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The globalised board of directors and corporate environmental performance: evidence from China

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ABSTRACT

This study examines the association between the globalised board of directors and corporate environmental performance, and then investigates the moderating effect of regional green development on the above association. Using a sample from the Chinese stock market during the period of 2008–2016, the findings reveal that the globalised board of directors is significantly positively associated with corporate environmental performance, suggesting that the globalised board of directors can play an important role in strengthening the moral and strategic motivations of corporate environmental responsibility, and enhance corporate environmental performance. Further, regional green development attenuates the positive relation between the globalised board of directors and corporate environmental performance. Above findings are robust to a variety of sensitivity tests and our main conclusions are still valid after controlling for the potential endogeneity between the globalised board of directors and corporate environmental performance. Interestingly, additional tests reveal that the positive effect of foreign directors on corporate environmental performance is more pronounced for those from the countries (regions) with shorter time zone difference, stronger investor protection and better performance in environmental responsibilities.

KEYWORDS

The globalised board of directors; regional green development; board governance; the supervisory and advisory functions; corporate environmental performance

1. Introduction

In the last four decades, it has been gradually recognised that contemporary enterprises should actively undertake environmental responsibilities and should not pursue economic benefits at the cost of environmental deterioration (Campbell, 2007; Maignan & Ralston, 2002; Mallin et al., 2013; Vidaver-Cohen & Simcic Brønn, 2008; Walls et al., 2012). In China, the second-largest economy in the world, environmental problems have become more and more prominent along with its rapid economic growth.¹ In response to worsening environment, the Chinese government had promulgated a set of environmental laws (regulations) to severely punish environmental violations and strengthening

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¹See the website: <https://www.nytimes.com/2007/08/26/world/asia/26china.html>.

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environmental protection. However, it seems that laws (regulations) had not achieved the desired effects (Du et al., 2014). For example, Yunnan Luoping Zinc & Electricity Co., Ltd. (002114.SZ) – a firm whose stock was listed in the Shenzhen stock exchange – was detected that its heavy metal-containing waste residue seriously contaminated the Zhujiang River as early as 2016, but it just treated the rectification requirements from the Ministry of Ecology and Environment in a passive and perfunctory way. As a result, the heavy metal-containing waste residue had not been cleaned up by the end of 2018.² In this regard, board monitoring as a micro-level mechanism is also expected to urge enterprises to improve their environmental performance (Du et al., 2014).

In recent years, along with the economic globalisation, multi-national firms have led the trend of establishing the globalised board of directors (Staples, 2007). In China, due to both the deficiency of governance mechanisms and the shortage of superior management practices, more and more Chinese listed firms have an increasing demand for foreign directors (Du et al., 2017; Youssef, 2003). Given that environmental responsibility embodies business ethics (the moral motivation) and strategic choice (the strategic motivation) of decision-makers (Jose & Lee, 2007), it is suggested that corporate boards can exert influence on corporate environmental performance through its supervisory and advisory roles (Kassinis & Vafeas, 2002; Mallin et al., 2013; Post et al., 2011; Shaukat et al., 2016; Walls et al., 2012). However, specific to environmental issues, not all directors are of equal importance for improving environmental performance. Prior literature has validated that, compared to their counterparts, women directors (Post et al., 2011), outside directors (Kassinis & Vafeas, 2002), and financial experts serving on audit committee (Shaukat et al., 2016) are more likely to concern about corporate environmental responsibility. Regarding foreign directors on the globalised board, Du (2018) finds that they can effectively monitor corporate financial decisions. Nevertheless, it is still a pending problem about whether the globalised board of directors (foreign directors) can improve board effectiveness about environmental issues and motivate Chinese listed firms to carry out environmental responsibilities better. In response, this study examines whether the globalised board of directors can enhance corporate environmental performance.

In addition, we further investigate the moderating effect of regional green development on the relation between the globalised board of directors and corporate environmental performance. Regional green development reflects macro-level social atmosphere towards environmental conservation, and thus environmental performance for firms located in provinces with higher level of green development is predicted to be better. Furthermore, drawing on Williamson (2000)'s institutional analysis framework, regional green development as a social atmosphere (an informal institution), is predicted to moderate (weaken or reinforce) the positive effect of the globalised board of directors as a formal (internal governance mechanism) on corporate environmental performance.

Using a sample from the Chinese stock market during the period of 2008–2016, we examine the influence of the globalised board of directors on corporate environmental performance, and further investigate the moderating effect of regional green development on the above effect. In brief, the findings reveal several aspects: First, the globalised board of directors is significantly positively related with corporate environmental performance, suggesting that the globalised board of directors can play an important role in

²See the website: <http://finance.sina.com.cn/chanjing/gsnews/2018-06-21/doc-ihfepqk8116553.shtml>.

strengthening the moral and strategic motivations of environmental responsibility, and thus enhance corporate environmental performance. Second, regional green development weakens the positive relation between the globalised board of directors and environmental performance. Third, above findings are robust to a variety of sensitivity tests and still stand after controlling for the potential endogeneity. Lastly, the positive effect of foreign directors on corporate environmental performance only holds for those from the countries (regions) with shorter time zone difference, stronger investor protection and better performance in environmental responsibilities.

This study makes several contributions as below. First, to our knowledge and literature in hand, this study is the first to examine whether the globalised board of directors (board nationality diversity, foreign directors) affects corporate environmental performance. Prior literature has validated the effects of (internal and external) governance mechanisms on corporate environmental responsibility (Mallin et al., 2013; Post et al., 2011; Shaukat et al., 2016; Walls et al., 2012). However, previous studies have provided little evidence about how the globalised board of directors affects corporate environmental performance. In this regard, our study adds to prior literature by documenting the positive role of the globalised board of directors in upgrading environmental performance.

More importantly, corporate social responsibility (CSR) can be divided into CSR-strength (e.g. philanthropy) and CSR-weakness (e.g. environmental wrongdoings). Contemporary enterprises have inconsistent attitudes towards different CSR dimensions (Chen et al., 2008; Du, 2015; Zygliopoulos et al., 2012). Chen et al. (2008) find that firms are more likely to engage in philanthropy along with pollution, low-quality products or employee discrimination. Du (2015) reveals that, compared to their counterparts, environmentally unfriendly firms usually exhibit higher level of corporate philanthropy. As such, it is still necessary for researchers to identify the influence of the globalised board of directors on different CSR dimensions.

Second, prior literature has validated that the globalised board of directors can facilitate cross-border acquisitions, promote operational efficiency, and add to firm value (Masulis et al., 2012; Oxelheim & Randøy, 2003). As for the supervisory function, Masulis et al. (2012) find that the globalised board of directors is less effective in supervising managers. Du et al. (2017) argue that the U.S. context limits the generalisation of Masulis et al. (2012)'s findings, and further report a positive relation between the globalised board of directors and earnings quality in the Chinese context. Specifically, the globalised board of directors not only transfers superior environmental practices to managers (i.e. to advise), but also mitigates managers from unethical environmental wrongdoings (i.e. to supervise). Therefore, echoing Du et al. (2017), our study lends supplement to prior literature about the supervising benefits of the globalised board of directors.

Third, we firstly address whether the influence of the globalised board of directors on corporate behaviour is asymmetric across different regions in China. Specifically, the level of green development at the province level attenuates the positive relation between the globalised board of directors and environmental performance. Thus, this study contributes to previous literature about how the globalised board of directors affects corporate behaviours.

Lastly but not least, this study identifies three important channels for the globalised board of directors to affect corporate environmental performance. First, time zone difference between foreign directors' original countries (regions) and China hinders them from

improving corporate environmental performance, implying that geographic distance results in extra costs for foreign directors to fulfill their duties. Second, foreign directors from countries (regions) with relatively weak investor protection weaken the positive effect of the globalised board of directors on corporate environmental performance. Third, foreign directors from countries (regions) with better performance exert a greater effect. Above findings can help researchers, managers and regulators to understand how foreign directors from different countries (regions) asymmetrically affect corporate behaviours.

The second section develops hypotheses. The third section illustrates variables, model, the sample and data source. The fourth section reports the results of our main tests and robustness checks. The fifth section addresses the endogeneity issue and conducts additional analyses. The final section summarises conclusions, develops managerial implications, and discusses limitations and future research.

2. Literature review, theory and research hypotheses

2.1. Motivations for undertaking environmental responsibilities

Prior literature has documented the moral and strategic motivations of corporate environmental responsibility (Babik & Trendafilova, 2011; Campbell, 2007; Jose & Lee, 2007; Maignan & Ralston, 2002; Vidaver-Cohen & Simcic Brønn, 2008). As Jose and Lee (2007) argue, a firm's main objective of engaging in environmental protection is related to competitive advantages, the long-term survival and stakeholder responsiveness, rather than laws (regulations). 2/3 of respondents (managers/executives from 113 countries/regions) consider CSR as a critical mean to gain competitive advantages and achieve sustainable development (Kiron et al., 2012).

Beyond maximising profit and shareholder value, corporate social responsibility (CSR) further requires large firms to take care of their stakeholders' benefits. In this regard, firms (managers) with higher level of business ethics are more likely to be concerned about their stakeholders and thus fulfill environmental responsibilities (Du et al., 2014). Maignan and Ralston (2002) conduct a cross-country study, finding that CSR is mainly driven by the moral motivation and CSR can be considered as the expression of organisational culture and value. Similarly, as an important CSR component, corporate environmental responsibility is altruistic or a virtue behaviour in essence.

Corporate environmental responsibility is originally for the sake of stakeholders, but it can ultimately benefit shareholders (Babik & Trendafilova, 2011; Maignan & Ralston, 2002). Given that a considerable part of customers value environmentally responsible activities, better environmental performance is associated with the enhanced reputation, higher level of customer loyalty, and more customers (McWilliams & Siegel, 2000; Porter & Kramer, 2011). Prior literature finds that socially responsible and environment-friendly firms are much easier to get access to financing (Benlemlih, 2017; Goss & Roberts, 2011), have higher credit ranking (Attig et al., 2013), and are less likely to be issued modified audit opinions (Du et al., 2018). Thus, firms should attach special importance to corporate environmental responsibility.

Given that environmental performance embodies business ethics and strategic choice, governance mechanisms have considerable impacts on corporate environmental performance (Mallin et al., 2013; Post et al., 2011; Shaukat et al., 2016; Walls et al., 2012). The

board of directors is a key component of governance mechanisms (Jensen & Meckling, 1976). Kassinis and Vafeas (2002) find that board size and the fraction of directors in industrial firms are positively related to environmental litigation, while the number of directorships held by outside directors is significantly negatively related with environmental litigation. In addition, Post et al. (2011) reveal that firms with at least three women directors exhibit better environmental performance. Shaukat et al. (2016) validate that financial experts on audit committee have a positive effect on environmental performance. In a nutshell, prior literature has suggested that board attributes could exert influence on environmental performance.

