Volume 7, Issue 2, pp. 46-53, 2023.
International Journal of Scientific Engineering and Science
ISSN (Online): 2456-7361

Research on the Impact of ESG Performance on Enterprise Value from the Perspective of Firm Heterogeneity

Xia Zhengfei[1*]
[1]School of Finance and Economics of Jiangsu University, Zhenjiang, JIangsu 212013, China
*e-mail: 1025964413@qq.com

Abstract— *The data of 209 listed companies in CSI 300 Index from 2018 to 2020 were selected, and the two-way fixed effect model was used to investigate the impact of ESG performance on enterprise value, and further explore the differential impact of ESG performance on enterprise value of heterogeneous enterprises. Study found that ESG performance significantly positive influence on enterprise value, but due to the management goal, social expectations, and input costs, makes the promoting effect of ESG performance exists heterogeneity and non-state-owned enterprises and non pollution of ESG performance significantly positive influence on corporate value, the state-owned enterprises and pollution of ESG performance does not significantly affect the enterprise value. Based on this, it is proposed that enterprises should integrate ESG concept into operation and management and enhance enterprise value by improving the level of ESG governance. For regulatory authorities, ESG information disclosure should be standardized, ESG supervision should be strengthened and positive policy guidance should be provided. For investors, ESG investment decisions should be adopted and ESG responsible investment should be emphasized.*

Keywords— *Sustainable development, Enterprise heterogeneity,ESG performance, Enterprise value.*

I. INTRODUCTION

The concept of ESG is different from the traditional investment concept and enterprise evaluation criteria for evaluating the financial performance of enterprises. It focuses on the environmental performance, social responsibility and corporate governance of enterprises. In this context, enterprises exploring greener, higher quality, more sustainable and safer development strategies have become the investment targets pursued by investors. In the future, it will be an important period for China's listed enterprises to focus on achieving green and sustainable development. Therefore, the concept of ESG has become a powerful starting point for high-quality green and sustainable development of economy and society, and the ESG performance of enterprises has also become an important factor to measure the sustainable development ability of enterprises.

The Global Sustainable Investment Alliance (GSIA) publicly released the total amount of assets under management involving ESG concept in the capital markets of developed countries from 2014 to 2018, and major financial institutions around the world responded accordingly. ESG investment began to rise rapidly around the world, and the total amount of ESG assets under management in major developed countries continued to grow rapidly. Among them, the total amount of ESG assets held in the United States has reached 12 trillion dollars, and in Europe it has reached 12.3 trillion euros. Since 2018, China Securities Regulatory Commission and Hong Kong Stock Exchange have successively issued relevant documents to continuously strengthen the management of listed companies' ESG information disclosure, forcing domestic listed companies to publish their ESG reports. The ESG evaluation system has gradually developed into a new standard for measuring the sustainable development ability and prospect of enterprises around the world and the investment criteria followed by investors. In other words, compared with the financial performance and management process, the ESG performance of enterprises has become the focus of public attention. ESG reports published by listed companies become an important source of information for investors to understand their financial status and investment prospects. The emphasis of the public and enterprises on non-financial performance (ESG performance) will have a significant impact on the market environment, as well as the earnings and value of enterprises. Therefore, whether for enterprises or investors, it is of practical significance to study the impact of ESG performance on enterprise value. Then, how does enterprise ESG performance affect enterprise value, and whether the heterogeneity of enterprises will cause the differentiation of the impact of ESG performance on enterprise value, this paper will focus on these issues.

