporting. Furthermore, other researchers (Jouirou, Chenguel, 2014; Majeed *et al*., 2015) also supported a positive relationship between board independence and ER. Although, there exists a growing interest in scrutinising the connection between board independence and CSR, not much is known about the impact of board independence on ER (Buchholtz *et al*., 2008). Thus, this paper studies the association between board independence and ER by proposing the following hypothesis:

H2: There exists a positive connection between board independence and ER

1.3 Foreign National Directors (FNDs)

Group diversity improves the quality of board decisions and brings knowledge, social diversity, and superior governance to the board (Dahyaa, McConnell, 2008; Orlitzky, Benjamin, 2003; Post *et al*., 2011). The voluntary disclosure strategies improve due to the existence of FNDs on enterprise boards (Khan *et al*., 2013). The directors with foreign nationalities also improve the independence level of the board as the board members from diverse ethical and cultural roots have distinctive sets of intellectual capabilities. The geographical separation between management and owners increases the demand for voluntary disclosure (Bradbury, 1991), as most of the shares in multinational businesses are being held by foreigners. Consequently, the FNDs report more voluntary information to satisfy the foreign owners of the company and to meet the rising reporting expectations of the international community. The FNDs also disclose greater information to retain foreign investors and attract potential foreign capital. This implies that environmental reporting also holds vital significance from an international perspective. Several researchers (Haniffa, Cooke, 2005; Khan, 2010) documented a positive relationship between board diversity and voluntary disclosure. Accordingly, the relevant hypothesis is as follows:

H3: There is a positive connection between the presence of FNDs on the board and ER.

2. Methodology and Data

The study population comprises 2273 corporations listed on China's SSE. The criteria set for selecting a particular company in the research sample is based on environmental reporting and only those companies that have shares worth at least 4 million yuan are selected, since large companies only regularly report their environmental practices in their annual reports or separately report their environmental activities in the sustainability/CSR reports. Based on the set criteria, the sustainability reports, annual reports, and websites of the selected 50 corporations from financial and non-financial Chinese sectors are investigated for the period 2015-2021 using a manual content analysis approach, in order to rank the firms in terms of their environmental reporting and to compare the environmental reporting in both financial and non-financial firms in China. The reason for selecting a research sample ranging from the period 2015-2021 is to determine a balanced 'before and after' impact of the 2018 CG Guidelines revisions on the environmental reporting.

Table 1. Distributions of Corporations by Sector

Financial Firms	No. of Corporations	Non-financial Firms	No. of Corporations
Commercial Banks	10	Chemical	3
NBFCs	5	Fertiliser	3
		Food	4
		Automobile	5
		Oil, Gas and Petroleum	8
		Cement	6
		Miscellaneous	6
Total Companies	15	Total Companies	35

Source: created by the author.

The *Table 1* demonstrates different sectors from which the companies are sampled for this study. The names and relevant sectors of selected companies can be provided upon request.

2.1 Variables Measurement

In this paper, the environmental reporting index (ERI) acts as the explanatory variable. The formula used to compute the environmental reporting is ERI = d10 i /nj. The codes '1' and '0' are used to code environmental items presented in the ERI. The reporting of a certain environmental item is coded as 1, whereas failure to report the environmental item is coded as 0. The 'nj' stands for the highest number of environmental items reported by the j^{th} firm, nj ≤ 10. The scores obtained by a particular enterprise are summarised and thereafter divided by the maximum score (10) to estimate the total score attained by a specific firm. The percentage scores derived in this way are used to rank the companies in terms of their environmental reporting. ERI score is also used to ascertain the industry characteristics (IC) variable, as the IC is computed by comparing the mean difference of the ERI score in both financial and non-financial firms. While the explanatory variables consist of CG variables, namely FND measured as a ratio of FNDs members to total board members and NED scaled as a ratio of NEDs to total board members.

