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Internationalization, Corporate Governance, and Environmental Sustainability

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Abstract: (1) Purpose: In recent decades, sustainability has become an important concept across the globe. Poor environmental performance is likely to put firms at risk of public censure and even environmental litigation, especially those operating in international markets. It is critical to understand how firms' operations affect environmental performance. This study investigates how firms' corporate governance actors interact with internationalization to shape environmental sustainability outcomes. (2) Design: Using a panel of data from 2008 to 2022 on listed Chinese companies, this study builds a moderation model to test proposed hypotheses. (3) Findings: This study shows that corporate governance actors play a moderating role in the relationship between internationalization and environmental performance. It also shows that internationalization is less likely to promote environmental performance in state-owned enterprises. (4) Originality: This study enriches the literature on international business and sustainability by advancing our understanding of the mechanisms through which internationalization improves the environmental performance of businesses. This study also contributes to the literature on corporate governance and environmental sustainability outcomes by investigating the global dimension of environmental sustainability issues.

Keywords: internationalization; corporate governance; environmental sustainability; CEO duality; board size; supervisory board; ownership



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1. Introduction

In recent decades, sustainability has become a more important concept globally. Governments, civil societies, and business communities are increasingly speaking out about environmental protection. Many countries have adopted sustainability-related regulations, and a number of global initiatives, such as the Global Reporting Initiative and Sustainable Development Goals, have been established. Poor environmental performance is likely to put firms at risk of public censure and even environmental litigation. Accordingly, there is growing academic interest in how firms' operations affect environmental sustainability outcomes. Achieving environmental sustainability requires substantial investments with long-term strategic implications, posing a considerable challenge for firms, especially those operating internationally. Firms that conduct business in global markets must actively respond to environmental challenges to comply with regulatory requirements and to gain recognition and trust from various stakeholders.

In this study, we establish a theoretical framework to investigate the mechanisms through which internationalization enhances firms' environmental performance. In our context, internationalization refers to the process by which firms expand their operations across national borders, engaging in activities such as trade, investment, and production

in foreign markets [1–3]. Specifically, we demonstrate that corporate governance factors moderate the relationship between internationalization and environmental performance. Furthermore, we find that the positive impact of internationalization on environmental performance is less pronounced in state-owned enterprises (SOEs). The proposed hypotheses are tested using a sample of data from 2008 to 2022 on listed Chinese companies, and the empirical findings provide robust support for all the hypotheses.

Most previous studies focused on how firms respond to institutional pressures in favor of environmentally friendly practices. Few studies have explored how firms' own characteristics interact with internationalization to shape environmental performance. To fill this gap in the literature, we provide key insights into how internationalization and its interaction with firms' corporate governance affect firms' environmental sustainability outcomes. Within the appropriate corporate governance arrangement, corporate managers are inclined to make decisions that benefit stakeholders and are more proactive in investing in environmental protection initiatives. Internationalization demands more transparent corporate governance and more effective monitoring, which are conducive to corporate investment in environmental protection and sustainability. We establish the moderating role of various corporate governance actors on the relationship between internationalization and environmental performance. These results help advance our understanding of the mechanisms through which internationalization promotes firms' environmental performance. In this sense, this study enriches the literature on internationalization and sustainability by providing additional insights into how internationalization affects firms' environmental practices.

In addition, our study also contributes to the literature on corporate governance and environmental sustainability outcomes. Knowledge of the relationship between corporate governance and environmental performance may be geographically bounded as existing studies are mostly based on advanced economies, particularly the United States. Therefore, we investigate how environmental sustainability outcomes depend on the interaction between corporate governance and internationalization in the context of an emerging market.

This study has implications for managerial practice with respect to compliance with local environmental regulations for firms operating in international markets. Internationalization compounds the difficulties associated with obtaining information about environmental issues and understanding the causal relationships between the decisions of management and environmental performance. Therefore, it is crucial for firms operating globally to establish an effective governance structure to ensure more environmentally friendly decisions.

The rest of the paper is organized as follows. The following section conducts a review of the related literature and develops the analytical framework and hypotheses. Section 3 describes the data used in the empirical analysis and specifies the empirical model. Section 4 presents and discusses the empirical results. The last section concludes.

2. Literature Review and Theory Analysis

In this section, we conduct a review of the related literature, based on which we build a theoretical framework and develop hypotheses to be tested.