2.2. The globalised board of directors and corporate environmental performance

The globalised board of directors (i.e. board nationality diversity) has attracted a great deal of attention of scholars in the field of accounting and finance. In emerging markets such as China, due to the incomplete governance mechanism and the lack of superior management practices, domestic firms applaud experts from developed countries (regions) (Du et al., 2017; Youssef, 2003). The globalised board of directors, which consists of experts with different cultural and institutional backgrounds, can lead to the brain gains, benefit local firms' strategically decision-making, and contribute to competitive advantages (Giannetti et al., 2015). Masulis et al. (2012) find that foreign directors are familiar with international markets and the globalised board of directors improves cross-border acquisition performance. In addition to the advisory role, Du et al. (2017) find that the globalised board of directors also mitigates financial misconducts. In general, foreign directors are both valuable advisors and relatively good monitors for domestic firms, especially in emerging markets such as China (Oxelheim & Randøy, 2003). As such, the influence of the globalised board of directors on corporate environmental performance mainly relies on its advisory and supervisory functions.

2.3. The supervisory function of the globalised board of directors

Given that immature business ethics are problematic in emerging markets like China (Du et al., 2014), in most cases, domestic directors have weaker environmental consciousness and moral motivation to supervise environmental wrongdoers. Besides, environmental laws and regulations are somewhat on paper, which hinders enterprises from fulfilling environmental responsibilities (Du et al., 2016; Zhang et al., 2018). As a result, as Du et al. (2016) note, it is quite prevalent for firms to pursue economic benefits at the cost of environmental pollution. The supervisory function of the globalised board of directors is particularly important in such a situation.

The supervisory effectiveness of corporate boards depends on the willingness and the ability to do so (Du et al., 2017; Masulis et al., 2012). Specific to environmental issues, the globalised board of directors can enhance the supervisory function for two reasons: First, foreign directors are more independent from managers. Unlike domestic directors, foreign directors are less socially connected to managers, and thus have higher level of independence (Wong & Chan, 1999). Moreover, the relatively mature labour markets in developed countries (regions) motivate foreign directors to hold more concerns about their reputation and career prospect (Du et al., 2017). As such, the globalised board of

directors advocates corporate responsiveness to environmental issues from stakeholders (Ibrahim et al., 2003). To sum up, both being out of managers' social network and reputation concerns make foreign directors less likely to be captured by managers, which guarantees higher extent of independence of the globalised board of directors to a considerable extent.

Second, the globalised board of directors has the moral motivation (higher level of business ethics and environmental consciousness) to diligently supervise managers over environmental conservation (Khanna, 2008; Zhang et al., 2018). The attitude towards environmental protection is rooted in cultural and institutional backgrounds (Campbell, 2007; Waldman et al., 2006). Driven by the government, non-government organisations and the public, firms in developed countries (regions) have recognised environmental protection as a social norm or macro-level social culture, and further these firms have incorporated environmental conservation into micro-level corporate culture (Berry & Rondinelli, 1998). As a result, foreign directors from developed countries (regions) are more likely to identify with the value of environmental responsibility (performance), and further have a stronger incentive to curb managers from environmental wrongdoings.

2.4. The advisory function of the globalised board of directors

Environmental responsibility can be used as a strategy to increase firm value (the strategic motivation; Jose & Lee, 2007; Kiron et al., 2012). Since 2008, the Shenzhen and Shanghai Stock Exchanges have required listed firms to issue CSR report, in which environmental responsibility is a key component. Moreover, since 2011, the *South Weekend*, an influential newspaper in China, has turned its eye on corporate environmental responsibility and announced a yearly list of environmental wrongdoers. Along with corporate internationalisation (globalisation), it is increasingly important for firms to obtain legitimacy by fulfilling environmental responsibilities. In this regard, Chinese listed firms have a long way to go. Thus, the globalised board of directors can play its advisory role to urge Chinese listed firms to establish the linkage between environmental responsibilities and the long-term value and be familiar with environmental management practices (Du et al., 2014).

With regard to the advisory function, the globalised board of directors is beneficial to promote the strategic motivation of corporate environmental performance: First, most foreign directors have well recognised that corporate environmental responsibility is crucial for firms to accumulate competitive advantages and ensure long-term survival (Johnson & Greening, 1999). Zhang et al. (2018) find that the percentage of directors with overseas experience is significantly positively related with CSR engagement, suggesting that the globalised board of directors is more likely to urge firms to behave in socially responsible ways. Consequently, the globalised board of directors can advise Chinese firms (managers) to strategically engage in environmental protection.

Second, as foreign directors have extensive work experience in the international market, they have accumulated the knowledge about how to strategically deal with environmental issues and properly handle the equilibrium between risks and benefits. To engage in environmental-friendly activities requires great investment, accompanies with high risks, and needs a comparatively long return cycle (Hart & Ahuja, 1996). In this regard, foreign directors on the globalised board of directors, who have superior environmental practices, can provide Chinese enterprises with important suggestions on the

adoption and implementation of environmental strategies. According to Giannetti et al. (2015), Iliev and Roth (2018), and Zhang et al. (2018), the globalised board of directors plays a crucial role in the cross-country transfer of superior environmental practices. Based on the aforementioned discussions, domestic firms (managers) can benefit from the globalised board of directors on environmental strategies, and further exhibit better environmental performance.

To sum up, based on the supervisory and advisory functions, the globalised board of directors is expected to enhance both the moral and strategic motivations for enterprises (managers) to improve environmental performance. Thus, Hypothesis 1 (H1) is formulated in an alternative as below:

H1: *Ceteris paribus, the globalised board of directors is positively associated with corporate environmental performance.*

2.5. *The moderating effect of regional green development*

In China, environmental conservation consciousness across different provinces varies greatly (The China National Bureau of Statistics, 2015). Regional green development as a multi-dimensional concept, proxied by green development index at the province level, embodies sustainable development and consists of resource utilisation index, environmental governance index, environmental quality index, ecological protection index, growth quality index and green life index.³

To obtain political promotion, local officials pay close attention to environmental policies. Against this context, regional green development has cultivated macro-level social atmosphere towards environmental friendliness and sustainable development, which motivate enterprises within different jurisdictions to undertake environmental responsibilities. Thus, regional green development positively affects environmental performance. Next, we further investigate the moderating effect of regional green development. Referring to Williamson (2000),⁴ regional green development – which embodies macro-level social atmosphere towards environmental conservation – should be positioned at the first level in the social institutions. However, the globalised board of directors can be classified as an element at the third level in the social institutions. Different social institutions interactively affect corporate decisions and moderate (attenuate or reinforce each other (e.g. Du et al., 2014).

On the one hand, social atmosphere about green development means the value identity towards environmental responsibility (Campbell, 2007; Waldman et al., 2006), and thus higher level of provincial green development provides enterprises in the province with stronger moral incentives to fulfill environmental responsibilities and have better environmental performance. Against this context, the positive effect of the

³Green development index at the province level can be obtained from the 'Green Development Index System' issued by the National Development and Reform Commission, the National Bureau of Statistics, the Ministry of Ecology and Environment and the Organization Department of Central Committee of the CPC.

⁴Williamson (2000)'s institution analysis framework includes four levels: (1) informal institutions (e.g. customs, traditions, norms, religions); (2) institutional environment (e.g. polity, judiciary, bureaucracy); (3) governance mechanisms; and (4) resource allocation and employment.

globalised board of directors on corporate environmental performance (the supervisory function) will be weakened. On the other hand, along with the green development at the province level, the demand for superior environmental practices increases accordingly. In this regard, the globalised board of directors can play the advisory role in the cross-country transfer of superior environmental practices (Giannetti et al., 2015; Iliev & Roth, 2018). As a result, the globalised board of directors is prone to exert greater influence on corporate environmental performance by its advisory function. That is, regional green development reinforces the positive relation between the globalised board of directors and corporate environmental performance.

Thus, we formulate two competitive hypotheses – Hypothesis 2a (H2a) and Hypothesis 2b (H2b):

H2a (H2b): Ceteris paribus, regional green development weakens (reinforces) the positive effect of the globalised board of directors on corporate environmental performance.

3. Research design

3.1. Model specification for hypothesis 1 (H1)

To test H1, we use the Tobit regression Model (1) to link environmental performance index (EPI) to the globalised board of directors (GBD), and other control variables:

$$EPI = \alpha_0 + \alpha_1 GBD + \alpha_{2-20} Controls + Industry\ Indicators + Year\ Indicators + \varepsilon \quad \text{Model(1)}$$

In Model (1), the dependent variable is EPI (environmental performance index). Extending extant studies (Al-Tuwaijri et al., 2004; King & Lenox, 2001; Patten, 1992; Wiseman, 1982), Clarkson et al. (2008) focus on purely discretionary environmental disclosure and develop a content analysis index on the basis of the Global Reporting Initiative (GRI) sustainability reporting guidelines. Compared to prior literature, Clarkson et al. (2008) provide an optimised index for environmental performance, which has highly positive correlation with the actual environmental performance.⁵ Up to now, Clarkson et al. (2008)'s method has been widely accepted (e.g. Du et al., 2014; Rahman & Post, 2012), and thus we refer to Clarkson et al. (2008) to measure corporate environmental performance. Specifically, environmental information disclosure is divided into ten components (GRI, 2006). Based on the scoring method advocated by Clarkson et al. (2008), the scoring scale of each component is from 0 to 6. Accordingly, we score each component separately, and then aggregate the scores to get environmental performance index (EPI).

In Model (1), the independent variable is the globalised board of directors with a label of GBD. Specifically, GBD is an indicator variable, which equals 1 if at least one foreigner serves in the boardroom and 0 otherwise (Du et al., 2017). In Model (1), if the coefficient on GBD (i.e. α_1) is significantly positive, then Hypothesis 1 (H1) is supported.

⁵It is difficult to measure corporate environmental performance (Clarkson et al., 2008; Ilinitch et al., 1998). Based on Environmental Protection Agency's TRI database, some scholars use total toxic waste released by each firm to capture environmental performance (King & Lenox, 2001). Please note that, due to the absence of firm-level pollution discharge data in most contexts, corporate environmental information disclosure has been viewed as an alternative proxy for environmental performance (Al-Tuwaijri et al., 2004; Patten, 1992; Wiseman, 1982).