The previous studies concentrated on determining the association between CG and ER in China and other developing economies, specifically Pakistan, suggest that CG as well as certain firm-specific characteristics exert a notable impact on environmental reporting (Zhou *et al*., 2019; Younas *et al*., 2023; Rashid, Naseer, 2018). For this reason, several firm-specific control variables are included to effectively examine the influence of CG on enterprises' environmental reporting. The first control variable is the financial profitability of the firms. The profitable businesses are often more interested in communicating their social practices to society than the less profitable companies (Ng *et al*., 2019), as the firms hold greater financial resources that can be employed to fund CSR practices (Brammer, Pavelin, 2006). The second control variable is the firm size. Large business organisations have more public exposure and are subject to higher regulatory and political pressure from different interest groups (Brown, Deegan, 1998; Patten, 2002). From the perspective of the Bangladeshi corporate sector, Khan (2010) suggested that large businesses undertake different social initiatives to legitimise their existence and to prove their corporate citizenship. The size and visibility of the organization are generally considered to be firm-level drivers of social and environmental reporting (Giannarakis *et al*., 2014; Cormier, Magnan, 2003). In this study, the gearing ratio was also controlled. The firms with low leverage find it easier to use their funds for environmental reporting, as they experience less pressure from creditors and other stakeholders (Brammer, Pavelin, 2006). In this article, control variables consist of debt to equity ratio (DTE) which is gauged as a proportion of long-term debt to total equity, firm size (FS), scaled as a log of current and fixed assets, and ROE, estimated as the ratio of profit after tax to total equity.

2.2 Econometric Model

The random effect regression model is adopted in this paper. In addition, the paired sample T-test is used to compare the ER in financial and non-financial firms, and to determine the degree of change in ER before and after the revision of the CG Guidelines in 2018 by the CSRC. The econometric model used in this study is as presented below:

$$ERI_{it} = \beta_0 + \beta_1 FND_{it} + \beta_2 NED_{it} + \beta_3 FS_{it} + \beta_4 ROE_{it} + \beta_5 DTE_{it} + \varepsilon_{it} \tag{1}$$

3. Results and Discussion

3.1 Companies' Ranking Based on ER

The environmental ranking of all 50 companies is presented chronologically in *Table 2*. The ERI analysis shows that 8 non-financial companies are among the top 10 environmental reporting companies which indicates that the majority of leading environmental reporting companies are from the non-financial sector. Similarly, the consecutive three lowest positions are occupied by financial companies, which again supports the lowest environmental reporting among financial companies. Furthermore, as non-banking financial companies (NBFC) have secured three of the lowest positions, it is inferred that environmental reporting is the lowest priority of NBFCs.

Table 2. Companies' Ranking Based on ER

Sr.	Company Name	Firm Type	Ranking
1	Changan	Non-financial	1
2	Agricultural Bank of China	Financial	2
3	PetroChina	Non-financial	3
4	SAIC Motor	Non-financial	4
5	China CITIC Bank	Financial	5
6	China National Petroleum Corporation	Non-financial	6
7	Sinofert	Non-financial	7
8	China National Chemical Engineering	Non-financial	7
9	Geely	Non-financial	7
10	Great Wall Motors	Non-financial	7
11	Sinopec	Non-financial	7
12	Shanghai Bolex Food Technology	Non-financial	8
13	Sinopec Shanghai Petrochemical	Non-financial	9
14	Tangshan Sanyou Chemical Industries	Non-financial	10
15	Sichuan Road & Bridge Group	Non-financial	11
16	Bank of China	Financial	12
17	ICBC	Financial	13
18	Anhui Conch Cement	Non-financial	13
19	Zhongman Petroleum and Natural Gas Group	Non-financial	13
20	Postal Savings Bank of China	Financial	14
21	Jidong Cement	Non-financial	14
22	Jiangsu Yangnong Chemical	Non-financial	15
23	Eastern Air Logistics	Non-financial	15
24	Li Auto	Non-financial	16
25	Shaanxi Yanchang Petroleum	Non-financial	16
26	China Construction Bank	Financial	17
27	China Merchants Bank	Financial	17