Among the many studies on factors influencing firms' environmental performance, a subset investigates the role of internationalization. Based on institutional theory [4], these studies examine how firms engaging in internationalization respond to institutional pressures in favor of corporate social responsibilities (CSRs), including environmentally friendly practices. Some studies propose that the institutional pressures from the firms' *host* countries guide their decision-making with respect to CSRs [5–9]. For instance, Marano

and Kostova [6] examine the impact of institutional forces on firms' adoption of CSR practices, using data on approximately 710 American multinational enterprises (MNEs) from 2007 to 2011. Amer [7] shows that both formal and informal pressures affect the timing and likelihood of compliance with local environmental regulations. Applying a dataset of Chinese firms spanning 2011 to 2021, Hu et al. [9] find that internationalization promotes the optimization of environmental performance due to the pressure from the laws and regulations of the host country.

Some other studies show that institutional voids in the firm's home country push MNEs from emerging markets to increasingly use CSR reporting as a global legitimization strategy to overcome liabilities associated with the home country [10–12]. These studies explain that this is because CSR reporting conveys an alignment with global meta-norms and expectations to host countries. For example, Marano et al. [11] show that CSR reporting is an effective strategy for MNEs from less institutionally developed countries to overcome origin-negative perceptions.

Another group of studies in this field proposes that international integration helps improve the environmental performance of firms from developing countries because they can learn advanced environmental technologies, standards, and management systems in the internationalization process [13–15]. For instance, using firm-level data from China, Lin et al. [13] find that firms with international linkage show better compliance with environmental regulations than their peers in the same industry. Drawing on a dataset of 108 countries over seven years, Prakash and Potoski [14] find that export encourages the adoption of ISO 14001 (the most widely adopted voluntary environmental regulation), even if its conditions extend beyond what domestic government regulations require.

According to the above discussion, internationalization requires firms to comply with the environmental standards and regulations of their host markets. This is especially important for firms from emerging countries operating in developed countries, which typically have more stringent environmental requirements than developing countries. In addition, internationalization helps enhance environmental performance among firms from developing countries by providing opportunities to adopt advanced environmental technologies, standards, and management systems. Furthermore, internationalized firms have a wider range of stakeholders, which may require firms to enhance their environmental information disclosure and transparency and showcase their efforts and achievements in environmental protection to the public. Therefore, we propose the following hypothesis:

H1. *Internationalization has a promoting effect on environmental performance.*

In this study, we argue that firm characteristics shape how firms respond to institutional forces. In particular, we conceptualize corporate governance actors as factors that moderate the relationship between internationalization and firms' environmental sustainability outcomes. We build on the stakeholder–agency paradigm [16], which treats managers as the agents of various stakeholders and applies the agency theory to describe the stakeholder–manager relationship.

As a firm becomes more globalized, monitoring management becomes more challenging and costly. According to the agency theory, agency costs are determined by two factors—task programmability and behavior verifiability [17]. Internationalization makes it more difficult to monitor both these two factors. First, when operating in foreign markets, firms need to cope with diverse customers, competitors, suppliers, and host governments, which increases the amount of information they must process, leading to more information asymmetries between shareholders and managers. Additionally, the international operation requires localized and specialized knowledge, which further compounds the agency problem, and the complexity of global operations increases the ambiguity of managers' ac-

tions, clouding the identification of cause–effect relationships between managers' decisions and firm performance in the international market. Therefore, internationalization requires a firm's board to monitor its managers more vigilantly, necessitating open and transparent corporate governance.

The literature on the relationship between corporate governance and environmental performance generally concludes that open and transparent corporate governance urges firms to adopt more environmentally proactive strategies, which helps them gain green credentials that appeal to consumers and investors who are concerned about environmental protection [18–21]. We describe how specific corporate governance actors moderate between internationalization and firms' environmental performance below.

In general, stakeholders are more likely to have a stronger preference for green practices than managers for the following reasons. Green management requires an enormous amount of extra managerial effort and significant investment, which may not generate profit in the short term. Managers tend to maximize short-term financial gains at the expense of investing in environmental initiatives. An effective supervision mechanism can ensure that firms comply with environmental regulations.