To isolate the incremental effect of the globalised board of directors on corporate environmental performance, a set of control variables are included into Model (1). First, to address the effect of internal governance mechanisms on environmental performance (Nie et al., 2018; Walls et al., 2012), we include BLOCK, MAN_SHR, QFII_SHR, DUAL, BOARD and INDR into Model (1). BLOCK is the ratio of shares owned by the largest shareholder to the total shares. MAN_SHR is the ratio of shares owned by managers to the total common shares. QFII_SHR is the ratio of shares owned by qualified foreign institutional investors to the total shares. DUAL is an indicator, equalling 1 if CEO chairs the board of directors and 0 otherwise. BOARD is the natural logarithm of the total number of directors. INDR is the proportion of independent directors.

Second, we also incorporate two variables of external governance mechanisms into Model (1). ANALYST is the natural logarithm of 1 plus the number of analysts that follow the firm. BIG10 is an indicator variable that equals 1 if the firm is audited by a Big 10 auditor and 0 otherwise.

Third, based on prior literature (Clarkson et al., 2008; Walls et al., 2012), several firm-specific characteristics are included in Model (1). SIZE is the natural logarithm of market value at the end of the year. LEV is the amount of interest-bearing liabilities (i.e. long-term and short-term loans, bonds, and notes payable) divided by total assets. ROA is calculated as the net income divided by average assets. TOBIN'Q denotes a firm's growth opportunity.

Fourth, referring to Clarkson et al. (2008) and Du et al. (2014), we consider other factors of FIN, VOLAT, and CAP_INV. FIN is the ratio of equity and debt re-financed in the year to total assets at the beginning of the year. VOLAT stands for information asymmetry, calculated as the standard deviation of market adjusted weekly stock return. CAP_INV is the investment on fixed assets, intangible assets and other long-term assets divided by sales revenues.

Fifth, the length of time as public firms may lead to the difference in environmental strategies (Du et al., 2014). Thus, LISTAGE, measured as the number of years since IPO, is included in Model (1). In addition, we include an indicator of SOE in Model (1). SOE is an indicator variable that equals 1 if the firm is a state-owned enterprise and 0 otherwise. Furthermore, GDP_PC and MKT are included in Model (1). GDP_PC is the GDP *per capita* at the province level (in ten thousand RMB). MKT is marketisation index at the province level (Wang et al., 2018).

Finally, to control for industry and time fixed effects, we include a set of dummy variables about industry and year dummies in Model (1).

3.2. Model specification for hypothesis 2a (H2a) and hypothesis 2b (H2b)

To test H2a (H2b), we employ Model (2) to link environmental performance index (EPI) with the globalised board of directors (GBD), regional green development (RGD), the interactive item of GBD×RGD and other control variables:

$$EPI = \beta_0 + \beta_1 GBD + \beta_2 RGD + \beta_3 GBD \times RGD + \beta_{4-22} Controls + Industry Indicators + Year Indicators + \varepsilon$$

Model(2)

In Model (2), EPI (environmental performance index) is the dependent variable and GBD (an indicator for the globalised board of directors) is the independent variable. Moreover, the moderating variable is regional green development at the province level (RGD). In Model (2), a significantly negative (positive) coefficient on $GBD \times RGD$ (β_3) is consistent with H2a (H2b).

3.3. Identification of sample

The sample for our empirical analyses is based on all Chinese listed firms between 2008 and 2016. We start from 2008 for the reason that most Chinese listed firms had not disclosed their environmental information until 2008. This initial sample consists of 21,348 firm-year observations. Then, we conduct the following selection procedures: (1) we drop 364 observations in the financial industry; (2) we delete 302 observations with negative net assets; (3) we drop 3,969 observations with missing data needed in our empirical analyses. Above procedures leave us with a final research sample of 16,713 firm-year observations, representing 2,770 unique firms. For sample distribution by year and industry, the clustering phenomenon just exists in a few industries and is not very serious in our sample.

3.4. Data source

Data sources are reported as below: (1) We hand-collect data on environmental performance index from annual reports, social responsibility reports and corporate websites. Specifically, we analyse the original contents, conduct the scoring procedure based on the GRI sustainability reporting guidelines, and then calculate environmental performance index (Clarkson et al., 2008; Du et al., 2014). (2) We identify the original country (region) of each director and hand-collect data on the globalised board of directors by directors' curriculum vitae in annual reports. (3) The data on regional green development are obtained from the 'China National Bureau of Statistics' (www.stats.gov.cn/tjsj/zxfb). (4) The data on BIG10 are obtained from the CICPA's official website (www.cicpa.org.cn). (5) The data on GDP_PC are obtained from the China Statistical Yearbook. (6) The data on MKT are obtained from Wang et al. (2018); (7) Other control variables are obtained from CSMAR database.

4. Empirical results

4.1. Descriptive statistics and t/z-tests

Section A of Table 1 reports descriptive statistics of all variables used in our main tests. The mean value of EPI is 0.730, revealing the average value of environmental performance index for sample firms. GBD has a mean value of 0.078, revealing that 7.8% of sample firms have established the globalised board of directors. The mean value of RGD is 80.282, indicating the average value of regional green development at the province level. Results for descriptive statistics of control variables are qualitatively similar to extant studies (e.g. Du, 2018).

In Section B of Table 1, the full sample is split into two subsamples: firms with the globalised board of directors (GBD = 1; the GBD subsample) and firms without the globalised board of directors (GBD = 0; the non-GBD subsample). And then, t-tests

Table 1. Descriptive statistics and t-/z-tests.

Variables	Section A: Descriptive statistics											Section B: t-/z-tests about the differences between firms with GBD and firms without GBD					
	GBD = 1 (N = 1,303)											GBD = 0 (N = 15,410)					
	N	Mean	S. D.	Min	Q1	Median	Q3	Max	Mean	Median	S. D.	Mean	Median	S. D.	t-tests	z-tests	
EPI	16,713	0.730	2.161	0.000	0.000	0.000	0.000	24.000	1.622	0.000	3.978	0.654	0.000	1.912	15.64***	7.09***	
GBD	16,713	0.078	0.268	0.000	0.000	0.000	1.000	80.371	79.600	2.016	0.000	80.274	79.600	2.065	1.63	1.92*	
RGD	16,713	80.282	2.061	75.200	79.110	79.600	83.710	0.383	0.354	0.155	0.000	0.354	0.335	0.150	6.64***	6.29***	
BLOCK	16,713	0.356	0.151	0.085	0.235	0.336	0.461	0.757	0.051	0.000	0.129	0.056	0.000	0.126	-1.38	-1.55	
MAN_SHR	16,713	0.055	0.126	0.000	0.000	0.000	0.022	0.611	0.001	0.000	0.004	0.001	0.000	0.003	5.80***	6.23***	
QFIL_SHR	16,713	0.001	0.003	0.000	0.000	0.000	0.000	0.022	0.001	0.000	0.000	0.001	0.000	0.000	3.72***	3.72***	
DUAL	16,713	0.232	0.422	0.000	0.000	0.000	1.000	1.000	0.274	0.000	0.446	0.229	0.000	0.420	5.12***	4.24***	
BOARD	16,713	2.156	0.197	1.609	2.079	2.197	2.708	2.182	2.182	2.197	0.196	2.153	2.197	0.197	1.51	1.28	
INDR	16,713	0.371	0.053	0.300	0.333	0.333	0.400	0.571	0.373	0.333	0.057	0.371	0.333	0.052	1.51	1.28	
ANALYST	16,713	1.567	1.123	0.000	0.693	1.609	2.485	3.689	1.839	1.946	1.082	1.544	1.609	1.124	9.13***	9.07***	
BIG10	16,713	0.523	0.499	0.000	0.000	1.000	1.000	1.000	0.614	1.000	0.487	0.516	1.000	0.500	6.83***	6.82***	
SIZE	16,713	22.603	1.100	20.437	21.840	22.487	23.231	27.067	22.974	22.739	1.373	22.572	22.468	1.068	12.72***	9.30***	
LEV	16,713	0.170	0.145	0.000	0.044	0.143	0.263	0.613	0.159	0.132	0.137	0.170	0.144	0.146	-2.68***	-2.28**	
ROA	16,713	0.037	0.054	-0.224	0.013	0.034	0.064	0.211	0.046	0.042	0.056	0.037	0.034	0.054	6.18***	7.15***	
TOBINQ	16,713	2.716	2.049	0.918	1.443	2.061	3.209	13.994	2.917	2.208	2.262	2.699	2.047	2.029	3.67***	3.23***	
FIN	16,713	0.305	0.338	0.000	0.059	0.226	0.432	2.101	0.296	0.193	0.347	0.306	0.228	0.337	-1.02	-2.40**	
VOLAT	16,713	0.053	0.022	0.021	0.038	0.048	0.062	0.147	0.054	0.049	0.023	0.053	0.048	0.022	1.32	0.77	
CAP_INV	16,713	0.127	0.172	0.000	0.026	0.069	0.155	1.049	0.121	0.075	0.144	0.128	0.068	0.174	-1.26	3.05***	
LISTAGE	16,713	10.394	6.256	0.000	5.000	10.000	16.000	26.000	9.286	7.000	6.372	10.487	10.500	6.238	-6.66***	-6.76***	
SOE	16,713	0.445	0.497	0.000	0.000	0.000	1.000	1.000	0.355	0.000	0.479	0.453	0.000	0.498	-6.81***	-6.80***	
GDP_PC	16,713	5.716	2.506	0.985	3.707	5.410	7.402	11.820	6.429	6.345	2.565	5.656	5.410	2.492	10.72***	10.23***	
MKT	16,713	7.633	1.804	2.940	6.360	7.810	9.296	10.863	8.156	8.370	1.615	7.589	7.780	1.812	10.93***	10.97***	

and z-tests are conducted to analyse whether significant differences between two subsamples exist. As reported, the mean value of environmental performance index (EPI) is 1.622 for GBD firms and 0.654 for non-GBD firms, and the difference is significant at the 1% level ($t = 15.64$). Similarly, the median value of EPI is also significantly different between two subsamples at the 1% level ($z = 7.09$). Overall, the GBD subsample has better environmental performance than the non-GBD subsample, consistent with H1.

4.2. Pearson correlation analyses

Table 2 presents the correlation coefficients among variables. EPI holds a significantly positive correlation with GBD (0.120 with $p < 0.01$), indicating that the globalised board of directors enhances corporate environmental performance, lending preliminary support to H1. Moreover, the correlation between EPI and RGD is positive and significant, which motivates our study to address the interactive effect between the globalised board of directors and regional green development on EPI.