II. LITERATURE REVIEW

Most of the existing researches separate environmental responsibility, social responsibility and corporate governance, and take a single factor as independent variable to study its impact on corporate value. In terms of environmental responsibility (E), some scholars have confirmed that there is a significant positive correlation between corporate environmental performance and corporate value. Enterprises with good environmental performance can accumulate more reputation, and disclosure of environmental governance information can attract the attention of external investors, thus improving corporate stock price and corporate value [1-2]. However, relevant studies only focus on the impact of environmental accountability behavior or environmental information disclosure on financial performance, so the endogenous problem of variables cannot be avoided. Without considering situational factors, the growth of corporate financial performance will not benefit from the fulfillment of corporate environmental responsibility [3], and even the more

Volume 7, Issue 2, pp. 46-53, 2023. *ISSN (Online): 2456-7361*

enterprises invest in environmental governance, the lower their corporate value [4]. In terms of social responsibility (S), relevant studies have shown that the correlation between social responsibility performance in ESG and corporate Tobin Q will be affected by the time span. Without considering sustainable growth, corporate value will not be affected by whether enterprises fulfill their social responsibilities [5]. Although the fulfillment of social responsibility is not conducive to the short-term financial value of enterprises, it is conducive to the improvement of the long-term production value and enterprise value [6-7], and the social performance will significantly positively affect the financial performance one period behind [8]. In terms of corporate governance (G), relevant studies show that corporate governance has a positive impact on corporate value, and enterprises with a higher level of governance have a higher corporate value [9], and the short-term impact is more significant than the long-term impact [10], indicating that corporate governance has an immediate impact on financial performance. In addition, some scholars have proved that factors such as enterprise growth, enterprise scale and foreign exchange derivatives play an intermediary role in the influence path of corporate governance on enterprise value [11-12].

With the attention paid to ESG concept, ESG performance has become an important factor to measure the sustainable development ability of enterprises. Therefore, it has gradually become the mainstream to investigate the impact of the three factors on enterprise value as a whole. However, there are few studies on ESG performance, and scholars at home and abroad still hold different views on the relationship between the two. On the one hand, some scholars have studied the mechanism of ESG performance on enterprise value and found that enterprises that actively improve ESG performance have higher ESG level, which can help them reduce the risk caused by market fluctuations [13], obtain more social resources, improve the efficiency of resource allocation, and thus increase enterprise value [14]. At the same time, the active public disclosure of ESG reports by enterprises can convey the signal of good operation to the market, enhance the confidence of stakeholders in the sustainable development of enterprises, and help enterprises attract ESG investment, reduce operational risks, enhance reputation and influence [15], so as to realize the improvement of stock price and enterprise value [16]. On the other hand, relevant studies prove that there is no correlation between ESG performance and enterprise value [17], not all dimensions of ESG can have an impact on enterprise value, and ESG information disclosure has no impact on enterprise value [18]. More scholars believe that there is a significant negative correlation between ESG disclosure and enterprise value [19], and enterprises with good ESG performance have lower enterprise value [20]. The reason for the inconsistent conclusions may be that the consideration of business objectives, costs, advantages and disadvantages of heterogeneous enterprises is ignored, and the ESG performance of different enterprises has a differentiated impact on enterprise value. Therefore, in recent years, some scholars began to study the role of firm heterogeneity in the impact of firm ESG performance on financial performance. Relevant studies show that when there is a difference between the nature of enterprise ownership and the nature of industry, the impact of enterprise ESG performance on enterprise value is not significantly different [21]. However, with the green and sustainable development of social economy, some scholars put forward other views. Zhang Lin and Zhao Haitao [22] found that the improvement of enterprise ESG performance had no significant impact on the financial performance of polluting enterprises, but significantly affected non-polluting enterprises. Cheng Shi and Cao Haimin [23] Research on listed food enterprises in our country and found that state-owned enterprises to shoulder social responsibility will significantly promote the financial performance, non-state-owned enterprises is not obvious; KAO [24] believe that fulfilling social responsibility has a positive impact on the financial performance of non-state-owned enterprises, while it has a negative impact on the financial performance of state-owned enterprises.

The main contributions of this paper are as follows: First, not only a certain factor is considered, but ESG data of domestic listed enterprises released by Wind financial information database is used to comprehensively study the impact of ESG performance on enterprise value, so as to make up for the defect of inaccurate results caused by the neglect of a certain factor. Second, samples are classified from the two aspects of ownership nature and industry nature, so as to study the impact of ESG performance of heterogeneous firms on the differentiation of firm value. Third, empirical evidence can be used for reference by relevant regulatory authorities, investors and listed enterprises to promote the improvement and supervision of domestic ESG information disclosure system, promote the high-quality development of the capital market, and promote enterprises to improve ESG performance and pay attention to their own sustainable development.