As the highest decision-making body of a company, environmental strategy is now regarded as a crucial obligation for the board of directors. An important obligation of the board is supervising management and ensuring alignment with stakeholder interests [22,23]. Much of the research on the board's role in environmental performance focuses on board independence, a commonly used measurement of which is CEO duality [18,24–26]. CEO duality, which refers to the chairman of the board also serving as the CEO, usually leads to an excessive concentration of power. As a result, it is difficult for the board of directors to supervise the CEO effectively. Heavily influenced by the CEO's personal preferences and interests, the decision-making process lacks comprehensive consideration and in-depth discussions, increasing the risk of ill-advised decisions. In the absence of effective oversight, managers may prioritize profit over environmental requirements, potentially disregarding sustainability concerns. Therefore, CEO duality negatively affects sustainability outcomes [18,24]. Based on the analysis above, as firms become more internationalized, they tend to reduce the practice of CEO duality, which supports the maintenance of strong environmental performance. Thus, we formulate the following hypothesis:

H2. *CEO duality has a negative moderating effect on the relationship between internationalization and environmental performance.*

Many empirical studies have confirmed the vital role of another fundamental board characteristic, namely, the size of the board, in shaping organizational performance. As is demonstrated in the literature, board size serves as a crucial determinant of board functionality and affects corporate decision-making [18,27–30]. As noted earlier, internationalization leads to higher agency costs. The literature has shown that board size is a function of operational complexity [31–33]. A greater number of board members can increase the board's information-processing capacity. Moreover, a larger board is more likely to have directors with valuable expertise and experience with international operations. Therefore, it is expected that internationalization will lead to a larger board.

Studies have demonstrated that firms with larger boards tend to achieve superior environmental performance [18,19]. The board focuses more on a firm's long-term interests and sustainable development. As environmental protection is widely valued, bad environmental performance can put firms at regulatory, litigation, and reputational risk, which will eventually harm their financial performance. As a result, environmentally friendly strategies have been increasingly regarded as an important duty of the board. A large board of directors is more likely to better supervise and monitor the implementation of environ-

mentally friendly strategies and policies. For instance, larger boards are better positioned to establish specialized committees like sustainability committees that focus on environmental issues, which may help increase the comprehensiveness of firms' environmental reporting and improve their environmental performance [34]. In addition, larger boards are more likely to include members from different industries with rich experiences and professional knowledge. According to the resource dependence theory [32,35], a diverse board provides greater access to advanced environmental protection technologies and helps firms secure more resources, such as specialized knowledge and experiences, which enable them to adopt more comprehensive environmental protection strategies. Research by Post et al. [36] and Walls et al. [21] has shown that boards with environmental expertise are better equipped to identify emerging sustainability risks and opportunities, leading to higher environmental performance. According to another explanatory framework, the social network theory, larger boards are more likely to have more extensive external connections and stakeholder relationships. As evidenced by Hillman et al. [37] and Johnson and Greening [38], these networks can provide valuable insights into environmental best practices, facilitate the adoption of green technologies, and strengthen the firm's capacity to collaborate effectively with environmental organizations and regulatory bodies. Therefore, internationalization leads to increased board size, which, in turn, contributes to improving a firm's environmental performance. We propose the following hypothesis based on the above analysis:

H3. *Board size has a positive moderating effect on the relationship between internationalization and environmental performance*.

In addition to the one-tier board model that is common in the United States, many other countries have adopted corporate governance systems inspired by the German model, which features a two-tier board structure consisting of a supervisory board and a management board [39]. In China, listed companies are also required to have a supervisory board or a supervision committee composed of supervisors elected by shareholders. The supervisory board is responsible for independently supervising both the board of directors and management. To ensure the independence of the supervisory board, supervisors are not allowed to concurrently serve as directors or managers. Their independence and commitment to the specific area of supervision enable them to better verify the actions of management and effectively reduce managers' self-serving behaviors. The literature has extensively highlighted the critical role of the supervisory board in determining firm performance, emphasizing its influence on various dimensions of organizational success [40–43].

As environmental performance is related to firms' long-term sustainable development, the supervisory board often places greater emphasis on firms' environmental performance than management. As in the case of the board of directors, the resource dependence theory also underscores the vital role of the size of the supervisory board in securing the external resources and expertise essential for advancing environmental sustainability. Larger supervisory boards contain more members with specialized knowledge or strong connections to environmental sustainability who can offer strategic insights into industry best practices, cutting-edge technologies, and evolving regulatory trends. A supervisory board with more members can also supervise management's decisions and actions with respect to environmental issues more effectively, such as investing in environmental initiatives and implementing environmental protection projects. As previously noted, in light of increased globalization, more principal–agent conflicts arise. Since the supervisory board can help alleviate agency conflicts in the process of internationalization, firms operating overseas tend to establish larger supervisory boards, which enhances environmental performance. Accordingly, we propose the following hypothesis:

H4. *The supervisory board has a positive moderating effect on the relationship between internationalization and environmental performance.*

Finally, we discuss how the ownership structure could affect the promoting effect of internationalization on environmental sustainability outcomes. The extant literature supports the notion that ownership, as a critical factor in firm strategy, significantly influences firms' environmental sustainability [21,24,44–49]. For instance, Gallo and Christensen [45] show that private firms and publicly traded firms exhibit contrasting behaviors when it comes to adopting detailed environmental reporting practices. Since we used data on Chinese firms, and given the important role of SOEs in the Chinese economy, we investigated the differential effect of internationalization on environmental performance between SOEs and non-SOEs.