Specific to control variables, EPI is significantly positively (negatively) correlated with BLOCK, QFII_SHR, BOARD, ANALYST, BIG10, SIZE, LEV, FIN, CAP_INV, LISTAGE, and SOE (MAN_SHR, DUAL, TOBIN'Q, VOLAT, and MKT). Moreover, most correlation coefficients are below 0.30, suggesting that multicollinearity is not very serious in our regression analyses.

4.3. Multivariate tests of hypotheses 1, 2a, and 2b

Table 3 tabulates the step-by-step regression results of corporate environmental performance (EPI) on the globalised board of directors, regional green development and other determinants. All models are significant at the 1% level. Furthermore, from column (1) to column (4), *Pseudo_R²* gradually increases and the differences in '*Pseudo_R²*' between nearby columns are all significant (see *Chi²*-tests in the next-to-last row), implying that the explanatory power increases when GBD, RGD and GBD×RGD are added into the multivariate regression models one by one. All reported t-statistics are calculated using the Huber-white procedure (White, 1980).

Column (1) of Table 3 addresses the effects of all control variables on EPI. As shown in Column (1), the coefficients on blockholder ownership (BLOCK), board size (BOARD), the number of analysts coverage (ANALYST), firm size (SIZE; market value), the percentage of interest-bearing liabilities (LEV), and the likelihood of being state-owned enterprises (SOE) are significantly positive, while the coefficients on the growth opportunity (TOBIN'Q), the percentage of equity and debt re-financing (FIN), information asymmetry (VOLAT) and a firm's listing age (LISTAGE) are significantly negative, similar to prior literature (e.g. Du et al., 2014).

Column (2) of Table 3 displays the regression results of H1. The coefficient on GBD is positive and significant at the 1% level (1.610 with $t = 5.65$), consistent with H1. Specifically, the significantly positive coefficient on GBD suggests that firms with the globalised board of directors are more environmentally responsible and have better environmental performance than their counterparts. Then, the value of environmental performance index (EPI) for firms with the globalised board of directors is 0.431

Table 2. Pearson correlation analyses.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
EPI	1.000																						
GBD	(2) 0.120***	1.000																					
RGD	(3) 0.020***	0.013	1.000																				
BLOCK	(4) 0.144***	0.051***	0.028***	1.000																			
MAN_SHR	(5) -0.075***	-0.011	0.091***	-0.047***	1.000																		
QFIL_SHR	(6) 0.046***	0.045***	0.022***	0.016**	-0.028***	1.000																	
DUAL	(7) -0.066***	0.029***	0.046***	-0.057***	0.462***	-0.006	1.000																
BOARD	(8) 0.135***	0.040***	-0.035***	0.020***	-0.157***	0.033***	-0.175***	1.000															
INDR	(9) -0.008	0.012	0.002	0.049***	0.099***	-0.002	0.099***	-0.463***	1.000														
ANALYST	(10) 0.158***	0.070***	0.083***	0.121***	0.129***	0.184***	0.040***	0.114***	0.008	1.000													
BIG10	(11) 0.059***	0.053***	0.074***	0.061***	0.037***	-0.009	0.034***	0.006	0.024***	0.065***	1.000												
SIZE	(12) 0.298***	0.098***	0.024***	0.210***	-0.222***	0.119***	-0.137***	0.195***	0.054***	0.396***	0.155***	1.000											
LEV	(13) 0.083***	-0.021***	-0.092***	0.001	-0.137***	-0.029***	-0.049***	0.110***	-0.022***	-0.097***	0.001	0.210***	1.000										
ROA	(14) 0.009	0.048***	0.094***	0.104***	0.139***	0.112***	0.048***	0.001	-0.014*	0.417***	0.021***	0.073***	-0.351***	1.000									
TOBINQ	(15) -0.119***	0.028***	0.049***	-0.114***	0.180***	-0.006	0.122***	-0.187***	0.076**	-0.001	0.003	-0.135***	-0.294***	0.184***	1.000								
FIN	(16) 0.029***	-0.008	-0.002	0.018**	-0.025***	0.013	0.035***	0.001	0.056***	0.001	0.139***	0.434***	-0.109***	-0.137***	0.001	1.000							
VOLAT	(17) -0.081***	0.010	0.022***	-0.035***	0.075***	-0.034***	0.058***	-0.113***	0.040***	-0.056***	0.005	0.023***	0.009	-0.041***	0.408***	0.083***	1.000						
CAP_INV	(18) 0.013*	-0.010	-0.046***	-0.028***	0.086***	-0.005	0.057***	0.033***	-0.005	0.091***	0.005	-0.045***	-0.049***	-0.016**	-0.002	0.099***	-0.043***	1.000					
LISTAGE	(19) 0.029***	-0.051***	-0.076***	-0.070***	-0.444***	0.037***	-0.221***	0.100***	-0.039***	-0.246***	-0.033***	0.293***	0.147***	-0.175***	-0.134***	0.022***	-0.054***	-0.043***	1.000				
SOE	(20) 0.155***	-0.053***	-0.090***	0.197***	-0.372***	0.049***	-0.283***	0.268***	-0.068***	-0.052***	-0.022***	0.281***	0.121***	-0.133***	-0.258***	-0.015**	-0.121***	-0.056***	0.424***	1.000			
GDP_PC	(21) 0.005	0.083***	0.486***	0.028***	0.146***	-0.002	0.085***	-0.112***	0.040***	0.058***	0.166***	0.196***	-0.094***	0.067***	0.106***	-0.030***	0.072***	-0.083***	-0.031***	-0.131***	1.000		
MKT	(22) -0.025***	0.084***	0.523***	0.011	0.187***	0.009	0.134***	-0.122***	0.020***	0.070***	0.151***	0.081***	-0.068***	0.098***	0.092***	-0.015**	0.077***	-0.089***	-0.127***	-0.232***	0.809***	1.000	

*; $p < 0.10$; **; $p < 0.05$; ***; $p < 0.01$.

higher than that for firms without the globalised board of directors, which accounts for 59.1% of the mean value of EPI. Above results suggest that the influence of the globalised board of directors on environmental performance is economically significant, in addition to its statistical significance.

In Column (3) of Table 3, we link environmental performance index with the globalised board of directors, regional green development and all control variables. The coefficient on GBD is positive and significant at the 1% level (1.677 with $t = 5.87$), lending additional support to H1. Then, as expected, the moderating variable of RGD has a significantly positive coefficient (0.209 with $t = 4.69$).

Column (4) of Table 3 tabulates the regression results of H2a (H2b) – whether regional green development weakens (reinforces) the positive effect of the globalised board of directors on corporate environmental performance. In Column (4), GBD has a significantly positive coefficient (1.815 with $t = 6.31$), supporting H1 again; RGD has a significantly positive coefficient (0.247 with $t = 5.39$), echoing the finding in Column (3). More importantly, the coefficient on GBD×RGD is negative and significant at the 5% level (-0.328 with $t = -2.48$), and the coefficient difference test between (GBD + GBD×RGD) and GBD is significant at the 5% level (F -value = 6.16). Above results lend

Table 3. Results of corporate environmental performance on the globalised board of directors, regional green development, and other determinants.

Variables	Dependent variable: The raw value of environmental performance index (EPI)							
	(1)		(2)		(3)		(4)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
GBD			1.610***	5.65	1.677***	5.87	1.815***	6.31
RGD					0.209***	4.69	0.247***	5.39
GBD×RGD							-0.328**	-2.48
BLOCK	2.901***	5.50	2.789***	5.35	2.746***	5.29	2.765***	5.33
MAN_SHR	-0.206	-0.26	0.159	0.20	0.184	0.24	0.209	0.27
QFII_SHR	1.778	0.09	-2.937	-0.14	-3.788	-0.18	-2.842	-0.14
DUAL	-0.256	-1.20	-0.322	-1.52	-0.304	-1.44	-0.317	-1.51
BOARD	2.146***	4.90	1.954***	4.52	1.861***	4.31	1.849***	4.30
INDR	1.015	0.68	0.674	0.45	0.650	0.44	0.853	0.57
ANALYST	0.529***	6.04	0.543***	6.21	0.538***	6.17	0.535***	6.15
BIG10	0.085	0.56	0.062	0.41	0.062	0.42	0.060	0.40
SIZE	2.123***	22.42	2.056***	21.93	2.049***	21.83	2.056***	21.95
LEV	1.382**	2.15	1.516**	2.37	1.635**	2.55	1.631**	2.55
ROA	-1.326	-0.76	-1.334	-0.77	-1.346	-0.78	-1.469	-0.86
TOBIN'Q	-0.304***	-5.02	-0.305***	-5.07	-0.309***	-5.14	-0.304***	-5.07
FIN	-0.920***	-3.30	-0.900***	-3.26	-0.929***	-3.36	-0.918***	-3.32
VOLAT	-17.216***	-3.60	-16.852***	-3.54	-16.731***	-3.52	-16.562***	-3.48
CAP_INV	-0.165	-0.36	-0.122	-0.27	-0.140	-0.31	-0.142	-0.31
LISTAGE	-0.129***	-8.01	-0.123***	-7.71	-0.122***	-7.64	-0.122***	-7.63
SOE	1.462***	7.44	1.532***	7.87	1.525***	7.86	1.510***	7.78
GDP_PC	0.060	1.12	0.048	0.91	-0.013	-0.24	-0.012	-0.22
MKT	0.114	1.59	0.103	1.44	0.024	0.31	0.013	0.17
INTERCEPT	-61.664***	-26.10	-59.600***	-25.94	-74.920***	-18.77	-78.071***	-18.98
Industry and Year	Yes		Yes		Yes		Yes	
Observations	16,713		16,713		16,713		16,713	
Pseudo_R ²	9.87%		10.01%		10.10%		10.12%	
Log Likelihood	-13,590.02		-13,568.95		-13,556.62		-13,552.48	
LR Chi ² value	2,977.87***(0.000)		3,020.01***(0.000)		3,044.67***(0.000)		3,052.96***(0.000)	
Δ Pseudo_R ²			42.14***(0.000)		24.66***(0.000)		8.28***(0.004)	
(GBD + GBD×RGD) V.S. GBD							6.16** (0.013)	

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

support to H2a, implying that regional green development weakens the positive relation between the globalised board of directors and corporate environmental performance.

4.4. Robustness checks using other proxies for corporate environmental performance

In Table 5, three additional variables are employed to re-test H1 and H2a (H2b). $\text{LN}(1 + \text{EPI})$ is the natural logarithm of (1+ the raw value of environmental performance index). EPI_STD is calculated as $(\text{EPI}_{j,t} - \text{EPI}_{\min,t}) / (\text{EPI}_{\max,t} - \text{EPI}_{\min,t})$. $\text{EPI}_{j,t}$ is the raw value of environmental performance index for firm j in year t ; and $\text{EPI}_{\min,t}$ ($\text{EPI}_{\max,t}$) is the minimum (maximum) of environmental performance index for all firms in year t . ENV is a proxy for all environmental items of GRI sustainability reporting guidelines, rather than environmental performance indicators.

