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Corporate Performance, Market-Industry Competition and Enterprise Environmental-Protection Investment

Liu Yang [1], Junting Tan [2], Weiyi Xia [3,4,*], Zhaomei Chi [1], Han Qin [2], Quanxin Gan [5,*] and Qin Yang [1,4]

1 School of International Education, Guangxi University of Finance and Economics, Nanning 530003, China; liuyang@gxufe.edu.cn (L.Y.); czm412@gxufe.edu.cn (Z.C.); gxufegqx@hotmail.com (Q.Y.)
2 MPAcc Center, Guangxi University of Finance and Economics, Nanning 530003, China; junting-tan118@hotmail.com (J.T.); xxsqinhan@hotmail.com (H.Q.)
3 Fangchenggang College, Guangxi University of Finance and Economics, Nanning 530003, China
4 Panyapiwat Institute of Management, Bangkok 10240, Thailand
5 Admissions and Employment Office, Guangxi University of Finance and Economics, Nanning 530003, China
* Correspondence: 2017250054@gxufe.edu.cn (W.X.); quanxin.ga@stu.nida.ac.th (Q.G.)

Abstract: Worldwide, many countries regard green as a keyword related to development, and investments into environmental protection are an important way for enterprises to achieve green development. Therefore, clarifying which factors influence enterprises to invest into environmental protection is very important. Starting from micro-enterprises and using the data from companies listed in China's A-share manufacturing industry from 2008 to 2019, in this study, we empirically analyze the relationship between corporate performance (CP) and the scale of investments by enterprises into environmental protection (EI) and analyze the moderating effect of industry competition on the relationship between CP and EI. The result shows that (1) a positive correlation can be found between CP and EI; (2) fierce industry competition can increase the positive impact of CP on EI; and (3) compared with industries with non-heavy pollution, fierce industrial competition increases the positive impact of CP on EI in industries with heavy pollution. The research results show that performance is a key factor influencing enterprises' decisions about investments into environmental protection, and industry competition can stimulate enterprises to invest into environmental protection. This study explores the internal and external factors influencing an organization to promote active behaviors of investing into environmental protection, provides a reference for enterprises to explore "win–win" paths, and provides a certain theoretical basis for the government to improve relevant regulations.

Keywords: corporate performance; enterprise environmental-protection investment; industry competition

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1. Introduction

In 2020, the Chinese government clearly put forward the goals of reaching their "carbon peak" in 2023 and "carbon neutrality" in 2060. At present, from the perspective of industrial structures, the proportion of industries with heavy pollution in China compared with the overall economy ranks the highest among developed economies, and the amount of air pollution produced by one unit output of the industries with heavy pollution is nine times that of the service industry. Changing this polluting economic structure is one way to achieve the carbon peak and carbon neutrality goals set by the government. Among these methods, changing the investment structure by increasing investments into environmental protection is a good starting point for changing this economic structure. The Chinese government has continued to increase their investments into environmental protection. However, China needs to invest about CNY 4 trillion into environmental protection annually, but the Chinese government's environmental-protection investment funds only account for about 10% of this need. Therefore, the Chinese government urgently needs to encourage everyone to invest into environmental protection to meet China's investment needs for environmental protection.

Enterprises are the main consumers of resources and the main manufacturers of pollutants. Therefore, they should bear the responsibility of investing into environmental protection and reducing the impact of business activities on the environment [1]. As environmental externalities cannot be internalized, environmental-protection projects often provide insufficient returns, and the rate of return is lower than the rate of return required by the market. Thus, enterprises investing into environmental protection is more a reflection of their response to external pressure and, therefore, the existing literature pays more attention to the influence of external factors such as government environmental regulation [2–4], the public [5–8], and consumers [9–11] on an enterprise's investment behaviors regarding environmental protection, and is based on institutional theory and stakeholder theory. However, explaining why some companies spend limited resources on environmental projects when they share the same institutional background or the same regional environment from an external perspective, while some enterprises focus on other projects, may be difficult.

Focusing on the factors influencing enterprises to invest into environmental protection, some studies in the literature empirically studied the internal factors of an enterprise, such as ownership concentration [12,13], environmental management system [14–16], managers' private income [17], political connection [18], internal control quality [19,20], and other factors related to their corporate governance structure and corporate social capital, but no consistent conclusions have been drawn. Therefore, what internal factors affect decision making by enterprises regarding investments into environmental protection is still worth exploring.

The existing literature discusses the pressure-formation process for high-performance enterprises and its impact on investment behaviors from the perspective of enterprise behavior theory and prospect theory. He et al. [21] found that the main way for high-performance enterprises to turn high expectations into reality and to alleviate the pressures of playing catch up is to adopt short-term investment behaviors such as hollowed-out, related-party transactions. When the actual performance of an enterprise is higher than the expected performance target, the greater is the possibility of negative behaviors being adopted by the enterprise [22,23]. Guo and Chen [24] found that, when an enterprise is in a state of excellent performance, redundant resources and successful paths that are accumulated during the early stages of operation will help the enterprise to implement M&A and to obtain a higher level of performance.

On the issue of environmental protection, a small amount of literature combines corporate performance with an enterprise's investments into environmental protection. Some scholars believe that high-performance enterprises have more disposable funds, are more likely to obtain external financing, and are more optimistic about future expectations. Therefore, high-performance enterprises will be more willing to increase their investments into environmental protection [25]. However, this view has not been unanimously recognized. Hitchens et al. [26] found no significant correlation between corporate performance and the scale of environmental investment by European SMEs. Additionally, some research results on the relationship between corporate performance and enterprise environmental investment have not reached a consistent conclusion.

In contrast to other investment decisions made by enterprises, investments into environmental protection are strongly affected by external factors. According to the characteristics of investments into environmental protection, the initial cost of an investment into environmental protection is often greater than its resultant income, which undoubtedly increases the business risk of an enterprise, resulting in some enterprises being unwilling to actively invest in environmental protection. Will the business risk be lessened with an increase in corporate performance? On the one hand, the level of an enterprise's performance represents their developmental abilities, profitability, and disposable capital, which affects the point of reference for decision making, thus affecting their decision making regarding investments into environmental protection. On the other hand, as the standard for evaluating the salary, promotion, and dismissal of managers, performance plays a part in the incentive

mechanism for managers, which affects the enterprise's preferences towards taking risks, thus affecting decisions made regarding investments into environmental protection.