Given their close ties to the government and their role in serving the public interest, SOEs are often subject to higher levels of public scrutiny and accountability, which prompt them to take more proactive and effective measures regarding environmental protection, thereby improving their environmental performance. In addition, SOEs are typically larger and have more resources, so they are able to invest more resources and effort in environmental initiatives. For instance, SOEs often benefit from greater access to resources and funding, such as government subsidies and policy-driven incentives, to support their environmental initiatives. SOEs also have stronger capabilities in research and innovation and can, therefore, reduce environmental pollution and resource consumption in the production process more effectively through technological innovation. As SOEs generally achieve higher environmental performance than non-SOEs regardless of the level of internationalization, which has been confirmed by previous studies [50–53], we posit the following hypothesis:

H5. *The promoting effect of internationalization on environmental performance is smaller for SOEs.*

Figure 1 illustrates the theoretical framework described above.

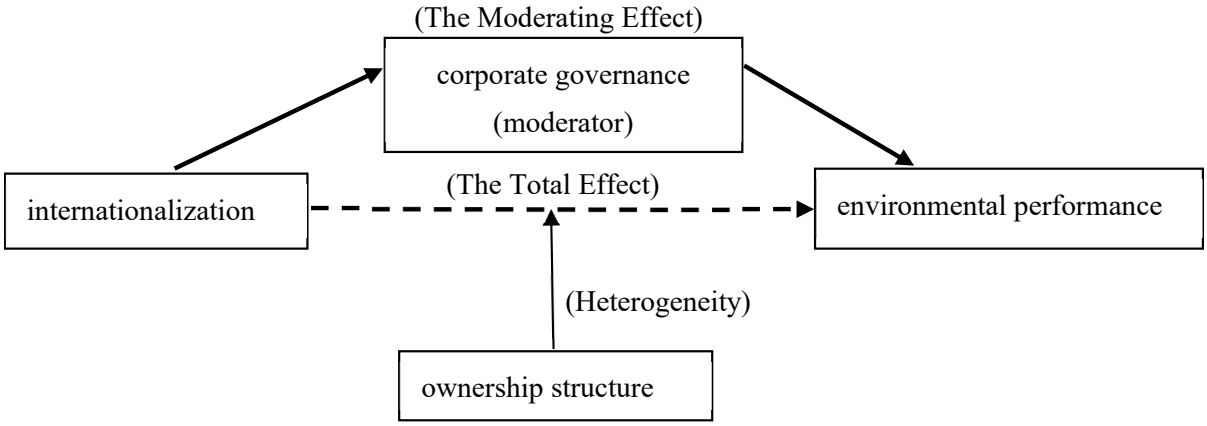


Figure 1. The theoretical framework.

3. Methodology

3.1. Sample and Data

In this study, we used data on A-share companies listed on the Shanghai and Shenzhen stock markets, which were obtained from the China Stock Market and Accounting Research (CSMAR) database. The Chinese counterpart of Standard and Poor's Compustat and Thomson, the CSMAR database is an economic and financial database of listed companies developed by Shenzhen Xishima Data Technology Co., Ltd. (Shenzhen, China) for academic

research purposes. A large number of studies have utilized data provided by the CSMAR database [54–56]. From this database, we obtained detailed information on firms' overseas operations, corporate governance, environmental performance, and financial characteristics. After combining the datasets and removing observations with missing data, we obtained a final sample with 35,949 firm-year observations, including 4577 companies from 2008 to 2022.