Panel A of Table 4 reports the OLS regression results using $\text{LN}(1 + \text{EPI})$ as the dependent variable. In Column (2) of Panel A, the coefficient on GBD is significantly positive (0.114 with $t = 5.50$). Then, in Column (4) of Panel A, the coefficient on $\text{GBD} \times \text{RGD}$ is significantly negative (-0.026 with $t = -2.42$). Above results additionally affirm H1 and H2a. Panel B of Table 4 reports the OLS regression results using EPI_STD as the dependent variable. In Column (2) of Panel B, GBD is significantly positively related with EPI_STD (0.029 with $t = 6.55$), consistent with H1. Then, in Column (4) of Panel B, $\text{GBD} \times \text{RGD}$ has a significantly negative coefficient (-0.005 with $t = -2.13$), lending additional support to H2a. Using ENV as the dependent variable, the Tobit regression results are listed in Panel C of Table 4. In Column (2) of Panel C, GBD is significantly positively associated with ENV (1.265 with $t = 5.72$). Then, in Column (4) of Panel C, the coefficient on $\text{GBD} \times \text{RGD}$ is negative and significant (-0.488 with $t = -4.54$). Results in Panel C of Table 4 verify H1 and H2a again.

4.5. The influence of the globalised board of directors on greenwashing

Corporate environmental performance based on environmental disclosure may be biased if some firms ‘talk much but do little’ or ‘do much but talk little’. To alleviate this bias, we investigate the effect of the globalised board of directors on corporate greenwashing (GW), which means that a firm does not undertake environmental responsibilities but claims that it acts environment-friendly. GW is defined as $|\text{ENV} - \text{ENV_EXP}|$ if $\text{ENV} < \text{ENV_EXP}$ and 0 otherwise (Du et al., 2018). ENV (ENV_EXP) is the actual (expected) value of environmental performance. If the actual value is greater than the expected value, the firm has already fulfilled its environmental responsibilities and is less likely to conduct greenwashing. On the contrary, if the actual value is less than the expected value, the firm has not fulfilled its environmental responsibility or does not meet the expectation from the public, implying that the firm may establish its reputation on environmental protection by greenwashing.

In Column (2) of Table 5, the coefficient on GBD is negative and significant (-0.290 with $t = -3.74$), implying that the globalised board of directors mitigates corporate greenwashing. Then, in Column (4) of Table 5, the coefficient on $\text{GBD} \times \text{RGD}$ is positive



Table 4. Robustness checks using other measures of corporate environmental performance.

Variables	Dependent variable: The natural logarithm of (1+ the raw value of environmental performance index) – LN(1+EPI)			
	(1)	(2)	(3)	(4)
GBD		0.114***	0.117***	0.126***
RGD			0.014***	0.017***
GBD×RGD				-0.026**
Control Variables	Yes	Yes	Yes	Yes
INTERCEPT	-4.253***	-4.155***	-5.245***	-5.432***
Industry and Year	Yes	Yes	Yes	Yes
Observations	16,713	16,713	16,713	16,713
Adjusted_R ²	19.08%	19.32%	19.47%	19.52%
F-value	84.86***(0.000)	84.38***(0.000)	83.47***(0.000)	82.08***(0.000)
Δ Adjusted_R ²		49.57***(0.000)	31.04***(0.000)	10.35***(0.001)
(GBD + GBD×RGD) V.S. GBD				5.84**(0.016)

Variables	The dependent variable: The standardised environmental performance index (EPI_STD)			
	(1)	(2)	(3)	(4)
GBD		0.029***	0.030***	0.032***
RGD			0.002***	0.003***
GBD×RGD				-0.005**
Control Variables	Yes	Yes	Yes	Yes
INTERCEPT	-0.648***	-0.623***	-0.807***	-0.843***
Industry and Year	Yes	Yes	Yes	Yes
Observations	16,713	16,713	16,713	16,713
Adjusted_R ²	15.58%	16.19%	16.35%	16.42%
F-value	66.62***(0.000)	68.25***(0.000)	67.67***(0.000)	66.68***(0.000)
Δ Adjusted_R ²		121.29***(0.000)	31.87***(0.000)	13.96***(0.000)
(GBD + GBD×RGD) V.S. GBD				4.53**(0.033)

(Continued)

Table 4. (Continued).

Variables	Panel C Robustness checks using environmental performance on the basis of all environmental items of GRI sustainability reporting guidelines			
	Dependent variable: Environmental performance on the basis of all environmental items of GRI sustainability reporting guidelines (ENV)			
	(1)	(2)	(3)	(4)
	Coefficient	t-value	Coefficient	t-value
GBD				
RGD			1.326***	5.98
GBD×RGD			0.224***	8.00
Control Variables	Yes		Yes	
INTERCEPT	-46.734***	-29.04	-61.962***	-24.11
Industry and Year	Yes		Yes	
Observations	16,713		16,713	
Pseudo_R ²	5.90%		6.06%	
Log Likelihood	-38,658.34		-38,595.13	
LR Chi ² value	4,849.06***(0.000)		4,975.47***(0.000)	
Δ Pseudo_R ²			69.48***(0.000)	
(GBD + GBD×RGD) V.S. GBD				
			56.94***(0.000)	
			16,713	16,713
			6.10%	6.10%
			-38,576.85	-38,576.85
			5,012.03***(0.000)	5,012.03***(0.000)
			36.56***(0.000)	36.56***(0.000)
			20.64***(0.000)	20.64***(0.000)

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

Table 5. Robustness checks about the influence of the globalised board of directors on greenwashing.

Variables	Dependent variable: Greenwashing (GW)							
	(1)		(2)		(3)		(4)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
GBD			-0.290***	-3.74	-0.312***	-4.01	-0.364***	-4.68
RGD					-0.095***	-8.29	-0.107***	-9.26
GBD×RGD							0.150***	3.81
BLOCK	0.527***	3.77	0.544***	3.90	0.552***	3.96	0.544***	3.91
MAN_SHR	0.617***	3.51	0.579***	3.29	0.584***	3.32	0.584***	3.32
QFII_SHR	-7.356	-1.06	-6.628	-0.96	-5.917	-0.85	-6.565	-0.95
DUAL	0.019	0.40	0.025	0.52	0.018	0.37	0.021	0.43
BOARD	-0.544***	-4.43	-0.520***	-4.24	-0.498***	-4.07	-0.498***	-4.07
INDR	-1.337***	-3.05	-1.299***	-2.97	-1.277***	-2.93	-1.337***	-3.06
ANALYST	-0.081***	-3.53	-0.082***	-3.59	-0.078***	-3.42	-0.076***	-3.32
BIG10	-0.036	-0.94	-0.033	-0.85	-0.022	-0.57	-0.020	-0.53
SIZE	0.477***	14.96	0.486***	15.22	0.489***	15.34	0.486***	15.22
LEV	-1.383***	-8.16	-1.402***	-8.28	-1.442***	-8.55	-1.444***	-8.56
ROA	1.334***	3.23	1.341***	3.25	1.354***	3.30	1.381***	3.37
TOBIN'Q	-0.064***	-5.77	-0.063***	-5.70	-0.061***	-5.56	-0.062***	-5.64
FIN	0.217***	3.50	0.215***	3.47	0.226***	3.66	0.224***	3.63
VOLAT	-3.022***	-2.83	-3.089***	-2.90	-3.087***	-2.91	-3.110***	-2.93
CAP_INV	0.229*	1.95	0.225*	1.91	0.219*	1.87	0.220*	1.87
LISTAGE	0.038***	8.98	0.037***	8.82	0.037***	8.83	0.038***	8.88
SOE	-0.070	-1.46	-0.081*	-1.69	-0.087*	-1.81	-0.083*	-1.74
GDP_PC	0.001	0.06	0.002	0.14	0.025*	1.70	0.024	1.61
MKT	-0.027	-1.41	-0.025	-1.32	0.016	0.79	0.020	1.00
INTERCEPT	-8.602***	-11.32	-8.854***	-11.64	-1.888*	-1.67	-0.808	-0.70
Industry and Year	Yes		Yes		Yes		Yes	
Observations	16,713		16,713		16,713		16,713	
Pseudo_R ²	2.11%		2.14%		2.26%		2.29%	
Log Likelihood	-28,264.75		-28,256.60		-28,221.77		-28,212.52	
LR Chi ² value	1,217.95***(0.000)		1,234.27***(0.000)		1,303.91***(0.000)		1,322.43***(0.000)	
Δ Pseudo_R ²			16.30***(0.000)		69.66***(0.000)		18.50***(0.000)	
(GBD + GBD×RGD) V.S. GBD							14.55***(0.000)	

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

and significant (0.150 with $t = 3.81$), implying that regional green development attenuates the negative relation between the globalised board of directors and corporate greenwashing. Above results lend supportive evidence to H1 and H2a, respectively.

4.6. Robustness checks using other proxies for the globalised board of directors

In Table 6, we replace GBD with two other proxies for the globalised board of directors. One is the proportion of foreign directors on corporate board (GBD_RATIO), the other is an indicator variable for the globalised board of directors including oversea Chinese that equals 1 if at least one foreigner or oversea Chinese serves in the boardroom and 0 otherwise (GBD_BROAD).

In Panel A of Table 6, the independent variable is GBD_RATIO. In Column (1), GBD_RATIO has a positive and significant coefficient (7.445 with $t = 5.64$), consistent with H1. In Column (3), GBD_RATIO×RGD has a significantly negative coefficient (-1.504 with $t = -2.04$), verifying H2a.

Table 6. Robustness checks using other measures of the globalised board of directors.