In addition, the existing literature mostly studies the moderating effect of internal governance factors on CP and EI from the perspective of an internal organization. A small amount of literature considers that, in different competitive environments, enterprise managers may adopt different competitive methods and strategies, thus affecting investment decisions for environmental protection. To explore the above problems, in this paper, we study the moderating effect of industry competition on the relationship between CP and EI from the perspective of risk aversion. Through the study of this moderating effect, we can strengthen the correlation between the internal and external factors of an organization and an enterprise's investments into environmental protection, and help provide reasons to encourage enterprises to actively invest in environmental protection. Finally, considering the different sensitivities of enterprises within industries with heavy pollution and non-heavy pollution to environmental 'legitimacy', we find that there are great differences in enterprises' decisions regarding investments into environmental protection. This paper further studies the differences in the moderating effect of industry competitiveness on the relationship between CP and EI for different industry attributes. The above research results will help China and other countries committed to green development determine what are the main factors that encourage enterprises to bear the responsibility of environmental protection and provides a theoretical and practical basis for realizing the goals of green development.

The rest of this paper is arranged as follows: Section 2 provides the theoretical background and research hypothesis. Section 3 introduces the sample, data, model, and variables used in the empirical analysis. Section 4 analyzes the empirical results. Finally, Section 5 gives the research conclusions, the significance of this study, the limitations of this study, and possible future research directions.

2. Theoretical Background and Research Hypothesis

2.1. Corporate Performance and Investments by Enterprises into Environmental Protection

In the literature, theoretical research on investment behaviors focuses on financial variables and research on the impact of profit on investment is usually called the profit theory of investment [27]. The establishment of the profit theory of investment was based on the following two views. The first view holds that the profit achieved determines the expected level of profit, while the level of investment is determined by the expected level of profit. Profit is thus used as a proxy variable of expected capital in the investment model; while, in the profit theory of investment, profit directly determines the level of investment. The second view is that investment ratios are limited by the supply of funds. In incomplete markets with information asymmetry and agency costs, investment decision making is more sensitive to the availability of internal funds because they have more cost advantages than external funds. Jensen [28] believed that the better the cash flow, the more enterprises tend to increase their investments.

Investments by enterprises into environmental protection are characterized by general investment projects and affect environmental performance at the same time, so they are characterized by the comprehensive income from economic performance and environmental performance. However, investment projects regarding environmental protection are generally focused on environmental-protection-technology R&D, pollution end treatment, environmental-protection-equipment purchase, cleaner production, and other aspects that makes producing direct economic benefits based on investments into environmental protection difficult in the short term [29]. Moreover, these large investment expenditures put pressure on profits and increase operating risks [30]. Risk-averse managers tend to reduce investments into environmental protection to reduce operating costs and to improve revenue. As the primary goal of enterprises is "survival" [31], this pressure to balance profit with risk is an important factor barring many enterprises from investing into environmental protection.

For high-performing enterprises, first, enterprises with outstanding business performances tend to show an upward trend. With improvements in the actual performance of enterprises, managers will improve their point of reference for decision making [32]. A higher existing profit level means a higher expected profit level. High-performing enterprises will thus not take "survival" but rather "seeking development" as their reference point for decision making. Therefore, high-performance enterprises will give more consideration to the environmental demands of stakeholders, and national strategies for continuously strengthening environmental governance will be met with more rapid environmental investments [24].

Second, the personal risk preferences of managers change with a change in the reference point for decision making. When taking "survival" as the reference point for decision making, managers show risk aversion. When taking "seeking development" as the reference point for decision making, managers show a risk preference, which affects the decision making of an enterprise regarding investments into environmental protection. Managers of high-performing enterprises will overestimate the positive impact of investments into environmental protection on the economic and social benefits awarded to enterprises in the short term, such as enhancing market competitiveness and improving corporate image, while underestimating the negative impact of investments into environmental protection on business risks when increasing the scale of investments into environmental protection. For enterprises that do not have outstanding business performance, they will be more inclined toward risk aversion. The threat rigidity hypothesis of Staw et al. [33] holds that decision makers in crisis prefer to rely on past experiences and existing knowledge to strengthen their control over existing resources, such as reducing costs and improving efficiency. Therefore, their decision-making behavior tends toward being stable rather than taking risks [34]. Compared with daily production and operational investments, investments into environmental protection do not produce an "immediate" effect, their explicit expected economic return is low, and their acquisition time is unknown. Enterprise managers tend to reduce the level of investment into environmental protection for the sake of business stability.

Third, high-performing enterprises not only have more internal capital but also are more likely to obtain external capital support [25,35], which can make up for the net loss from investments into environmental protection in the initial stages, to a certain extent, and can help stabilize investor confidence [36]. The trade-off between the costs and benefits affects the decision-making process of an enterprise regarding investments into environmental protection. When enterprises bear the cost of investments into environmental protection, they will also obtain a certain amount of income. The cost of environmental-protection investment is often large in the early stages and small in the later stages, while the income generated from investments into environmental protection follows an opposite trend. The net profit and loss of investments into environmental protection is the difference between the income from investments into environmental protection minus the cost. In the initial stages of investments into environmental protection, the cost is often greater than the income, that is, the net loss, which is one of the main reasons why some enterprises are unwilling to invest in environmental protection. The high profit level of high-performing enterprises provides support for enterprises regarding their resources. This will reduce the risk of market fluctuation caused by a net loss in environmental-protection investment and stabilize investors' confidence in the future performance of enterprises. Based on the above analysis, we propose the following research hypothesis:

Hypothesis 1 (H1). *Corporate performance is positively correlated with the scale of an enterprise's investment into environmental protection.*

2.2. The Moderating Role of Industry Competition

As an important external governance mechanism, industry competition can encourage managers to improve business efficiency, to a certain extent. Under different competitive

environments, the role of the joint constraints of incentive mechanisms within the enterprise and external governance mechanisms in agency problems will change, further affecting the level of investment by an enterprise into environmental protection. Corporate performance is an evaluation standard that affects the salary, promotion, and dismissal of managers. In a market with fierce competition, the comparability between corporate performance levels increases [22], and it is easier to evaluate the abilities of managers [37]. On the contrary, in a market with weak competition, the role of corporate performance in evaluations will be significantly reduced. Therefore, fierce competition makes the relationship between corporate performance and actual environmental behavior more intuitive. In particular, when the design and production of similar products are the same, the difference in environmental impact mainly comes from investments into environmental protection [38]. At this time, the market becomes more sensitive to the proportion of corporate performance invested in green-technology R&D, pollution control, and other investments. As the pressure of environmental protection increases, managers' perception of environmental-pollution risks and losses will be amplified accordingly. In this situation, the pursuit of risk by high-performance managers is further strengthened based on the psychological decision-making process of loss aversion. When determining what investment projects to engage in, managers will overestimate the possible benefits of investments into environmental protection and underestimate the risks of investments into environmental protection, which will then promote an increase in the scale of investments into environmental protection by enterprises.