3.2. Model

The basic model for testing Hypothesis 1 is as follows:

$$y_{it} = \alpha_0 + \alpha_1 INTER_{it} + \sum \alpha_j X_{jit} + firm_i + Year_t + \mu_{it} \quad (1)$$

To test Hypotheses 2–4, we follow the approach of MacKinnon and Dwyer [57] and specify the following moderation model:

$$CG_{it} = \beta_0 + \beta_1 INTER_{it} + \sum \beta_j X_{jit} + firm_i + Year_t + \theta_{it} \quad (2)$$

$$y_{it} = \gamma_0 + \gamma_1 INTER_{it} + \gamma_2 CG_{it} + \sum \gamma_j X_{jit} + firm_i + Year_t + \varepsilon_{it} \quad (3)$$

The regression model for testing Hypothesis 5 is specified, as below:

$$y_{it} = \lambda_0 + \lambda_1 INTER_{it} + \lambda_2 INTER_{it} \times SOE_i + \sum \lambda_j X_{jit} + firm_i + Year_t + \zeta_{it} \quad (4)$$

The variable y_{it} represents the environmental sustainability outcome of firm i in year t, which is measured in the following way. The CSMAR database provides a series of indictors that reflect the efforts made by firms and their achievements in environmental protection, as shown in Table A1. We measured a firm's environmental sustainability outcome by summing the values of all indictors.

$INTER_{it}$ represents the firm's level of internationalization. According to the Uppsala Model [1], firms typically adopt a gradual and incremental approach to internationalization, which is characterized by step-by-step progression that emphasizes learning and incremental commitment. This model suggests that firms initially engage in low-risk and low-commitment activities (exporting) to test foreign markets. As they gain experience and knowledge regarding foreign markets, firms gradually transition to higher-commitment modes of entry (foreign direct investment). Therefore, in the baseline regression, we measured $INTER_{it}$ using a dummy variable indicating whether firm i has made an outward foreign direct investment (FDI) by year t.

CG_{it} represents a set of corporate governance actors of firm i in year t, including *CEO duality* (a dummy variable equal to one if the CEO is also the chairman of the board and zero otherwise), the size of the board (the number of board directors), and supervisory board (the number of supervisors). SOE_i is a dummy variable, which is equal to one if firm i is an SOE and zero otherwise. The control variables X_{it} include leverage (the company's debt as a percentage of its total assets), age (the number of years of operation since the company's establishment), and the size (the number of employees) of firm i in year t. We include two fixed effects in the regression models, that is, the firm fixed effect firm_i and the year fixed effect $Year_t$. μ_{it}, θ_{it}, ε_{it}, and ζ_{it} are random error terms.

The moderation model consists of three regression equations, which decompose the total effect of internationalization $INTER_{it}$ on the environmental sustainability outcome y_{it} into two parts: the indirect effect, measured using $\beta_1 \times \gamma_2$, and the direct effect, measured using γ_1. Moderation depends on the extent to which internationalization affects the corporate governance actors (moderators) and the extent to which the moderators affect the environmental sustainability outcome.

Table 1 reports the descriptive statistics of the variables. The mean value of the environmental sustainability outcome is 5.47. Given that the maximum value is 26, the average environmental performance of the firms in the sample is relatively low. The mean value of *INTER* is 0.47, which indicates that approximately half of the firms in the sample have made outward FDI. The mean value of *CEO* duality is 0.08, suggesting that only a small fraction of firms in the sample have CEO duality. The minimum and maximum values of the other corporate governance actors indicate great variations in the corporate governance arrangements of the firms in the sample. The mean value of *SOE* is 0.39, suggesting that about 40% of the listed firms in the sample are SOEs.

Table 1. Descriptive statistics of the variables.

Variable	Observation	Mean	Std. Dev.	Min	Max
y_{it}	35,949	5.47	4.60	0	26
INTER	35,949	0.47	0.50	0	1
CEO duality	35,949	0.08	0.27	0	1
board size	35,949	16	3.81	3	54
supervisory board	13,202	12	2.89	3	19
SOE	35,949	0.39	0.49	0	1
age	35,949	17.18	6.06	0	63
size	35,949	6186	22,481	2	552,810
leverage	35,949	0.47	0.88	0.01	85.68

4. Results and Discussions

4.1. Empirical Results

Table 2 presents the results of testing Hypothesis 1. Column (3) reports the regression results of Model (1), with all control variables and the fixed effects. The estimated coefficient of *INTER* is significantly positive, suggesting that if firms engage in activities with a higher level of internationalization, they can improve their environmental performance. Thus, Hypothesis 1 is supported.

Table 2. The promoting effect of internationalization on environmental performance.

	(1)	(2)	(3)
	Environmental Performance	Environmental Performance	Environmental Performance
INTER	0.232 ***	0.090 ***	0.034 ***
	(0.007)	(0.007)	(0.008)
age		0.016 ***	0.070 ***
		(0.001)	(0.004)
size		0.183 ***	0.073 ***
		(0.002)	(0.004)
leverage		−0.008 **	0.003
		(0.004)	(0.003)
Firm fixed effect	no	no	yes
Year fixed effect	no	no	yes
Observations	35,949	35,949	35,949
R-squared	0.029	0.181	0.287

Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$.