III. THEORETICAL BASIS AND RESEARCH HYPOTHESIS

3.1 ESG performance and enterprise value

Economic and social development cannot be achieved without a good natural environment, and the advancement of economic and social development cannot be achieved without the sound development of enterprises. When an enterprise integrates ESG concept into its business decision-making, implements ESG strategy, actively discloses ESG information, and actively invests more time and resources to improve its ESG performance, it will send a signal to the society and stakeholders that its business condition is good and its investment prospects are promising. Therefore, the enterprise will gain more support and attention from the public. Enhance the social image of enterprises and form competitive advantages, the value of enterprises will also be improved. At the same time, as more and more stakeholders begin to pay attention to the ESG performance of enterprises, enterprises should balance and take into account the demands of different stakeholders in the development, improve the internal control system, protect the rights and interests of employees, and contribute social value, which will further enhance the reputation of enterprises, and a high reputation can gather social resources for enterprises from all aspects. Effectively avoid or reduce the harm of negative events to the enterprise, so as to enhance the enterprise value. In addition, enterprises involved

International Journal of Scientific Engineering and Science
Volume 7, Issue 2, pp. 46-53, 2023. ISSN (Online): 2456-7361

in pollution or negative events in the past can make the market clearly see their attitude towards ESG work and business integrity through ESG information disclosure, which can make stakeholders take a new look at their ESG performance, win reputation and investment, reduce information asymmetry, increase enterprise value, and contribute to the healthy and sustainable development of enterprises. Therefore, hypothesis 1 is proposed in this paper.

Hypothesis 1: Enterprise ESG performance has a positive impact on enterprise value.

3.2 ESG performance and firm value from the perspective of firm heterogeneity

Because samples are selected in this paper, the heterogeneity of enterprise size is not analyzed. Instead, samples are classified from the two aspects of ownership nature and industry nature, so as to explore the impact of ESG performance of heterogeneous enterprises on the differentiation of enterprise value.

Firstly, in terms of corporate ownership. Since non-state-owned enterprises and state-owned enterprises have different business objectives and characteristics, non-state-owned enterprises take survival and development as the main purpose, and will adopt the business strategy of maximizing corporate benefits in daily business activities, which can increase shareholders' returns and improve corporate financial performance. However, due to its special equity nature and social status, state-owned enterprises have more social resources and need to assume more social responsibilities. As a result, their efforts in addressing environmental and social problems are often ignored by the public, and the improvement of their internal control system is highly concerned and expected, so it is difficult for state-owned enterprises' ESG performance to transform into actual economic benefits. In conclusion, hypothesis 2 is proposed in this paper.

Hypothesis 2: When the nature of enterprise ownership is different, the impact of enterprise ESG performance on enterprise value is also different.

Secondly, environmental performance is a critical part of corporate ESG performance. It is widely believed by the public and stakeholders that enterprises in polluting industries will have adverse effects on social environment and human health, so improving the ESG performance in the production and operation activities of polluting enterprises is taken for granted. The positive signals it sends may be ignored and will not affect the financial performance of enterprises. However, enterprises in non-polluting industries spend less cost and resources on improving ESG performance. Based on the reputation theory, if enterprises increase their investment in improving ESG performance, their reputation will be positively affected, so that they can obtain more social resources, enhance social influence, effectively avoid the impact of negative news on enterprises, and thus affect enterprise value. To sum up, hypothesis 3 is proposed in this paper.

Hypothesis 3: When the industry nature of enterprises is different, the impact of enterprise ESG performance on enterprise value is also different.