In addition, fierce competition facilitates the antagonistic relationship between enterprises within the same industry, triggering the pressures of "innovation competition" [39]. Therefore, the more intense the market competition, the more enterprises need to find new competitive advantages to alleviate this competitive pressure. Among them, a new competitive advantage can be realized through an enterprise's investment into environmental protection, especially an enterprise's investment into environmental-product innovation and environmental-technology R&D to meet the increasing demand for green standards, to increase the differentiated comparative advantages of products, to help an enterprise establish a good green reputation and brand image, and to improve its brand effect [40] to, therefore, alleviate the competitive pressure of the industry. As Zhang et al. [41] found, ecological labels and environmental values will have a positive impact on the purchase intentions of green products.

When the market competition is low, competitive elimination in the market is weak. Even if enterprises invest more into environmental protection and improve their corporate image, the impact on stimulating consumers to buy green products and technologies will be small. On the contrary, it may expose the problems of environmental pollution for enterprises, attract the attention of regulatory authorities, and affect the normal production and operation of enterprises. This is the phenomenon called "whip the fast and hard working—unfair punishment" [42]. To maintain corporate image and interests, high-performing enterprises are more likely to invest resources into other projects, rather than environmental-protection projects. Based on this, we propose the following research hypothesis:

Hypothesis 2 (H2). *Fierce competition will intensify the positive impact of corporate performance on the scale of investments into environmental protection.*

2.3. Influence of Industry Differences on Moderating Effect

In order to achieve the goals of green development, most countries implement different environmental policies based on the actual situation of different regions and industries. It can be seen that different industry attributes and different environmental regulations and standards inevitably affect the strategic decision making of enterprises. Compared with enterprises in industries with non-heavy pollution, enterprises from industries with heavy pollution produce a greater degree of environmental pollution and environmental damage. Therefore, enterprises in industries with heavy pollution are increasingly facing stricter and

higher emission-reduction standards. For example, China has clearly begun to implement a differentiated qualification certification, government support and other measures for classified enterprises. These policies undoubtedly make heavy-polluting enterprises bear more environmental-protection responsibilities and increase their willingness to reach environmental legitimacy and to avoid environmental-pollution risks.

When faced with fierce competition, enterprises will inevitably make investment decisions in accordance with governmental regulations about the environment. Compared with industries with non-heavy pollution, enterprises in industries with heavy pollution are obviously facing more stringent environmental-regulation pressures. The dual external pressure of market competition and environmental regulation will encourage high-performing enterprises to invest in environmental-protection projects to alleviate this external pressure and to thus achieve both the goals of legitimacy and acquiring a green reputation. Based on this, we propose the following, research Hypothesis 3:

Hypothesis 3 (H3). *Compared with industries with non-heavy pollution, fierce market competition will intensify the positive impact of CP on EI in industries with heavy pollution.*

Therefore, we propose the following theoretical model, shown in Figure 1 below.

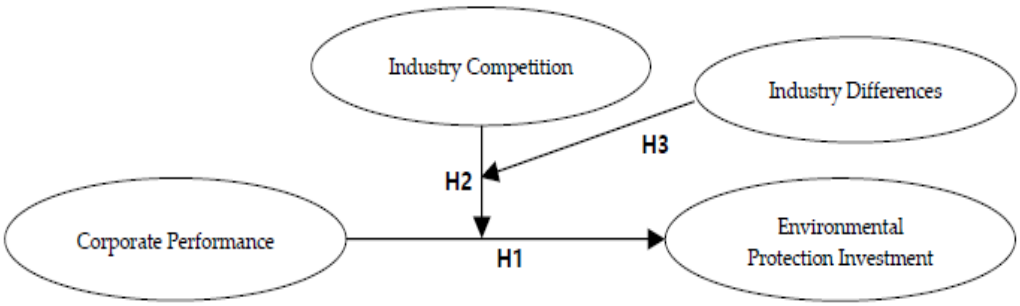

Figure 1. Theoretical model.

3. Research Design

3.1. Research Samples and Data Sources

3.1.1. Research Samples

On 22 November 2007, the State Council of China issued the "*11th Five-Year Plan for National Environmental Protection*". Strictly speaking, 2008 was the opening year of the 11th five-year plan of environmental protection, and the environmental-protection investment data for enterprises were only updated to 2019, so we chose 2008–2019 as the research object of A-share manufacturing listed companies in China. In order to ensure the reliability of the data, the data for missing data and data of ST (specially treatment) and PT (particular transfer) enterprises were deleted, 16,145 research samples were finally identified.

This study further divided the whole sample into industries with heavy pollution and with non-heavy pollution. It was used to test the difference in the moderating effects of industry competition on the relationship between CP and EI under different industry attributes. Following Li and Lu [43], and Bai and Zhang [20], the industries with heavy pollution were determined according to the "List of Classification Management of Environmental Verification Industries of Listed Companies" issued by China's Ministry of Environmental Protection in 2008 and the "Guidelines for Industrial Classification of Listed Companies" issued by the China Securities Regulatory Commission in 2012, including 16 categories such as metallurgy, chemical, petrochemical, coal and thermal power. If an enterprise was from an industry with heavy pollution, we set the value to 1; otherwise, it was 0. After the classification, there were 7384 enterprises in the heavy-pollution industries group and 8761 enterprises in the non-heavy-pollution industries group.

3.1.2. Data Sources

The data on enterprise's investments into environmental protection were obtained by manually screening and sorting based on the detailed data from a list of "construction projects" in the CSMAR database, which includes data on corporate performance, industry competition, and other financial indicators. To avoid the influence of extreme values, all continuous variables were "Winsorize" tailed at the upper and lower 1% levels.