Table 3 presents the regression results for Hypothesis 2. Columns 1–3 correspond to Models (1)–(3), respectively. The results of Model (1) from Table 2 are included in Column (1)

for comparative purposes. The regression coefficient on *INTER* in Column (2) of Table 3 is negative and significant, as predicted. The regression coefficients of *INTER* and *CEO duality* in Column (3) of Table 3 are both significant and have the expected signs. Together, these results suggest that CEO duality negatively moderates the relationship between internationalization and environmental performance, confirming Hypothesis 2.

Table 3. The moderating effect of CEO duality on the relationship between internationalization and environmental performance.

	(1)	(2)	(3)
	Environmental Performance	**Duality**	**Environmental Performance**
INTER	0.034 ***	−0.055 ***	0.033 ***
	(0.008)	(0.008)	(0.008)
CEO duality			−0.021 ***
			(0.006)
age	0.070 ***	−0.006 *	0.070 ***
	(0.004)	(0.004)	(0.004)
size	0.073 ***	−0.033 ***	0.072 ***
	(0.004)	(0.004)	(0.004)
leverage	0.003	−0.003	0.003
	(0.003)	(0.003)	(0.003)
Firm fixed effect	yes	yes	yes
Year fixed effect	yes	yes	yes
Observations	35,949	35,949	35,949
R-squared	0.287	0.022	0.288

Standard errors in brackets, *** $p < 0.01$, * $p < 0.1$.

Table 4 reports the results of the regression analysis for board size as the corporate governance actor. Again, the results of Model (1) are shown in Column (1) for the sake of comparison. The second column of Table 4 shows that the effect of internationalization on the moderator *board size* is positive and significant. Both the direct effect and the moderating effect on environmental performance are significantly positive, as shown in Column (3) of Table 4. These regression results suggest that the effect of internationalization on environmental performance is positively moderated by board size, corroborating Hypothesis 3.

Table 5 exhibits the moderating effect of the supervisory board on the relationship between internationalization and environmental performance. The result for Model (1) is the same as in previous tables. From the second column of Table 5, it is clear that the effect of internationalization on the supervisory board, the moderator, is significantly positive. The third column shows that the moderating effect of the supervisory board is positive and significant. The above results indicate that the supervisory board serves as a positive moderator in the relationship between internationalization and environmental performance, validating Hypothesis 4.

Table 6 shows the results of the ownership effect. For comparative analysis, the findings from Model (1) in Table 2 are presented in Column (1). As shown in Column (2), the coefficient of the interaction term between *INTER* and *SOE* is significantly negative, indicating that internationalization plays a less pronounced role in promoting environmental performance when a firm is state-owned. This result is consistent with Hypothesis 5.

Table 4. The moderating effect of board size on the relationship between internationalization and environmental performance.

	(1)	(2)	(3)
	Environmental Performance	**Board Size**	**Environmental Performance**
INTER	0.034 ***	0.006 ***	0.034 ***
	(0.008)	(0.002)	(0.008)
board size			0.097 ***
			(0.020)
age	0.070 ***	−0.004 ***	0.070 ***
	(0.004)	(0.001)	(0.004)
size	0.073 ***	0.037 ***	0.070 ***
	(0.004)	(0.001)	(0.004)
leverage	0.003	−0.002 ***	0.003
	(0.003)	(0.001)	(0.003)
Firm fixed effect	yes	yes	yes
Year fixed effect	yes	yes	yes
Observations	35,949	35,949	35,949
R-squared	0.287	0.048	0.288

Standard errors in brackets, *** $p < 0.01$.

Table 5. The moderating effect of the supervisory board on the relationship between internationalization and environmental performance.

	(1)	(2)	(3)
	Environmental Performance	**Supervisory Board**	**Environmental Performance**
INTER	0.034 ***	0.199 ***	0.033 **
	(0.008)	(0.049)	(0.013)
supervisory board			0.005 **
			(0.003)
age	0.070 ***	−0.019	0.071 ***
	(0.004)	(0.026)	(0.007)
size	0.073 ***	0.175 ***	0.082 ***
	(0.004)	(0.030)	(0.008)
leverage	0.003	−0.032	−0.001
	(0.003)	(0.021)	(0.006)
Firm fixed effect	yes	yes	yes
Year fixed effect	yes	yes	yes
Observations	35,949	13,202	13,202
R-squared	0.287	0.039	0.272

Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$.