Panel A Robustness checks using a ratio variable for the globalised board of directors						
Variables	Dependent variable: The raw value of environmental performance index (EPI)					
	(1)		(2)		(3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
GBD_RATIO	7.445***	5.64	7.620***	5.78	8.937***	6.20
RGD			0.204***	4.56	0.230***	5.09
GBD_RATIO×RGD					-1.504**	-2.04
Control Variables	Yes		Yes		Yes	
INTERCEPT	-60.454***	-26.07	-75.424***	-18.88	-77.528***	-19.02
Industry and Year	Yes		Yes		Yes	
Observations	16,713		16,713		16,713	
Pseudo_R ²	10.03%		10.11%		10.13%	
Log Likelihood	-13,566.87		-13,555.16		-13,551.88	
LR Chi ² value	3,024.17***(0.000)		3,047.60***(0.000)		3,054.16***(0.000)	
Δ Pseudo_R ²	46.30***(0.000)		23.42***(0.000)		6.56***(0.010)	
<i>(GBD_RATIO + GBD_RATIO×RGD) V.S. GBD_RATIO</i>					4.18***(0.041)	
Panel B Robustness checks using the globalised board of directors in a broad sense						
Variables	Dependent variable: The raw value of environmental performance index (EPI)					
	(1)		(2)		(3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
GBD_BROAD	1.075***	4.75	1.116***	4.92	1.344***	5.85
RGD			0.203***	4.55	0.278***	5.96
GBD_BROAD×RGD					-0.482***	-4.44
Control Variables	Yes		Yes		Yes	
INTERCEPT	-60.218***	-26.00	-75.134***	-18.76	-81.365***	-19.39
Industry and Year	Yes		Yes		Yes	
Observations	16,713		16,713		16,713	
Pseudo_R ²	9.96%		10.04%		10.12%	
Log Likelihood	-13,576.85		-13,565.25		-13,553.33	
LR Chi ² value	3,004.22***(0.000)		3,027.41***(0.000)		3,051.26***(0.000)	
Δ Pseudo_R ²	26.34***(0.000)		23.20***(0.000)		23.84***(0.000)	
<i>(GBD_BROAD+ GBD_BROAD×RGD) V.S. GBD_BROAD</i>					19.72***(0.000)	

*. $p < 0.10$; **. $p < 0.05$; ***. $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

In Panel B of Table 6, the independent variable is GBD_BROAD. Column (1) shows that GBD_BROAD is significantly positively related with EPI (1.075 with $t = 4.75$), verifying H1 again. Further, in Column (3) of Panel B, the coefficient on GBD_BROAD×RGD is negative and significant (-0.482 with $t = -4.44$), providing additional support to H2a.

5. Endogeneity and additional tests

5.1. Endogeneity tests using firm fixed effect

The firm-level fixed effect is employed to control for firm-level factors that do not change over time, and the results are reported in Table 7. In Column (1) of Table 7, the coefficient on GBD is positive and significant (0.393 with $t = 2.45$). Furthermore, in Column (2) of Table 7, the coefficient on GBD×RGD is negative and significant (-0.222 with $t = -2.33$). In

Table 7. Endogeneity tests using firm fixed effect.

Variables	Dependent variable: The raw value of environmental performance index (EPI)			
	(1)		(2)	
	Coefficient	t-value	Coefficient	t-value
GBD	0.393**	2.45	0.483***	2.90
RGD			0.230**	2.28
GBD×RGD			-0.222**	-2.33
BLOCK	0.302	1.14	0.306	1.15
MAN_SHR	0.185	0.83	0.169	0.76
QFII_SHR	-0.471	-0.09	0.145	0.03
DUAL	0.027	0.52	0.030	0.57
BOARD	0.165	0.74	0.144	0.65
INDR	-0.151	-0.24	-0.210	-0.34
ANALYST	-0.001	-0.05	-0.001	-0.04
BIG10	-0.063	-1.10	-0.058	-1.02
SIZE	0.086*	1.72	0.089*	1.77
LEV	-0.133	-0.68	-0.142	-0.74
ROA	-0.221	-0.64	-0.191	-0.56
TOBIN'Q	0.001	0.15	-0.001	-0.02
FIN	-0.041	-0.93	-0.040	-0.92
VOLAT	-1.288*	-1.68	-1.310*	-1.71
CAP_INV	-0.034	-0.30	-0.051	-0.46
LISTAGE	-0.283	-1.50	-0.282	-1.50
SOE	0.022	0.30	0.031	0.45
GDP_PC	0.003	0.07	-0.018	-0.40
MKT	-0.045	-0.81	-0.070	-1.28
INTERCEPT	2.515	0.92	-15.562*	-1.84
Firm and Year		Yes		Yes
Observations		16,713		16,713
Adjusted_R ²		0.78%		1.53%
F-value		3.19***(0.000)		3.33***(0.000)
(GBD + GBD×RGD) V.S. GBD				5.45***(0.020)

*, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

general, empirical results in Table 7 are qualitatively similar to those in Table 3, which indicates that the main findings remain unchanged after employing the firm-level fixed effect to address the endogeneity issue.

5.2. Endogeneity tests using IV estimation approach

To effectively conduct the IV estimation approach, it is critical to select the instrumental variable for the globalised board of directors. In this study, we choose AIRPORT as the instrumental variable. Specifically, AIRPORT denotes the number of international airports within 100 kilometres around a firm's registered address. Referring to Wooldridge (2001), a valid instrumental variable ought to meet two criteria: (1) It is strongly correlated with the potential endogeneity regressor (i.e. the globalised board of directors in this study); (2) It only affects the dependent variable (i.e. corporate environmental performance) through the potential endogeneity independent variable. The willingness of candidates to work abroad is a key factor that determines whether enterprises can successfully establish the globalised board of directors. In this regard, enterprises close to international airports are easily reached and are more attractive for candidates. Du et al. (2017) and Masulis et al. (2012) have validated that enterprises located near international airports are more likely to have

foreign experts serving in the boardroom. Thus, AIRPORT meets the first criterion as it is theoretically predicted to be strongly correlated with the globalised board of directors. In China, the establishment of an international airport must be approved by the State Council, so it is less likely that the geographic distribution of international airports can directly affect corporate decision towards environmental responsibility. Accordingly, AIRPORT may fit in well with the second criterion to some extent.

Panel A of [Table 8](#) reports the results of the IV estimation approach for H1. At the first stage, we use OLS regression to link the globalised board of directors (GBD) to international airports (AIRPORT) and other control variables. In Column (1) of Panel A, AIRPORT is significantly positively related with GBD (0.029 with $t = 10.85$), consistent with our theoretical expectation. Then, at the second stage, we use the fitted value of GBD (i.e. GBD*) as the independent variable to re-test H1. In Column (2) of Panel A, the coefficient on GBD* is positive and significant (8.447 with $t = 2.99$), verifying H1. Furthermore, in the next-to-last (last) row, Chi^2 value of AR (Wald) tests for weak IV is 8.83 (8.56) and is significant at the 1% level, indicating that AIRPORT is a valid instrument for GBD.

Panel B of [Table 8](#) tabulates the results of IV estimation approach for H2a and H2b. Referring to Wooldridge (2001), at the first stage, we employ the OLS regression to link the globalised board of directors (GBD) to international airports (AIRPORT), the interactive term of AIRPORT×RGD and other control variables. Next, we also link the interactive term of GBD×RGD to international airports (AIRPORT), the interactive term of AIRPORT×RGD, and other control variables. In doing so, we obtain the fitted value of GBD (i.e. GBD*) and GBD×RGD [i.e. (GBD×RGD)*], respectively. Then, at the second stage, we regress EPI on GBD*, (GBD×RGD)* and other control variables to re-test H2a (H2b). In Column (3) of Panel B, GBD* is significantly positively related with EPI (11.747 with $t = 3.94$), verifying H1 again. In addition, the coefficient on (GBD×RGD)* is negative and significant (-3.197 with $t = -2.10$), lending supportive evidence to H2a. Meanwhile, in the next-to-last (last) row, Chi^2 value of AR (Wald) test for weak IV is 20.47 (18.91) and is significant at the 1% level, indicating that AIRPORT is still valid for the model with interaction term.

5.3. Endogeneity tests using Heckman's (1979) approach

In addition to the fixed-effects estimate and IV regression, we further employ Heckman's (1979) two-stage regression approach to alleviate the self-selection problem. First, using AIRPORT and all control variables in Model (1), we conduct the first-stage regression of Heckman's (1979) approach, and then calculate the inverse Mills Ratio (IMR). As expected, in Column (1) of [Table 9](#), AIRPORT is significantly positively related with GBD (0.189 with $t = 12.39$). Second, in the second stage of Heckman's (1979) approach, we include IMR to re-test Hypotheses 1, 2a, and 2b. As shown in Column (2) of [Table 9](#), GBD has a significantly positive coefficient (4.736 with $t = 2.80$), supporting H1 again. In addition, results in Column (3) lend important support to H2a, along with a significantly negative coefficient on GBD×RGD (-0.390 with $t = -2.57$).

Table 8. Endogeneity tests using IV estimation approach.

Panel A The results of IV estimation approach for H1					
Variables	The first stage		The second stage		
	Dependent variable: The globalised board of directors (GBD)		Dependent variable: The raw value of environmental performance index (EPI)		
	(1)		(2)		
	Coefficient	t-value	Coefficient	t-value	
AIRPORT	0.029***	10.85			
GBD*			8.447***	2.99	
INTERCEPT	-0.853***	-11.22	-54.084***	-16.09	
Industry and Year	Yes		Yes		
Observations	16,713		16,713		
<i>Pseudo_R²/Adjusted_R²</i>	5.51%		9.91%		
Log Likelihood			-13,585.13		
LR Chi ² value/F-value	31.30***(0.000)		2,987.66***(0.000)		
<i>AR test for weak identification</i>		8.83***(0.003)			
<i>Wald test for weak identification</i>		8.56***(0.003)			

Panel B The results of IV estimation approach for H2a and H2b						
Variables	The first stage		The second stage			
	Dependent variable: The globalised board of directors (GBD)		Dependent variable: The interactive term of GBD×RGD		Dependent variable: The raw value of environmental performance index (EPI)	
	(1)		(2)		(3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
AIRPORT	0.028***	10.35	0.008*	1.89		
GBD*					11.747***	3.94
RGD	-0.004***	-3.40	0.081***	19.40	0.519***	3.82
AIRPORT×RGD	-0.002	-1.03	0.039***	7.65		
(GBD×RGD)*					-3.197**	-2.10
INTERCEPT	-0.529***	-4.29	-7.326***	-19.27	-93.731***	-7.92
Industry and Year	Yes		Yes		Yes	
Observations	16,713		16,713		16,713	
<i>Pseudo_R²/Adjusted_R²</i>	5.58%		9.90%		10.02%	
Log Likelihood					-13,568.47	
LR Chi ² value/F-value	20.74***(0.000)		37.72***(0.000)		3,020.98***(0.000)	
<i>[GBD* +(GBD×RGD)*] V.S. GBD*</i>					4.39**(0.036)	
<i>AR test for weak identification</i>			20.47***(0.000)			
<i>Wald test for weak identification</i>			18.91***(0.000)			

*, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$. All reported t-/z-statistics are based on standard errors adjusted following White (1980).