3.2. Empirical Model

Mixed data from multiple years and multiple enterprises were used in this study. The fixed effect model and cluster-robust standard error (robust) were used in the regression analysis. To test Hypothesis 1, the regression model used was as follows:

$$EI_{i,t} = \alpha + \beta_1 CP_{i,t} + \beta_2 CONTROL_{i,t} + YEAR_t + \xi_{i,t} \quad (1)$$

In model (1), EI represents the scale of enterprise environmental-protection investment; CP represents corporate performance; CONTROL represents a collection of control variables; ξ represents the disturbance term; α represents the constant term; and β_1 represents the coefficient of explanatory variables, with its direction being the focus of this study, indicating the impact of corporate performance on the scale of an enterprise's investment into environmental protection.

In industrial competition, we asked whether the effect of corporate performance on the scale of investments into environmental protection for manufacturing enterprises changes. Therefore, according to the moderating effect model and based on model (1), we added variable HHI and cross-product term CP × HHI, and model (2) was constructed to test Hypothesis 2:

$$EI_{i,t} = \alpha + \beta_1 CP_{i,t} + \beta_2 HHI_{i,t} + \beta_3 CP_{i,t} \times HHI_{i,t} + \beta_4 CONTROL_{i,t} + YEAR_t + \xi_{i,t} \quad (2)$$

In model (2), HHI represents the industry competition intensity and β_3 represents the key coefficient of the moderating effect.

3.3. Variable Definitions

(1) Dependent Variable

The scale of investments by an enterprise into environmental protection (EI): this article followed the practices of Tang and Li [44], and Zhai and Liu [45], calculating EI using total investment/capital stock, in which the total investment is the total amount of new investments into environmental protection in the current year and the capital stock is the average total assets. That is, EI = the newly added investments into environmental protection in the current year/the average total assets.

(2) Independent Variable

Corporate performance (CP): following Zeng et al. [46], this study selected the net interest rate of total assets (ROA) to measure corporate performance, which refers to the ratio of the net profit realized by the enterprise in a certain operating period to the average total assets.

(3) Moderating Variable

Industry competition intensity (HHI): according to industrial theory, competition is more often generated within industrial enterprises. This study used the Herfindahl–Hirschman index to measure this variable with reference to the practices of Gu [47] and Zhang et al. [39]. This indicator measures the amount of competition in an industry. The higher the HHI, the greater the degree of monopoly. On the contrary, the smaller the HHI, the greater the degree of market competition.

HHI = $\sum (X_i/X)^2$, where $X = \sum X_i$, X_i is the book value of the owner's equity in a single enterprise.

(4) Control Variables

According to the previous research, an enterprise's investments into environmental protection are affected by many other factors, mainly including three aspects: the basic characteristics, financial performance, and governance characteristics of the corporation [16,43,48]. Therefore, based on the above research, this study set the following control variables:

(1) The size of enterprise (SIZE). With the increase in enterprise scale, enterprises will have more opportunities to invest in environmental protection [49]. Following Duan and Xu [50], this index was measured using the natural logarithm of total assets at the end of the year.

(2) The age of enterprise (AGE). The longer an enterprise has been established, the more technology and knowledge advantages it has. In order to reduce uncertain losses, enterprises tend to invest into environmental protection. Following Guo and Zhang [51], the difference between the year of establishment and the year of observation was selected to measure the age of enterprises.

(3) Property right (SOE). According to property right theory, state-owned holding enterprises will increase their investments into environmental protection in response to the national economy and people's livelihoods. Following Cui et al. [52], it was set as a virtual variable, with 1 for state-owned enterprises and 0 otherwise.

(4) Financial risk (LEV). The higher the financial risk, the greater the debt-repayment pressure, the more serious the financing constraint, and the less investment into environmental protection. Following Tan and Yang [53], Jiang and Huang [54], and Gebhardt et al. [55], we measured financial risk using the asset–liability ratio.

(5) Operational risk (VOL). The greater the operating risk, the less likely a long-term investment will be made, which is negatively correlated with the enterprise's investments into environmental protection. Following Yang et al. [56], and Giuli and Kostovetsky [57], the annual stock price volatility of the enterprise was used to measure operating risk.

(6) Financial slack (SLACK). The more slack resources managers have, the more complacent managers will be, which makes them optimistic and unlikely to try alternative strategies [58]. It reduces the motivation of managers to invest in environmental protection. Following Yang et al. [16] and Zou et al. [59], we used the ratio of cash and cash equivalents to total assets at the end of the period to measure this index.

(7) Shareholding ratio of institutional investors (INSHARE). As an external force of the corporate governance mechanism, institutional investors have strong abilities to perform information analyses and mining. Institutional investors' shareholding can reduce the degree of information asymmetry and the financial constraints of enterprises, improve the level of corporate governance, and allow enterprises to fulfill their environmental-protection responsibilities. Following Zhu et al. [60], this index was measured by the ratio of the number of shares held by institutional investors to the total share of capital owned by the enterprise.

(8) Proportion of independent directors (IDD). Independent directors influence an enterprise's investments into environmental protection by encouraging and restricting directors and by supervising and balancing the board of directors. In a sense, the scale of independent directors represents the influence of independent directors when expressing independent opinions to the board of directors or at a general meeting of shareholders. The larger the scale, the greater the possibility that the environmental-protection investment issues proposed by independent directors will be discussed and adopted by the board meeting [36]. Following Liu and Li [61], this index was measured by the proportion of independent directors to the number of the board of directors.

(9) CEO change (TURN). After a change in CEO, the new CEO will have short-term expectations and be unwilling to bear too many investment risks. Therefore, a new CEO will try to avoid investing resources into projects with limited maturity and lacking effectiveness, which will affect the enterprise's environmental-protection investment behaviors.

Following Huang [62], we set it as a virtual variable. If the CEO changed, we set it to 1; otherwise, it is 0.

(10) Agency cost (COST). The agency cost is caused by a conflict of interest between management and shareholders. On the agency issue, in order to obtain private benefits from investment, an enterprise's management will be committed to building an empire and attempt to maximize assets, which will affect the enterprise's decisions to invest in environmental protection. Following Jensen and Meckling [63], and Guo [64], this indicator was measured based on the proportion of administrative expenses in operating revenue.