Table 2 (*continuation*). Companies' Ranking Based on ER

Sr.	Company Name	Firm Type	Ranking
28	ICL Group	Non-financial	17
29	Sygenta	Non-financial	18
30	Eastroc Beverage Group	Non-financial	18
31	Shanghai Belling	Non-financial	18
32	Sichuan Teway Food Group	Non-financial	19
33	Shandong Xinchao Energy Corporation	Non-financial	19
34	Shanghai Ziyan Food	Non-financial	19
35	Bank of Beijing	Financial	20
36	China Minsheng Bank	Financial	20
37	HOLCIM	Non-financial	20
38	Bank of Communications	Financial	21
39	Everbright Securities	Financial	22
40	China Shanshui Cement Group	Non-financial	22
41	Huaxin Cement	Non-financial	22
42	CNOOC	Non-financial	23
43	ICBC Financial Leasing	Financial	24
44	China National Building Material Group	Non-financial	25
45	Camel Group	Non-financial	26
46	Xilinmen FURNITURE	Non-financial	27
47	YTO Express Group	Non-financial	28
48	China Industrial Securities	Financial	29
49	Bank of Communications Financial Leasing	Financial	30
50	CCB Financial Leasing	Financial	31

Source: created by the authors.

3.2 Comparison of ER in Financial and Non-financial Firms

This article compares the environmental reporting ER in the aforementioned sectors, firstly by reporting the frequency of each environmental item, and secondly by comparing the mean values of ER in both groups. The paired sample T-test with a probability of less than 0.5 % suggests that ER is significantly higher in the non-financial sector than in the financial sector in China. Since the non-financial sector is more harmful to the environment, it therefore engages in more environmental reporting to satisfy all stakeholders related to its business.

The percentage score for each environmental item is computed by dividing the reporting frequency for each environmental item by the total number of observations in non-financial and financial sectors (*Table 3*). The individual contribution of both sectors toward each environmental item is discovered with the help of this frequency-based comparative analysis.

The frequency-based comparative analysis illustrates that the mean environmental reporting is significantly greater in the non-financial firms than in the financial sector. Compared to financial companies, non-financial companies have a greater detrimental impact on nature, so they perform and report higher environmental activities to neutralise their bad reputation and to legitimise their business existence.

The analysis based on the environmental issues demonstrates that the highest reporting frequency has been recorded for environmental items: Award for Environmental Protection in the financial sector and for Energy Conservation Measures in the non-financial sector. Both sectors have reported the lowest frequency for the usage of environmentally friendly equipment and facilities. Thus, the use of environmentally friendly equipment is very low in both sectors of China. This study suggests that there is an immense need to set up environmentally friendly infrastructure in the corporate sector of China in order to reduce the detrimental effect of industry effluent, chemicals, and gases on the natural environment.

Table 3. ER Comparison between Financial and Non-Financial Sectors

Frequency-Based Comparison of ER		
Environmental Provisions	% = Reporting in Financial Sector/101	% = Reporting in Non-financial Sector/24
1. Awards for environmental protection	92.08	94.21
2. Plantation of the trees	89.11	78.51
3. Supporting private/public environmental protection movements	56.44	53.31
4. Energy conservation measures	84.16	96.69
5. Environmentally friendly equipment and facilities	1.98	30.17
6. Promoting environmental awareness in the community	47.52	30.99
7. Recycling of waste material	42.57	30.99
8. Financial assistance to various organisations working for environmental protection	51.49	73.14
9. Safe disposal of waste	61.39	73.55
10. Biodiversity Protection	46.53	64.05
Total	57.33	62.56
Mean Difference Comparison of ER		
Group	Mean	
Non-financial Sector	0.616	
Financial Sector	0.573	
	Pr(|T| > |t|) = 0.0327	
Mean Difference Comparison of ER before and after the Revision of the CG Guidelines in 2018		
Group	Mean	
Before 2018 (Obs.144)	0.567	
After 2018 (Obs.199)	0.630	
	Pr(|T| > |t|) = 0.0006	

Source: own calculations.