5.4. Endogeneity tests using PSM-DID method

Some sample firms have not foreign directors in the boardroom in early years, but they hired foreign directors in later years. Above case provides us with a unique setting to conduct endogeneity test using PSM-DID method on the basis of the arrival of foreign directors.

First, we identify two groups of sample firms: the group with the arrival of foreign directors (i.e. the treated group), the group without the arrival of foreign directors (i.e. the controlling group). Next, we employ the propensity score matching (PSM) process,

Table 9. Endogeneity tests using Heckman's (1979) two-stage regression approach.

Variables	The first stage		The second stage			
	Dependent variable: The globalised board of directors (GBD)		Dependent variable: The raw value of environmental performance index (EPI)			
	(1)		(2)	(3)		
	Coefficient	z-value	Coefficient	t-value	Coefficient	t-value
AIRPORT	0.189***	12.39				
GBD			4.736***	2.80	6.159***	3.60
RGD					0.261***	5.67
GBD×RGD					-0.390***	-2.89
IMR			-1.661*	-1.88	-2.292**	-2.57
BLOCK	0.434***	4.10	2.570***	4.89	2.464***	4.71
MAN_SHR	-0.984***	-6.10	0.631	0.77	0.864	1.06
QFII_SHR	10.400***	2.45	-11.153	-0.53	-14.038	-0.67
DUAL	0.159***	4.04	-0.399*	-1.83	-0.425**	-1.96
BOARD	0.705***	7.33	1.637***	3.52	1.408***	3.04
INDR	0.777**	2.39	0.227	0.15	0.267	0.18
ANALYST	-0.022	-1.22	0.562***	6.35	0.561***	6.37
BIG10	0.058*	1.87	0.022	0.14	0.004	0.03
SIZE	0.201***	9.99	1.949***	17.90	1.909***	17.54
LEV	-0.442***	-3.32	1.754***	2.73	1.963***	3.05
ROA	0.266	0.76	-1.394	-0.81	-1.576	-0.92
TOBIN'Q	0.020**	2.14	-0.313***	-5.20	-0.315***	-5.24
FIN	-0.054	-1.02	-0.884***	-3.21	-0.895***	-3.24
VOLAT	-1.354	-1.47	-16.114***	-3.38	-15.509***	-3.26
CAP_INV	-0.112	-1.19	-0.054	-0.12	-0.049	-0.11
LISTAGE	-0.014***	-4.26	-0.116***	-7.06	-0.112***	-6.82
SOE	-0.311***	-7.63	1.678***	8.05	1.709***	8.23
GDP_PC	0.035***	3.18	0.034	0.64	-0.033	-0.61
MKT	-0.008	-0.49	0.082	1.12	-0.022	-0.29
INTERCEPT	-8.113***	-16.05	-56.392***	-19.81	-74.742***	-17.39
Industry	Yes		Yes		Yes	
Year	Yes		Yes		Yes	
Observations	16,713		16,713		16,713	
Pseudo R ²	10.40%		10.03%		10.16%	
Log Likelihood	-4,099.55		-13,566.37		-13,547.68	
LR Chi ² value	951.82***(0.000)		3,025.18***(0.000)		3,062.56***(0.000)	
(GBD + GBD×RGD) V.S. GBD					8.38*(0.004)	

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-/z-statistics are based on standard errors adjusted following White (1980).

abiding by the one-to-one principle and adopting '±0.001' as the threshold to match each observation in the treated group to the controlling group. In doing so, governance mechanisms (BLOCK, MAN_SHR, QFII_SHR, DUAL, BOARD and INDR), firm-specific characteristics (SIZE, LEV, ROA, and TOBIN'Q) and a dummy variable for state-owned enterprises (SOE) are chosen to conduct the PSM process. Then, we get a sample of 2,554 observations, including 1,277 in the treated group and 1,277 in the controlling group. As shown in Panel A of Table 10, after conducting the PSM process, the differences in all chosen variables become insignificant between the treated group and the controlling group, suggesting that we have done a relatively good matching work. Lastly, we define a set of variables as below: TREAT is an indicator variable for the treated group, equalling 1 if the firm experienced the arrival of foreign directors during the sample period and 0 otherwise. POST is an indicator variable for the post-period, equalling 1 for the post-period and 0 otherwise. TREAT×POST is the interactive term of TREAT and POST. In difference-in-difference (DID) regressions, TREAT×POST is included to estimate the effect

of the arrival of foreign directors on corporate environment performance. In the meantime, TREAT and year dummies are used to control for the treatment effect and the time effect, respectively.

As shown in Column (1) of Panel B of Table 10, we find a significantly positive coefficient on TREAT×POST (1.274 with $t = 2.03$), consistent with H1. It suggests that the difference in corporate environmental performance between the treated group and the controlling group becomes significantly greater after the arrival of foreign directors. Then, in Column (2), we find a significantly negative coefficient on TREAT×POST×RGD (-0.616 with $t = -2.94$), consistent with H2a.

5.5. Additional tests considering the original countries (regions) of foreign directors

Referring to Du et al. (2017) and Masulis et al. (2012), we investigate the influence of time zone difference between original countries (regions) of foreign directors and corporate headquarters – which captures the geographic distance and monitoring costs – on corporate environmental performance. GBD_TZ (GBD_NTZ) is an indicator that equals 1 if the work time period of at least one foreign director's original country or region has a (no) overlap with the trading hours of China's stock market and 0 otherwise. In Column (1) of Panel A in Table 11, GBD_TZ is significantly positively related with EPI (2.041, with $t = 6.49$), but the coefficient on GBD_NTZ is insignificant. Above results reveal that the difference in time zone suppresses the positive effect of foreign directors on environmental performance, echoing Du et al. (2017) and Masulis et al. (2012).

Foreign directors on corporate boards are expected to hold stronger stakeholder perspective when investor protection mechanisms are of high quality and being effectively implemented in their original countries (regions). In response, GBD_H_IP (GBD_L_IP) is an indicator variable that equals 1 if the investor protection index of at least one foreign director' original country or region is higher (lower) than that of China and 0 otherwise. As reported in Column (2) of Panel A in Table 11, GBD_H_IP is significantly positively related with EPI (1.903, with $t = 6.22$), but the coefficient on GBD_L_IP is insignificant, suggesting that foreign directors from countries (regions) with better investor protection have done a relatively good job in enhancing corporate environmental performance.

We further examine whether foreign directors from countries (regions) with better performance in environmental responsibilities exert greater effect on corporate environmental performance. Based on the Environmental Performance Index developed by Yale University, Columbia University and World Economic Forum, we define GBD_H_ER (GBD_L_ER) as an indicator variable, equalling 1 if at least one foreign director' original country (region) performs better (worse) in environmental responsibilities compared with China and 0 otherwise. In Column (3) of Panel C in Table 11, GBD_H_ER is significantly positively related with EPI (1.560, with $t = 5.40$), but the coefficient on GBD_L_ER is insignificant, suggesting that the positive effect of foreign directors on environmental performance only holds for foreign directors from environmentally friendly countries (regions).

Table 10. Endogeneity tests using PSM-DID method.

Panel A T-tests about the differences between the treated group and the controlling group										
Variables	Full sample					Matched sample				
	TREAT = 1 [N = 1,303]		TREAT = 0 [N = 14,083]		t-test	TREAT = 1 [N = 1,277]		TREAT = 0 [N = 1,277]		t-test
	Mean	S. D.	Mean	S. D.		Mean	S. D.	Mean	S. D.	
BLOCK	0.375	0.150	0.353	0.150	5.16***	0.373	0.150	0.372	0.158	0.21
MAN_SHR	0.041	0.115	0.057	0.128	-4.26***	0.042	0.116	0.045	0.113	-0.58
QFII_SHR	0.001	0.004	0.001	0.003	4.28***	0.001	0.004	0.001	0.004	0.77
DUAL	0.203	0.403	0.231	0.421	-2.27**	0.208	0.406	0.221	0.415	-0.82
BOARD	2.177	0.204	2.152	0.197	4.34***	2.175	0.204	2.182	0.201	-0.87
INDR	0.372	0.057	0.371	0.052	0.69***	0.371	0.057	0.372	0.055	-0.35
SIZE	23.049	1.335	22.545	1.046	16.23***	22.998	1.291	23.009	1.199	-0.22
LEV	0.162	0.135	0.172	0.147	-2.17**	0.162	0.135	0.167	0.143	-0.84
ROA	0.045	0.057	0.036	0.054	5.68***	0.045	0.057	0.044	0.056	0.30
TOBIN'Q	2.612	2.064	2.701	2.026	-1.52	2.631	2.074	2.623	2.096	0.11
SOE	0.496	0.500	0.452	0.498	3.02***	0.490	0.500	0.475	0.500	0.80

Panel B The results of difference-in-difference (DID) regressions				
Variables	Dependent variable: The raw value of environmental performance index (EPI)			
	(1)		(2)	
	Coefficient	t-value	Coefficient	t-value
TREAT	-0.174	-0.46	-0.203	-0.54
TREAT×POST	1.274**	2.03	1.395**	2.26
RGD			0.138	1.35
TREAT×POST×RGD			-0.616***	-2.94
Control Variables	Yes		Yes	
INTERCEPT	-57.963***	-11.15	-68.765***	-7.88
Industry and Year		Yes		Yes
Observations		2,554		2,554
Pseudo R ²		11.69%		11.83%
Log Likelihood		-2,600.17		-2,595.92
LR Chi ² value		688.42***(0.000)		696.91***(0.000)
(TREAT×POST + TREAT×POST×RGD) V.S. TREAT×POST				8.678***(0.003)

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

5.6. Cross-sectional analyses considering external monitoring mechanisms

In Panel A of Table 11, for both the subsample with high analyst coverage and the subsample with low analyst coverage, GBD has a positive and significant coefficient. However, the coefficient test reveals that the coefficient on GBD for the subsample with low analyst coverage (2.735 with $t = 5.25$) is significantly larger than that for the subsample with high analyst coverage (0.992 with $t = 3.05$).

Next, DIS_REGU is defined as the distance between the firm's registered address and the nearest securities regulator (the China Securities Regulatory Commission, the Shanghai Stock Exchange and the Shenzhen Stock Exchange), which captures regulatory intensity (El Ghouli et al., 2013). In Panel B, the coefficients on GBD are both significantly positive for two subsamples, but the coefficient on GBD is significantly larger for the subsample with weak regulatory intensity (2.072 with $t = 5.52$) than that for the subsample with strong regulatory intensity (1.120 with $t = 2.57$).

Table 11. Cross-sectional analyses considering external monitoring mechanisms.