In addition, this study also controlled the annual fixed effect (YEAR) to exclude the heterogeneity from different years.

Details of the variable symbols and specific settings are shown in Table 1 below.

Table 1. Research variable description.

Type	Name	Code	Indicators' Description
Dependent variable	The scale of an enterprise's investment into environmental protection	EI	Newly added investments into environmental protection in the current year/average total assets
Independent variable	Corporate performance	CP	Net profit/average total assets
Moderating variable	The industry competitive intensity	HHI	Herfindahl–Hirschman index calculated using the recorded owners' equity
Control variables	The size of the enterprise	SIZE	Natural log of total assets
	The age of the enterprise	AGE	Difference between establishment and observation year
	Property right	SOE	1 for state-owned enterprises; otherwise, 0
	Financial risk	LEV	Total liabilities/total assets
	Financial slack	SLACK	Cash and cash equivalents/total assets
	Operating risk	VOL	Annual stock-price volatility in the current year
	CEO change	TURN	If the CEO changed, set to 1 in the current year; otherwise, 0
	Agency Cost	COST	Management expenses/operating income
	Proportion of independent directors	IDD	Number of independent directors/total number of directors
	Shareholding ratio of institutional investors	INSHARE	Institutional investor holdings/total shares
	Annual dummy variables	YEAR	Setting 11 dummy variables in 12 years

4. Empirical Results and Analysis

4.1. Descriptive Statistics

The descriptive statistics of variables in this study are shown in Table 2. Among them, the maximum of EI is 5.9010, the minimum is 0, the mean is 0.3042, and the median is 0, indicating that more than half of the sample enterprises do not reach the average amount of investments into environmental protection. The standard deviation of 1.0271 is greater than the mean and median, indicating that there are obvious individual differences in the amount of investment into environmental protection by the sample enterprises. The difference between the maximum (0.2398) and the minimum (−0.2221) CP is large, and the standard deviation is greater than the mean and median, indicating that there are significant

individual differences in the performances of the sample enterprises. The mean industry competitiveness (HHI) is 27.2311, which is higher than the median, 23.0590, indicating that most of the sample enterprises are in an industry with a high degree of competition. The mean SOE is 0.3052, indicating that 30.52% of the sample enterprises are state-owned enterprises. The mean TURN is 0.1096, indicating that 10.96% of the sample enterprises had a CEO turnover during 2008–2019. From the descriptive statistics of other variables in Table 2, it can be found that there is a large difference between the maxima and the minima, indicating that there are large difference between the financial risk, operational risk, and internal governance environments of the sample enterprises.

Table 2. Descriptive statistics.

Variables	N	Mean	Std	Minimum	Maximum	Median
EI	16,145	0.3042	1.0271	0	5.9010	0
CP	16,145	0.0489	0.0620	−0.2221	0.2398	0.0450
HHI	16,145	27.2311	18.8159	3.0736	67.0646	23.0590
SIZE	16,145	21.9174	1.1685	18.4887	26.8076	21.7518
AGE	16,145	20.3595	5.0092	7	37	20
SOE	16,145	0.3052	0.4605	0	1	0
LEV	16,145	38.9713	19.6609	5.4152	92.4247	37.8942
SLACK	16,145	0.7136	3.1169	0.0060	26.8284	0.1332
VOL	16,145	48.9663	23.0038	17.9081	157.6656	43.1473
TURN	16,145	0.1096	0.3124	0	1	0
COST	16,145	0.0905	0.0650	0.0061	0.7891	0.0780
IDD	16,145	37.1087	5.2373	0	57.1429	33.3333
INSHARE	16,145	35.2940	23.5946	0.0775	88.2443	34.8098

4.2. Correlation Analysis

The correlation coefficient analysis of the independent variable, dependent variable and moderating variable in this study is shown in Table 3. It can be seen that the correlation coefficient between EI and CP (r = 0.026) is positive and significant at the 10% level, indicating that an improvement in corporate performance will help to improve investments into environmental protection.

The correlation coefficient between HHI and EI (r = 0.014) is positive but not significant, and the correlation coefficient between HHI and CP (r = 0.080) is positive and significant at the 1% level. The following sections will further test our hypotheses based on a regression analysis.

4.3. Multiple Regression Analysis

To determine whether to use the fixed-effect model or the random-effect model, we conducted the Hausman test. According to the Hausman test results, the *p* value is <0.01, so the fixed-effect model should be used instead of the random-effect model. The following hypothesis tests adopt the two-way fixed-effect model regression.

4.3.1. Regression Analysis of the Impact of CP on EI

The regression results between CP and EI are shown in Table 4. According to model (1) in Table 4, the coefficient between CP and EI (β_1 = 0.398) is positive and significant at the 5% level, indicating that, with an improvement in corporate performance, the anti-risk ability is improved. Since "seeking development" is the expected goal of high-performance enterprises, which encourages enterprises to invest more actively into environmental protection, Hypothesis 1 is verified.

Table 3. Correlation test results of main variables.

Variables	EI	CP	HHI	SIZE	AGE	SOE	LEV	SLACK	VOL	TURN	COST	IDD	INSHARE
EI	1												
CP	0.026 *	1											
HHI	0.014	0.080 ***	1										
SIZE	−0.034 **	−0.045 ***	−0.051 ***	1									
AGE	−0.084 ***	−0.099 ***	−0.015 **	0.207 ***	1								
SOE	−0.122 ***	−0.161 ***	−0.083 ***	0.302 ***	0.188 ***	1							
LEV	−0.002	−0.419 ***	−0.159 ***	0.337 ***	0.124 ***	0.330 ***	1						
SLACK	−0.012	0.028 ***	−0.041 ***	−0.131 ***	0.026 ***	0.086 ***	0.031 ***	1					
VOL	0.039 ***	0.022 ***	0.006	−0.248 ***	−0.111 ***	−0.083 ***	−0.069 ***	0.167 ***	1				
TURN	−0.066 ***	−0.112 ***	−0.023 ***	−0.023 ***	0.042 ***	0.157 ***	0.096 ***	0.015 **	0.005	1			
COST	0.045 ***	−0.175 ***	0.101 ***	−0.305 ***	0	−0.091 ***	−0.115 ***	−0.037 ***	0.090 ***	0.046 ***	1		
IDD	−0.008	−0.011	0.003	0.093 ***	0.022 ***	−0.058 ***	−0.039 ***	−0.060 ***	0.011	−0.073 ***	0.032 ***	1	
INSHARE	−0.056 ***	0.060 ***	−0.036***	0.415 ***	0.108 ***	0.327 ***	0.199 ***	−0.053 ***	−0.236 ***	0.052 ***	−0.120 ***	−0.037 ***	1

Note: *, **, *** represent the significance level of 1%, 5%, and 10%, respectively.