Furthermore, the item-based analysis highlights that the non-financial sector clearly outperforms the financial sector in environmental reporting items, including awards for environmental reporting, energy conservation measures, eco-friendly facilities and equipment, financial assistance to various organisations, safe disposal of waste, and biodiversity protection measures. In contrast, the financial sector has managed to lead in reporting environmental items consisting of planting trees, supporting environmental protection movements, promoting environmental awareness, and recycling waste. Thus, this study recommends that both sectors focus on the improvement of their respective performances in lagging environmental areas.

The mean ER has significantly uplifted after the 2018 revision of the CG Guidelines by the CSRC. This shows that the revision of the CG Guidelines by the CSRC not only increased CSR reporting but also environmental reporting in Chinese firms. Similarly, a significant increase in CSR reporting was discovered in Malaysian firms after the introduction of the Silver Book (Esa, Ghazali, 2012). The study outcomes are also supported by Lone *et al*. (2016) to determine the extent of CSR disclosure in Pakistan after the introduction of SECP 2013 Voluntary CSR Guidelines. This infers that the implications of this study can also be applied in the international context, especially in other developing nations.

3.3 Descriptive Statistics

Table 4 shows that the boards of Chinese firms are occupied by NEDs (0.73%), and the number of FNDs on the boards is not very high (0.21%). The means of FS, ROE, and DTE are 7.67, 0.20, and 0.45, respectively.

Table 4. Descriptive Statistics

Overall Sample			
Variable	**Mean**	**Min**	**Max**
ERI	0.603	0.10	1
FND	0.211	0	0.857
NED	0.736	0	0.928
FS	7.675	6.092	9.346
ROE	0.207	-0.766	2.222
DTE	0.475	0	7.748
Non-Financial Sector			
ERI	0.616	0.2	1
FND	0.227	0	0.857
NED	0.697	0	1
FS	7.470	6.242	8.743
ROE	0.236	-0.503	2.222
DTE	0.422	0	2.958
Financial Sector			
ERI	0.573	0.10	0.90
Variable	**Mean**	**Min**	**Max**
FND	0.172	0	0.714
NED	0.830	0.429	1
FS	8.165	6.092	9.346
ROE	0.139	-0.766	0.437
DTE	0.601	0	7.748

Source: own calculations.

Additionally, the comparative descriptive analysis reveals that the environmental reporting is greater in the non-financial firms than in the financial firms, which is consistent with the paired sample T-test results. The average ratios of FND and ROE are also higher in the non-financial firms. Conversely, the mean compositions of NED, FS, and DTE are comparatively higher in the financial firms.

3.4 Correlation Matrix

There exists a highly significant relationship between environmental reporting and all independent variables, except for NED and ROE.

Table 5. Correlation Matrix based on Overall Sample

	1	**2**	**3**	**4**	**5**	**6**	**1/VIF**
ERI	1.000						
DTE	-0.254***	1.000					0.995
FND	0.243***	-0.015	1.000				0.897
NED	0.066	0.046	-0.221***	1.000			0.779
FS	0.256***	0.041	-0.206***	0.341***	1.000		0.863
ROE	0.0008	-0.057	-0.130***	-0.266***	-0.021*	1.000	0.888

Notes: ***, ** and * shows statistical significance at 0.01, 0.05 and 0.10 percent.

Source: own calculations.

DTE is negatively correlated with ERI. No multi-collinearity is observed between all explanatory variables, as the VIF is reportedly less than 10 for all explanatory variables.