To ensure the robustness of our findings, we conducted an additional analysis by employing an alternative measurement of internationalization that is widely recognized and frequently used in the literature [7,58,59]. Specifically, we measured internationalization using firms' operating income from overseas markets. This approach captures the extent of a firm's internationalization by focusing on the revenue generated outside its home country. The results reported in Table 7 remain qualitatively similar to the baseline results in spite of differences in the magnitudes of the coefficients.

Table 6. The ownership effect on the relationship between internationalization and environmental performance.

	(1) Environmental Performance	(2) Environmental Performance
INTER	0.034 ***	0.043 ***
	(0.008)	(0.009)
SOE × INTER		−0.027 **
		(0.013)
Control variables	yes	yes
Firm fixed effect	yes	yes
Year fixed effect	yes	yes
Observations	35,949	35,949
R-squared	0.287	0.288

Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$.

Table 7. An alternative measurement of internationalization.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Environmental Performance	Duality	Environmental Performance	Board Size	Environmental Performance	Supervisory Board	Environmental Performance	Environmental Performance
INTER	0.014 ***	−0.011 ***	0.014 ***	0.004 ***	0.101 ***	0.063 ***	0.148 ***	0.109 ***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.021)	(0.020)	(0.039)	(0.022)
CEO duality			−0.018 **					
			(0.008)					
board size					0.362 *			
					(0.206)			
supervisory board							0.072 ***	
							(0.026)	
SOE × INTER								−0.020 **
								[0.008]
Control variables	yes	yes	yes	yes	yes	yes	yes	yes
Firm fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Year fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Observations	17,509	17,509	17,509	17,509	17,509	6797	6797	17,509
R-squared	0.294	0.024	0.294	0.038	0.256	0.064	0.244	0.256

Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

There may be estimation bias due to omitted factors or reverse causality between internationalization and environmental performance. To solve this endogeneity problem, we used the lagged one-period explanatory variable (*L. INTER*) as the instrumental variable (IV) and applied the two-stage least square (2SLS) method. In the first and the second columns of Table 8, we report the first and second-stage results, respectively. As is shown, there is a significantly positive correlation between the explanatory variable and the instrumental variable in the first stage regression. Additionally, the F statistics are much larger than 10, allowing us to rule out the weak IV problem [60,61]. The findings presented in Column (2) align closely with those reported in Table 2, demonstrating consistency across the analyses. As part of our robustness checks, we further lagged all independent variables and re-estimated the regression model. The results presented in Column (3) of Table 8 show that the direction, magnitude, and statistical significance of the key coefficient remain largely unchanged, reinforcing the reliability and robustness of our baseline results.

Table 8. The endogeneity test.

	(1)	(2)	(3)
	INTER	**Environmental Performance**	**Environmental Performance**
L.INTER	0.354 ***		
	(0.004)		
INTER		0.033 *	0.048 ***
		(0.018)	(0.015)
Control variables	yes	yes	yes
Lagged Control variables			yes
Firm fixed effect	yes	yes	yes
Year fixed effect	yes	yes	yes
Observations	35,099	35,948	30,453
weak IV test (F statistic)		6927.84	

Standard errors in brackets, *** $p < 0.01$, * $p < 0.1$.

4.2. Discussion

The regression results presented in this study provide robust support for all hypotheses outlined in Section 2, confirming that corporate governance factors play a moderating role in the relationship between internationalization and environmental performance. Specifically, CEO duality exerts a negative moderating effect, weakening the positive impact of internationalization on environmental performance. In contrast, board size demonstrates a positive moderating effect, enhancing the relationship between internationalization and environmental performance. Similarly, a larger supervisory board also positively moderates this relationship, further strengthening the link between internationalization and improved environmental outcomes. Additionally, the analysis reveals that the positive influence of internationalization on environmental performance is less pronounced for SOEs compared to their non-state-owned counterparts. These findings underscore the critical role of internal governance structures in influencing how firms leverage internationalization to achieve environmental sustainability.

The existing literature on internationalization and sustainability has predominantly focused on the role of external environmental factors like institutional pressures in shaping companies' environmental sustainability outcomes as they internationalize. While these studies provide valuable insights into how external forces drive firms to adopt greener practices, they have largely overlooked the vital role of internal organizational structures in mediating the relationship between internationalization and environmental sustainability. This study addresses this underexplored area and provides a more comprehensive understanding of the interplay between internationalization and environmental performance. Furthermore, our research contributes to the broader literature on corporate governance and environmental performance by introducing a global dimension. While prior studies primarily focused on domestic contexts, our work highlights how internationalization introduces unique challenges and opportunities for firms to enhance their environmental sustainability on a global scale. This global perspective is particularly relevant in an era of increasing cross-border operations and interconnected environmental challenges, offering new insights for both academics and practitioners seeking to align corporate governance with sustainable development goals.