Table 4. Regression results.

Variables	EI					
	Full Samples		Heavy-Polluting Industry		Non−Heavy Polluting Industry	
	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
CP	0.398 **	0.932 ***	0.545 *	1.225 ***	0.010	0.564
	(2.20)	(3.24)	(1.94)	(3.28)	(0.04)	(1.16)
HHI		0.002		0.001		0.002
		(1.21)		(0.54)		(0.70)
CP×HHI		−0.021 **		−0.024 **		−0.023
		(−2.04)		(−1.99)		(−1.31)
SIZE	0.151 ***	0.150 ***	0.132 ***	0.131 ***	0.149 ***	0.148 ***
	(4.53)	(4.50)	(2.81)	(2.78)	(3.19)	(3.19)
AGE	0.090	0.092	0.195 *	0.196 **	−0.444	−0.440
	(0.56)	(0.57)	(1.94)	(1.96)	(−1.41)	(−1.40)
SOE	0.045	0.045	0.012	0.012	0.080	0.082
	(0.66)	(0.66)	(0.14)	(0.13)	(0.75)	(0.76)
LEV	0.001	0.001	−0.001	−0.001	0.004 **	0.004 **
	(1.01)	(1.02)	(−0.88)	(−0.91)	(2.33)	(2.33)
SLACK	−0.004	−0.004	0.001	0.001	−0.002	−0.002
	(−0.83)	(−0.86)	(0.10)	(0.11)	(−0.32)	(−0.38)
VOL	−0.000	−0.000	−0.001	−0.001	−0.000	−0.000
	(−0.45)	(−0.41)	(−0.81)	(−0.83)	(−0.29)	(−0.23)
TURN	−0.049 **	−0.049 **	−0.015	−0.015	−0.076 **	−0.076 **
	(−2.15)	(−2.16)	(−0.44)	(−0.44)	(−2.55)	(−2.56)
COST	0.662 ***	0.654 ***	0.590	0.563	0.507 **	0.507 **
	(3.38)	(3.34)	(1.60)	(1.53)	(2.15)	(2.16)
IDD	−0.002	−0.002	−0.004	−0.003	−0.002	−0.002
	(−0.82)	(−0.83)	(−0.76)	(−0.73)	(−0.57)	(−0.59)
INSHARE	−0.000	−0.000	−0.001	−0.001	−0.000	−0.000
	(−0.76)	(−0.74)	(−0.61)	(−0.60)	(−0.46)	(−0.45)
YEAR	Control	Control	Control	Control	Control	Control
Constant	−4.688	−4.745	−6.252 ***	−6.282 ***	5.632	5.511
	(−1.42)	(−1.45)	(−2.74)	(−2.77)	(0.90)	(0.88)
N	16,145	16,145	7,384	7384	8761	8761
R^2	0.013	0.014	0.024	0.025	0.017	0.018
Adj−R^2	0.0119	0.0122	0.0214	0.0219	0.0149	0.0150
F	4.969 ***	4.776 ***	4.358 ***	4.427 ***	2.690 ***	2.468 ***

Note: *, **, *** represent the significance level of 1%, 5%, and 10%, respectively.

From the results of the relationship between the control variables and EI in model (1) from Table 4, we can see that the correlation between the coefficient of firm size (SIZE) and EI (β = 0.151) is positive and significant at the 1% level, the correlation between the coefficient of CEO turnover (TURN) and EI (β = −0.049) is negative and significant at the 5% level, and the correlation between the coefficient of agency cost (COST) and EI (β = 0.662) is positive and significant at the 1% level.

4.3.2. Regression Analysis of the Moderating Effect of HHI on CP and EI

According to model (2) in Table 4, the coefficient of CP and EI (β_1 = 0.932) is positive and significant at the 1% level, indicating that the higher the performance level of manufacturing enterprises, the larger the scale of investments into environmental protection. Thus, Hypothesis 1 is further verified.

In addition, the coefficient CP × HHI and EI (β_3 = −0.021) is negative and significant at the 5% level. The smaller the HHI value, the higher the industry competition. These results show that higher industry competition triggers "green competition" among manufacturing enterprises, resists the long-term environmental impact and business risks brought on by fierce competition, and encourages high-performance enterprises to invest more resources into environmental protection projects. Hypothesis 2 is thus validated.

From the relationship between the control variables and EI in model (2), it can be seen that it is consistent with the relationship between the control variables and EI in model (1).

4.3.3. Regression Analysis on Influence of Industry Differences on Moderating Effect

According to the grouping regression results in Table 4, compared with non-heavy-pollution industries, the coefficient (β_1 = 0.545) of CP and EI in heavy-pollution industries is positive and significant at the 10% level. After adding HHI and CP × HHI, the coefficient of CP and EI in heavy-pollution industries increases from 0.545 to 1.225 and is significant at the 1% level. Additionally, the coefficient (β_3 = −0.024) of CP × HHI is negative and significant at the 5% level, indicating that fierce industry competition increases the positive impact of CP on EI in heavy-pollution industries.

4.4. Robustness Tests

This paper used the methods of index substitution, adding control variables and reducing samples to test the robustness, and continued to use the fixed-effect model for the regression analysis, as follows:

First, replace the explanatory variable. Replace net profit/total assets with net profit/average total assets. It can be seen from Table 5 that the coefficient of CP is still significantly positive, and that the coefficient of CP × HHI is negative and significant at the level of 5%. The coefficient of CP × HHI in heavy-pollution industries is negative and significant at the 5% level.

Table 5. Robustness Test 1.