3.5 Regression Analysis

In *Table 6*, the overall sample random effect regression indicates that FNDs have established significant and positive associations with environmental reporting. Conversely, the NEDs do not demonstrate any significant impact on ER. This means that FNDs have a notable role in determining the environmental reporting of the corporate sector. The insignificant role of NEDs in corporate ER again argues that the NEDs are not effectively performing their monitoring role. Additionally, among all control variables, ROE exerts an insignificant impact on ER, whereas DTE exhibits a significant but negative impact on ER, and FS reflects a profoundly positive influence on environmental reporting.

Both NEDs and foreign FNDs have exerted an insignificant influence on environmental reporting in the financial sector. This reveals that board members in the financial sector are the least concerned about environmental reporting since the financial sector companies have a nominal or very small detrimental effect on the environment. The insignificant role of non-executive directors in environmental reporting is also found in the previous studies conducted in other developing countries (Salehi *et al*., 2017). Conversely, the insignificant role of FNDs in environmental reporting is consistent with the results produced by Sharif and Rashid (2014) and Majeed *et al*. (2015) in the context of the Pakistani economy (a neighbouring country). Since financial companies report environmental practices to show that profit maximisation is not the sole objective of their business, both ROE and FS have exhibited positive and significant relationships with ER.

Table 6. Impact of CG on ER

	Overall Sample	**Non-financial Firms**	**Financial Firms**
FND	0.220*** (0.055)	0.190*** (0.059)	0.137 (0.113)
NED	-0.008 (0.057)	-0.033 (0.061)	0.010 (0.133)
DTE	-0.064*** (0.014)	-0.104***(0.024)	-0.030* (0.017)
FS	0.111*** (0.021)	0.113*** (0.021)	0.157*** (0.029)
ROE	0.018 (0.034)	-0.017 (0.035)	0.200** (0.101)
Constant	-0.250*** (0.155)	-0.246 (0.226)	-0.748*** (0.248)
Diagnostic Tests			
Obs.	343	242	101
R^2	0.22	0.18	0.49

Notes: ERI as an explained variable, the standard error in parenthesis. ***, ** and * shows statistical significance at 0.01,0.05 and 0.1 percent, respectively..

Source: own calculations.

FNDs have displayed a significantly positive impact on environmental reporting in the non-financial sector, whereas non-executive directors have an insignificant influence on environmental reporting. This implies that FNDs on the boards of the non-financial sector of Chinese firms seriously consider the environmental consequences resulting from the practices of non-financial companies. Consequently, they encourage environmental reporting to project a positive image of their respective corporations and to legitimise their business existence in the eyes of investors. Conversely, the insignificant effect of NEDs reveals that they are not performing their monitoring role effectively, as they do not prioritise the practice of environmental reporting. Nguyen et al. (2019) confirmed an unsubstantial connection between NEDs and the ecological performance of Chinese companies. Similarly, Said et al. (2017) also reported an unnoticeable connection between board independence and social reporting in the context of developing economies. Besides this, the ROE also has displayed a negative but insignificant association with environmental reporting, while other control variables have shown a profound relationship with the explained variable, with the DTE ratio demonstrating a negative effect and firm size representing a positive effect on environmental reporting.

Conclusions

The results of the study reveal that the FNDs exhibit a significant and positive influence on ER in the non-financial firms, whereas there is an insignificant effect of CG on ER in the financial firms in China. Additionally, the NEDs have an insignificant effect on environmental reporting in both sectors. The DTE ratio displays a significant negative influence, while FS exerts a positive influence on ER in both sectors. Furthermore, ROE has a positive effect on environmental reporting in the financial firms, with an insignificant connection with ER in the non-financial firms. This study also reports that the magnitude of environmental reporting is greater in the non-financial firms than in the financial firms, and a significant increase is observed in the extent of ER in the corporate sector after the revision of the CG Guidelines by the CSRC in 2018.