Panel A Cross-sectional analyses considering analyst coverage				
Variables	Dependent variable: The raw value of environmental performance index (EPI)			
	High analyst coverage		Low analyst coverage	
	(1)		(2)	
	Coefficient	t-value	Coefficient	t-value
GBD	0.992***	3.05	2.735***	5.25
Control Variables	Yes		Yes	
INTERCEPT	-60.801***	-22.29	-63.653***	-14.31
Industry and Year	Yes		Yes	
Observations	7,980		8,733	
<i>Pseudo_R</i> ²	9.79%		8.59%	
Log Likelihood	-8,133.31		-5,370.56	
LR Chi ² value	1,765.24***(0.000)		1,009.97***(0.000)	
Chow test for two subsamples			142.25***(0.000)	
Coefficient test on GBD			-8.05***(0.004)	
Panel B Cross-sectional analyses considering regulatory intensity				
Variables	Dependent variable: The raw value of environmental performance index (EPI)			
	High regulatory intensity		Low regulatory intensity	
	(1)		(2)	
	Coefficient	t-value	Coefficient	t-value
GBD	1.120**	2.57	2.072***	5.52
Control Variables	Yes		Yes	
INTERCEPT	-63.945***	-19.03	-52.164***	-14.91
Industry and Year	Yes		Yes	
Observations	8,355		8,358	
<i>Pseudo_R</i> ²	10.14%		10.91%	
Log Likelihood	-6,969.58		-6,519.87	
LR Chi ² value	1,573.08***(0.000)		1,596.38***(0.000)	
Chow test for two subsamples			171.09***(0.000)	
Coefficient test on GBD			-2.74*(0.098)	
Panel C Cross-sectional analyses considering the nature of the ultimate owner				
Variables	Dependent variable: The raw value of environmental performance index (EPI)			
	SOE subsample		Non-SOE subsample	
	(1)		(2)	
	Coefficient	t-value	Coefficient	t-value
GBD	1.026***	3.04	2.091***	4.47
Control Variables	Yes		Yes	
INTERCEPT	-55.555***	-20.42	-56.852***	-11.34
Industry and Year	Yes		Yes	
Observations	7,442		9,271	
<i>Pseudo_R</i> ²	11.77%		5.48%	
Log Likelihood	-7,771.32		-5,677.32	
LR Chi ² value	2,073.56***(0.000)		658.62***(0.000)	
Chow test for two subsamples			555.48***(0.000)	
Coefficient test on GBD			-3.41*(0.065)	

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. All reported t-statistics are based on standard errors adjusted following White (1980).

In China, state-owned enterprises are not only regulated by securities regulators, but also under the supervision of SASAC and local governments, which leads to the relatively high level of external monitoring. As reported in Panel C of Table 12, GBD has significantly positive coefficients for both the SOE and non-SOE subsamples, but the coefficient on GBD is significantly larger for the non-SOE subsample (2.091 with $t = 4.47$) than that for the SOE subsample (1.026 with $t = 3.04$).

Overall, the positive relation between foreign directors and corporate environmental performance is more pronounced for firms with weak external monitoring mechanisms – low analyst coverage, weak regulatory intensity and non-SOE.

5.7. Additional tests about economic consequences of better environmental performance

To address economic consequences of better environmental performance, additional variables of COC, COD, ROT and SUBSIDY are defined. COC (the cost of capital) is defined as $[(EPS_{t+2} - EPS_{t+1})/P_t]^{1/2}$ (EPS is the mean value of analysts' forecast on earnings per share; P is stock price at the end of the year). COD is the cost of debt, measured as the total interest expenses divided by the amount of interest-bearing liabilities. ROT is the natural logarithm of (1+ the amount of refund of taxes). SUBSIDY is the natural logarithm of (1+ the amount of government subsidies).

In Columns (1) and (2) of Panel B in Table 12, EPI is significantly negatively related with both COC (-0.001 with $t = -4.15$) and COD (-0.001 with $t = -2.26$). Meanwhile, in Columns (3) and (4), EPI is significantly positively related with both ROT (0.071 with $t = 2.84$) and SUBSIDY (0.032 with $t = 4.44$). Above result suggest that environmentally responsible enterprises have lower costs of capital and debt, more tax benefits and more government subsidies, consistent with theoretical expectation.

6. Conclusions, managerial implications, limitations and future research

In this study, we address the relation between the globalised board of directors and environmental performance, and further investigate the moderating effect of regional green development on above relation. Our findings reveal a positive and significant relation between the globalised board of directors and corporate environmental performance, suggesting that the globalised board of directors can strengthen the moral and strategic incentives for firms to undertake environmental responsibility and enhance environmental performance. Moreover, regional green development attenuates the positive effect of the globalised board of directors on corporate environmental performance.

This study has several managerial implications as below: First, our findings imply that board nationality diversity can enhance board independence and board supervisory capability, which can help to shift superior environmental practices to managers and result in better environmental performance. Thus, our finding can inspire regulatory bodies to attach the importance to the positive role of board nationality diversity in corporate behaviour (e.g. environmental performance in our study). Moreover, Chinese listed firms should incorporate foreign directors from advanced countries



Table 12. Additional tests.

Variables	Panel A Additional tests considering the characteristics of foreign directors' original countries (regions)					
	Time zone difference			Dependent variable: The raw value of environmental performance index (EPI)		
	Investor protection		Environmental responsibilities			
	(1)	(2)	(3)			
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
GBD_TZ	2.041***	6.49				
GBD_NTZ	-0.280	-0.46				
GBD_H_IP			1.903***	6.22	1.560***	5.40
GBD_L_IP			-0.580	-0.81	1.501	1.48
GBD_H_ER					Yes	
GBD_L_ER					-59.585***	-25.89
Control Variables	Yes		Yes		Yes	
INTERCEPT	-59.441***	-25.99	-59.359***	-25.87	-59.585***	-25.89
Industry and Year	Yes		Yes		Yes	
Observations	16,713		16,713		16,713	
Pseudo R ²	10.07%		10.05%		10.01%	
Log Likelihood	-13,561.16		-13,563.04		-13,569.46	
LR Chi ² value	3,035.59***(0.000)		3,031.83***(0.000)		3,019.00***(0.000)	

(Continued)

Table 12. (Continued).

Variables	Panel B Additional tests about economic consequences of better corporate environmental performance							
	Dependent variable: Cost of capital (COC)		Dependent variable: Cost of debt (COD)		Dependent variable: Refund of taxes (ROT)		Dependent variable: Government Subsidy (SUBSIDY)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
EPI	-0.001***	-4.15	-0.001**	-2.26	0.071***	2.87	0.032***	4.44
BLOCK	-0.015***	-6.00	-0.021***	-4.33	0.284	0.76	-0.054	-0.40
MAN_SHR	0.012***	3.87	-0.048***	-8.56	3.266***	6.59	1.407***	10.19
QFIL_SHR	0.288***	3.41	-0.495***	-2.69	-6.520	-0.40	11.494**	2.37
DUAL	-0.002*	-1.95	-0.001	-0.57	-0.261*	-1.91	-0.048	-1.02
BOARD	-0.004**	-1.97	0.005	1.36	-0.483	-1.49	0.245**	2.22
INDR	0.007	0.94	0.005	0.40	-1.415	-1.26	0.476	1.24
ANALYST	0.007***	16.17	0.002***	3.15	1.628***	25.48	0.955***	43.83
BIG10	0.015***	4.82	-0.172***	-29.46	3.378***	7.74	1.256***	7.78
SIZE	0.035***	3.82	-0.200***	-12.36	1.167	1.07	4.746***	9.37
LEV	-0.004***	-17.43	0.002***	3.14	-0.463***	-14.91	-0.228***	-13.66
ROA	-0.009***	-10.14	0.004***	2.34	0.186	1.47	0.039	0.83
TOBINQ	-0.042***	-3.90	0.068***	3.80	-24.960***	-16.07	-6.135***	-11.61
SOE	-0.001**	-4.15	-0.001**	-2.26	0.071***	2.87	0.032***	4.44
INTERCEPT	-0.015***	-6.00	-0.021***	-4.33	0.284	0.76	-0.054	-0.40
Industry and Year	Yes		Yes		Yes		Yes	
Observations	11,518		13,579		16,092		16,024	
Adjusted_R ²	27.38%		15.41%		24.72%		26.43%	
F-value	109.53***(0.000)		62.83***(0.000)		133.11***(0.000)		144.92***(0.000)	

*; p < 0.10; **, p < 0.05; ***, p < 0.01. All reported t-statistics are based on standard errors adjusted following White (1980).

(regions) to actively establish the globalised board of directors, which can cultivate environmental consciousness and facilitate them to improve environmental performance.

Second, given the positive impact of green development as a social atmosphere on environmental performance, it is suggested that the government should pay close attention to the bright side of adding environmental requirements into the official's evaluation system. As such, regional green development can inspire local officials to show the solicitude for the increasingly deteriorated natural environment in China, which is expected to constrain enterprises in the province from destroying the natural environment, urge enterprises to fulfill environmental responsibilities.

Third, our findings suggest a doable strategy of hiring foreign directors from different countries (regions) for listed firms located in provinces with lower level of green development to enhance environmental performance. By introducing foreign directors into the boardroom, firms in provinces with lower green development can ensure board nationality diversity, establish the globalised board of directors, and are inclined to behave in an environment-friendly way.

Finally, our findings can further refine the scope of Chinese listed firms to choose foreign directors to establish the globalised board of directors, motivating Chinese enterprises to pay close attention to the negative impact of time zone difference on the role of the globalised board of directors in enhancing corporate environmental performance. Furthermore, our findings can inspire Chinese enterprises to import foreign directors from environment-friendly countries (regions).

This study also has its limitations. First, environmental performance is measured based on environmental information disclosure. Although the index has been highly acknowledged by scholars (e.g. Du et al., 2014; Rahman & Post, 2012), it may be biased if some firms 'talk much but do little' or 'do much but talk little'. Second, our study focuses on environmental performance (a specific CSR dimension), and it remains unknown about whether the globalised board of directors can play its advising and monitoring roles in other CSR dimensions (e.g. philanthropy, product quality, staff health). Third, due to data limitation, we cannot obtain the data on environmental consciousness of foreign directors. As a result, we do not examine whether the effect of foreign directors with different levels of environmental consciousness on environmental performance is similar or asymmetric. Finally, our study is conducted based on the Chinese context, so our findings may not fit in well with other contexts. As a result, it should be very cautious in generalising our findings to other settings. Future research can further use the international context to investigate whether the globalised board of directors affects environmental performance. In this regard, cross-national empirical evidence will provide important supplements to our findings based on the context of China.

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