Variables	CP (Alternative Measures)				Added Control Variables			
	Full Samples		Heavy Polluting Industry	Non-Heavy Polluting Industry	Full Samples		Heavy Polluting Industry	Non-Heavy Polluting Industry
	Model (1)	Model (2)	Model (2)	Model (2)	Model (1)	Model (2)	Model (2)	Model (2)
CP	0.004 **	0.009 ***	0.012 ***	0.007	0.432 **	0.970 ***	1.247 ***	0.553
	(2.29)	(3.35)	(3.23)	(1.41)	(2.37)	(3.36)	(3.33)	(1.14)
HHI		0.002	0.001	0.002		0.002	0.001	0.002
		(1.24)	(0.57)	(0.77)		(1.27)	(0.68)	(0.73)
CP × HHI		−0.000 **	−0.000 **	−0.000		−0.021 **	−0.023 *	−0.023
		(−2.14)	(−2.06)	(−1.52)		(−2.06)	(−1.94)	(−1.31)
SIZE	0.151 ***	0.149 ***	0.131 ***	0.147 ***	0.148 ***	0.147 ***	0.125 ***	0.148 ***
	(4.52)	(4.49)	(2.76)	(3.19)	(4.31)	(4.27)	(2.68)	(3.02)
AGE	0.090	0.092	0.196 **	−0.439	0.088	0.090	0.198**	−0.446
	(0.56)	(0.57)	(1.97)	(−1.40)	(0.54)	(0.56)	(1.99)	(−1.42)
SOE	0.046	0.045	0.012	0.081	0.040	0.040	−0.011	0.092
	(0.67)	(0.66)	(0.14)	(0.76)	(0.58)	(0.58)	(−0.12)	(0.85)
LEV	0.001	0.001	−0.002	0.004 **	0.001	0.001	−0.001	0.004 **
	(1.03)	(1.02)	(−0.94)	(2.36)	(1.08)	(1.09)	(−0.83)	(2.42)
SLACK	−0.004	−0.004	0.001	−0.002	−0.004	−0.004	0.001	−0.003
	(−0.85)	(−0.87)	(0.08)	(−0.38)	(−0.85)	(−0.88)	(0.13)	(−0.46)
VOL	−0.000	−0.000	−0.001	−0.000	−0.000	−0.000	−0.001	−0.000
	(−0.45)	(−0.39)	(−0.81)	(−0.21)	(−0.53)	(−0.49)	(−0.86)	(−0.23)
TURN	−0.049 **	−0.049 **	−0.016	−0.076 **	−0.049 **	−0.050 **	−0.015	−0.076 **
	(−2.16)	(−2.17)	(−0.46)	(−2.56)	(−2.18)	(−2.19)	(−0.46)	(−2.57)
COST	0.665 ***	0.657 ***	0.561	0.515 **	0.652 ***	0.644 ***	0.511	0.515 **
	(3.38)	(3.35)	(1.51)	(2.19)	(3.37)	(3.33)	(1.41)	(2.18)
IDD	−0.002	−0.002	−0.003	−0.002	−0.002	−0.002	−0.003	−0.002
	(−0.82)	(−0.84)	(−0.74)	(−0.59)	(−0.77)	(−0.78)	(−0.67)	(−0.56)
INSHARE	−0.000	−0.000	−0.001	−0.000	−0.001	−0.001	−0.001	−0.000
	(−0.76)	(−0.72)	(−0.59)	(−0.45)	(−0.79)	(−0.77)	(−0.64)	(−0.45)
MSHARE					−0.028	−0.027	−0.402	0.236
					(−0.15)	(−0.15)	(−1.46)	(0.99)
TOP1					−0.220	−0.220	−0.292	−0.108
					(−0.83)	(−0.83)	(−0.70)	(−0.32)
BALANCE					0.018	0.020	0.059	−0.003
					(0.39)	(0.43)	(0.96)	(−0.04)
YEAR	Control	Control	Control	Control	Control	Control	Control	Control
Constant	−4.676	−4.733	−6.272 ***	5.517	−4.517	−4.572	−6.075 ***	5.625
	(−1.41)	(−1.44)	(−2.77)	(0.88)	(−1.35)	(−1.38)	(−2.67)	(0.90)
N	16,145	16,145	7384	8761	16,145	16,145	7384	8761
R^2	0.013	0.014	0.025	0.018	0.014	0.014	0.027	0.018
Adj-R^2	0.0120	0.0123	0.0219	0.0151	0.0121	0.0124	0.0235	0.0152
F	4.977 ***	4.759 ***	4.438 ***	2.475 ***	4.549 ***	4.422 ***	4.166 ***	2.376 ***

Note: *, **, *** represent the significance level of 1%, 5%, and 10% respectively.

Second, increase the control variables. Referring to Zhang et al. [39], the control variables (the shareholding ratio of managers, the shareholding ratio of the largest shareholder, and the degree of equity balance) are added to the model. The shareholding ratio of managers = the number of shares held by management/total share capital; the shareholding ratio of the first largest shareholder = number of shares held by the first largest shareholder/total shares; and the degree of equity balance = total number of shares held by the second to fifth largest shareholder/number of shares held by the first largest shareholder. The results of Table 5 show that the coefficient of CP is still significantly positive after adding these control variables and that the coefficient of CP × HHI is still significantly negative in the full samples. The coefficient of CP × HHI in heavy-pollution industries is negative and significant at the 10% level.

Third, in view of the impact of the implementation of the new Environmental Protection Law of the People's Republic of China in 2015 on the results of this study, we selected A-share manufacturing listed companies from 2015 to 2019 as the research object for the robustness test. It can be seen from the results in Table 6 that, except for the significance level and directional change in a small number of control variables, the coefficient of CP is significantly positive and the coefficient of CP × HHI is significantly negative in all samples. The coefficient of CP × HHI in heavy-pollution industries is negative and significant at the 1% level.

Table 6. Robustness test two.