The study proposes several implications for policymakers and regulatory bodies. First, the significant influence of FNDs on ER in non-financial firms unveils that FNDs have an imperative role in determining environmental reporting in China's corporate sector. Consistent with the stakeholder theory, they design eco-friendly policies and undertake essential ecological protection measures to satisfy different stakeholders associated with their businesses. Hence, this study suggests that the regulatory bodies in China, including the CSRC and the PBOC and abroad (with socio-economic setups similar to those of China), should urge the corporate sector to increase the number of FNDs on the corporate boards. Subsequently, the insignificant impact of NEDs on ER in both financial and non-financial firms highlights that the NEDs in China do not perform their monitoring role effectively. Therefore, both CSRC and POBC and regulatory bodies in emerging economies should introduce certain environmental protection guidelines as a mandatory part of the independent director's responsibilities. Moreover, governmental institutions in emerging countries, especially in China, should primarily require large and financially sound corporations to undertake necessary ecological protection measures. Furthermore, this paper also implies that companies with higher debt are less likely to report ecological practices, since they must use the available funds to pay their creditors, which would otherwise be available to invest in environmental protection initiatives.

Given the potential increase in the environmental reporting after the revision of the CG Guidelines in 2018, the CSRC may introduce comprehensive voluntary CSR guidelines that are exclusively concentrated on environmental reporting. In line with this, regulatory bodies in other emerging countries should also introduce an inclusive set of voluntary social disclosures for their corporate sector. Lastly, the higher magnitude of environmental reporting in the non-financial firms can be attributed to the exercise of stakeholder theory and the business nature of non-financial firms. Hence, the regulatory bodies in developing countries should introduce a different set of ecological legislation to monitor and control the detrimental effect of the corporate sector on nature, especially of the non-financial sector.

There are certain limitations related to this study. Firstly, there is substantial room for committing human error due to the adoption of manual content analysis. Secondly, the ERI is based only on 10 constructs of environmental reporting. Further studies can be conducted by upgrading additional environmental constructs in the ERI. Finally, the same research can be extended to investigate the environmental reporting among different corporate sectors in China as well as in other countries.

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ĮMONIŲ VALDYMAS (CG) IR APLINKOSAUGOS ATSKAITOMYBĖ (ER): KINIJOS FINANSŲ IR NEFINANSINIŲ SEKTORIŲ DUOMENYS

Yiping Guo

Santrauka. Šiame straipsnyje empiriškai tiriamas įmonių valdymo (CG) ir aplinkosaugos atskaitomybės (ER) ryšys Kinijos finansų ir ne finansų sektoriuose 2015–2021 metais. Pasitelktas savarankiškai sukurtas aplinkosaugos ataskaitų teikimo indeksas (ERI), susijęs su rankine turinio analize. Be to, taikytas ataskaitų teikimo dažnumo palyginimas (RFC) ir porinės imties T-testas. Jais siekta palyginti abiejų sektorių aplinkosaugos ataskaitų teikimą ir pranešti apie galimus pokyčius, įvykusius prieš ir po Kinijos vertybinių popierių reguliavimo komisijos (CSRC) 2018 m. atliktą įmonių valdymo gairių peržiūrą. Šis straipsnis nauju požiūriu prisideda prie egzistuojančių tyrimų, susijusių su įmonių valdymu ir aplinkosauga, taikant savarankiškai sukurtą ERI, kad būtų galima įvertinti aplinkosaugą tiek Kinijos finansų, tiek ne finansų įmonėse iš suinteresuotųjų šalių teorijos perspektyvos. Politikos formuotojai ir reguliavimo institucijos Kinijoje ir užsienyje, norėdami patenkinti suinteresuotųjų šalių poreikius ir pagerinti įmonių aplinkosaugos atskaitomybę, turėtų sutelkti dėmesį į siūlomą valdymo sistemą.

Reikšminiai žodžiai: aplinkosaugos atskaitomybė (ER); įmonių socialinė atsakomybė (CSR); įmonių valdymas (CG); suinteresuotųjų šalių teorija.