While our empirical analysis was conducted in the Chinese context, the findings of this study provide valuable insights into the managerial practices of firms from other emerging economies operating in global markets, particularly in more developed nations. Internationalization amplifies the challenges of accessing accurate and timely information on environmental issues, as well as understanding the intricate causal relationships between management decisions and environmental outcomes. In this context, firms must adopt a proactive approach to environmental governance to mitigate risks and align with diverse regulatory frameworks across jurisdictions. As our results suggest, establishing an effective governance structure and fostering transparency in decision-making can enable firms to make more environmentally responsible choices. Specifically, increasing board independence and enlarging the size of the board and the supervisory committee can enhance a firm's ability to balance global expansion with environmental stewardship. Prioritizing these measures will enable firms to not only comply with local regulations but also strengthen their reputation, build trust with stakeholders, and contribute to sustainable development on a global scale.

5. Conclusions

With increasing global attention on environmental sustainability, firms must proactively address environmental challenges to meet regulatory standards and earn the recognition and trust of diverse stakeholders. Poor environmental performance can have devastating consequences for firms not only because of potential legal risks but also due to the loss of legitimacy in the global market. This forces firms, especially those from emerging economies, to adopt substantive environmental practices if they engage in international operations.

This study builds a theoretical framework to explore the underlying mechanisms through which internationalization improves firms' environmental performance. In particular, we show that the corporate governance actors play a moderating role in the relationship between internationalization and environmental performance. In addition, we show that internationalization plays a less significant role in enhancing environmental performance when firms are state-owned. We test the proposed theory using a sample of data from Chinese listed companies between 2008 and 2022. The empirical results support all the hypotheses.

We identify the gaps and opportunities for future research. First, due to data availability, we measure internationalization in two ways; whether a firm has made outward FDI and by its overseas revenues. Future research could develop more in-depth measurements of the degree of internationalization. Second, we do not distinguish between different environmental sustainability outcomes. This study uses a compressive measurement combining environmental performance, strategy, and disclosures. A possible further research direction is how internationalization affects a specific type of environmental outcome.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Indictors used for the construction of environmental performance.

Variable	Definition
ISO14001 [62]	1 if ISO14001 is adopted, 0 otherwise.
ISO9001 [63]	1 if ISO9001 is adopted, 0 otherwise.
EPtConcept	1 if environmental policies are disclosed, 0 otherwise.
EPGoal	1 if environmental goals are disclosed, 0 otherwise.
EPManSysSchema	1 if an environmental management system is established, 0 otherwise.
EPEduTrain	1 if environmental education and training are provided, 0 otherwise.
EPSpecialAct	1 if the firm has taken any environmental protection activities, 0 otherwise.
EnvEventEmergMech	1 if a response mechanism for environmental emergencies is established, 0 otherwise.
EPHonorReward	1 if the firm has received any environmental protection rewards, 0 otherwise.
ThreeSimultaneity	1 if the "three simultaneities" system (a Chinese environmental management system) is implemented, 0 otherwise.
AnnualReport	1 if the annual report discloses environmental-related information, 0 otherwise.
CSRReport	1 if the social responsibility report discloses environment-related information, 0 otherwise.
EnvReport	1 if separate environmental reports are provided, 0 otherwise.
WasteGasEmissRed	1 if waste gas emission reduction reported qualitatively, 2 if reported quantitatively, 0 if not reported.
WasteWaterEmissRed	1 if wastewater reduction and treatment reported qualitatively, 2 if reported quantitatively, 0 if not reported.
SootDustRed	1 if managing issues of dust and smoke reported qualitatively, 2 if reported quantitatively, 0 if not reported.
SolidWasteDispUtil	1 if solid waste utilization and disposal reported qualitatively, 2 if reported quantitatively, 0 if not reported.
NoiseLightRadGovern	1 if managing issues of noise, light pollution, and radiation reported qualitatively, 2 if reported quantitatively, 0 if not reported.
ClearProdImplement	1 if clean production reported qualitatively, 2 if reported quantitatively, 0 if not reported.
PollEmissStanda	1 if discharge of pollutants meets the standard.

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