Variables	Used the 2015–2019 Samples			
	Full Samples		Heavy-Polluting Industry	Non−Heavy Polluting Industry
	Model (1)	Model (2)	Model (2)	Model (2)
CP	0.469 **	1.585 ***	1.806 ***	0.447
	(2.21)	(3.98)	(3.38)	(0.67)
HHI		0.005	0.004	−0.003
		(1.34)	(0.98)	(−0.60)
CP × HHI		−0.042 ***	−0.048 ***	−0.007
		(−3.26)	(−3.14)	(−0.29)
SIZE	0.152 ***	0.149 ***	0.163	0.157 **
	(2.71)	(2.71)	(1.53)	(2.42)
AGE	0.022	0.024	0.126	−0.465
	(0.15)	(0.17)	(1.45)	(−1.46)
SOE	−0.204 *	−0.204 *	−0.245 *	−0.106
	(−1.93)	(−1.95)	(−1.78)	(−0.70)
LEV	0.003 *	0.003 *	0.003	0.004 **
	(1.69)	(1.81)	(1.06)	(2.19)
SLACK	0.148	0.151	0.334	−0.036
	(1.15)	(1.17)	(1.59)	(−0.22)
VOL	−0.001	−0.001	−0.000	−0.001 *
	(−1.54)	(−1.54)	(−0.59)	(−1.74)
TURN	−0.041	−0.040	0.007	−0.087 **
	(−1.39)	(−1.37)	(0.15)	(−2.56)
COST	0.680 ***	0.649 ***	0.474	0.429
	(2.80)	(2.73)	(0.80)	(1.58)
IDD	−0.003	−0.003	−0.000	−0.006
	(−0.66)	(−0.65)	(−0.05)	(−1.12)
INSHARE	−0.001	−0.001	−0.001	−0.002
	(−1.40)	(−1.49)	(−0.81)	(−1.43)
MSHARE	−0.163	−0.170	−0.573	0.071
	(−0.58)	(−0.60)	(−1.06)	(0.24)
TOP1	−0.883 *	−0.893 *	−2.054 **	0.148
	(−1.72)	(−1.75)	(−2.44)	(0.31)

Table 6. *Cont.*

Variables	Used the 2015–2019 Samples			
	Full Samples		Heavy-Polluting Industry	Non−Heavy Polluting Industry
	Model (1)	Model (2)	Model (2)	Model (2)
BALANCE	−0.096	−0.094	−0.244 *	0.041
	(−1.32)	(−1.30)	(−1.82)	(0.55)
YEAR	Control	Control	Control	Control
Constant	−3.041	−3.142	−5.077 *	5.861
	(−0.98)	(−1.03)	(−1.77)	(0.96)
N	9049	9049	3953	5096
R^2	0.022	0.024	0.052	0.019
Adj−R^2	0.0200	0.0217	0.0476	0.0153
F	4.568 ***	4.410 ***	4.359 ***	1.930 ***

Note: *, **, *** represent the significance level of 1%, 5%, and 10%, respectively.

Therefore, it can be considered that Hypothesis 1, Hypothesis 2, and Hypothesis 3 have good robustness.

5. Discussions and Suggestions

5.1. Discussions

Based on the data from a list of China' s A-share manufacturing companies from 2008 to 2019, this paper finds the following: First, corporate performance is positively correlated with the scale of investments into environmental protection, indicating that high-performance enterprises show higher risk preferences and are more willing to invest into environmental protection projects. Second, fierce industrial competition has increased the positive effect of corporate performance on the scale of enterprises' investments into environmental protection, indicating that industry competition brings about an external pressure to enterprises. To resist the long-term environmental impact and operational risks caused by fierce competition, high-performance enterprises are encouraged to invest more resources into environmental protection projects. Third, compared with non-heavy-polluting industries, fierce industry competition has increased the positive impact of corporate performance on the scale of investments into environmental protection in heavy-polluting industries, indicating that industry attributes are important factors affecting an enterprise's decision making about investments into environmental protection.

In addition, we find that firm size (SIZE) is significantly positively correlated with EI at the 1% level. From the perspective of management behavior, large-scale enterprises are more willing to invest into environmental protection to show their ability to "seek development" and to establish a good green image to meet financing needs and stakeholders' environmental demands [65,66]. CEO turnover (TURN) has a significantly negative correlation with EI, indicating that CEO turnover affects the risk-taking level of enterprises. CEO successors tend to invest into projects with obvious short-term benefits due to a tendency towards "loss aversion" [67,68]. Therefore, for CEO successors, environmental investment is a suboptimal choice when resources are limited. Agency cost (COST) is significantly positive correlated with EI at the 1% level, indicating that agency cost is caused by a conflict of interest between management and shareholders. On the agency problem, the existing literature mainly focuses on the mechanism behind the impacts of manager's private income and private costs on investment decision making. Jensen [69] and other scholars believe that, in order to obtain private benefits from investment, enterprise managers need to be committed to building an empire and attempt to maximize assets [70]. Investments into environmental protection are characterized by large amounts of investment and long periods of investment, which are conducive to motivating managers to control income by increasing investments into environmental protection.

5.2. Suggestions

From the perspective of the enterprise: First, improve their image as a green business. Enterprises are profit-making organizations. The motive of increasing the profits of an enterprise drive managers to make investment decisions and owners of the enterprise to raise awareness of environmental protection by managers and to improve their green business philosophy, which is helpful in realizing sustainable development. Second, pay attention to improving internal governance mechanisms. Managers of high-performance enterprises may have a risk preference, so it is necessary to strengthen the internal governance mechanisms of high-performance enterprises to prevent managers from insufficient or excessive environmental investment and, thus, to find a balance between efficient environmental investment and promoting sustainable and healthy development and environmental governance.

From the perspective of the government, first, give full play to the pressures of the market on enterprises to fulfill their environmental responsibility. On the one hand, the government should appropriately relax the threshold for market access in industries with a monopoly. If the government allows more enterprises to join a monopolized industry, industry competition will form and encourage competition among enterprises to develop low-carbon alternatives. On the other hand, the government should cultivate public awareness of environmental protection and encourage the public to practice green consumption and behaviors. Public demand for environmental protection encourages enterprises to consciously invest into environmental protection.

Second, the government should adjust these measures to local conditions, verify our system according to multiple levels and angles, and encourage enterprises to assume environmental responsibility. Environmental information disclosure between the government and enterprises should be improved to effectively strengthen the responsibility of enterprises as environmental-protection investors. In addition, the government should improve market-based environmental-management policy tools. For example, helping enterprises raise environmental protection funds through various ways; reducing problems with costs in the financing process; improving the efficiency of green financing; and giving preferential treatment regarding loan amount, loan interest rate, loan term, loan conditions, and other aspects for environmental investment.

5.3. Limitations and Further Research

This study has certain limitations. First, this study focused only on the A-stock manufacturing industry in China, meaning that generalizing the findings of the study to dissimilar business contexts is challenging. For that reason, replicating this study in different industries and countries can be attempted in future studies. Second, although the data in this study are sufficient to support the research conclusions, the latest data can still be added to future research to further enhance the representativeness of these conclusions.

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