IV. Research design

4.1 Sample selection and data sources

Since the CSI 300 Index is updated every six months, this paper selects the financial data and ESG data of 300 enterprises updated by Wind financial database for the last time in 2021 for three consecutive years from 2018 to 2020. Although some enterprises are not in CSI 300 Index before this adjustment, it does not affect the research of this paper. In order to make the samples more standardized and the research results more real and effective, data were extracted based on the following principles: first, sample enterprises with missing financial data or no ESG score were excluded; Second, sample enterprises excluding finance and real estate industries; Third, the other variables except ESG rating score were reduced by 1% and 99%. A total of 627 observations were obtained from 209 listed companies.

4.2 Variable setting

(a) Explained variables

In this paper, Tobin Q value is used to measure enterprise value, which is not affected by accounting policy changes, covers the information of investors' judgment of enterprise's future value, reflects the enterprise's competition and development strength to a certain extent, and is persuasive to measure enterprise value. In addition, in order to test the robustness of the regression results, Tobin Q is replaced by the logarithm of the market value of the sample listed companies as the second measurement method of enterprise value.

(b) Core explanatory variables

Most domestic scholars use ESG evaluation data of listed enterprises released by authoritative institutions in their research, such as ESG rating data of China Securities, ESG data of Green A-share listed enterprises of ShangDaorong, etc. In order to better measure the overall performance of listed enterprises' ESG responsibilities, the core explanatory variable of this paper adopts the Wind ESG rating of self-owned listed enterprises released by Wind Information financial terminal. Based on domestic and foreign ESG-related policies and standards, Wind ESG rating system integrates a large amount of information from major data sources to provide the most comprehensive ESG data according to the ESG characteristics of Chinese enterprises. It specifically distinguishes the three dimensions of environment, society and governance, subdivides 27 topics, and sets more than 300 specific indicators. The ESG rating score of listed enterprises obtained by Wind's unique calculation method can more comprehensively reflect the ESG management practice level of enterprises and major sudden risks, which is authentic, authoritative and intuitive on the whole.

(c) Control variables

Because enterprise value may be affected by the microscopic characteristics of the enterprise, the financial operation status of the enterprise and other conditions, the control variables in this paper include enterprise Size (Size), asset-liability ratio (Lev), return on equity (ROE), total asset turnover (Asset_tur) and equity concentration (Top10). Year dummy variable (ydum) was added to control the time effect.

The variable types, names, symbols and explanations are shown in Table 1.

TABLE 1. The variable definition table

Variable types	Name(number)	Explanation
Explained variables	Enterprise value（Tobin Q）	(Total Market Value + Book Value of Liabilities) / Book Value of Total Assets
Core explanatory variables	ESG performance（ESG）	Wind ESG rating score
Control variables	Enterprise size（Size）	The total assets of the enterprise are logarithmic
	Gearing ratio（Lev）	Total liabilities at the end of the period/total assets at the end of the period
	Return on equity（Roe）	Return on equity = net profit / average shareholders' equity
	Total asset turnover（Asset_tur）	Total asset turnover = sales revenue / total assets
	Equity concentration（Top10）	Shareholding ratio of the top 10 shareholders

4.3 Model construction

The measurement model in this paper is shown in equations (1) and (2) :

$$\text{Tobin }Q_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Control_{i,t} + ydum + \varepsilon_{i,t}, \quad (1)$$

$$\ln cap_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Control_{i,t} + ydum + \varepsilon_{i,t}. \quad (2)$$

In equations (1) and (2), i is number of enterprises, t is year, Tobin Q and ESG are explained and core explained variables, respectively, Control is each control variable, ydum is annual dummy variable, in doing so is an error term, and βi (i=0,1,2) is the parameter to be estimated. In order to test the robustness of the regression results, Equation (2) selects the logarithm of the market value of the sample listed companies (ln cap) to replace Tobin Q of Equation (1) as the second measurement method of enterprise value.

V. EMPIRICAL ANALYSIS

5. 1 Descriptive statistical results of variables

Refer to the descriptive statistical results in Table 2, it is observed that the maximum, minimum and standard deviation of Tobin Q of the sample enterprises of the dependent variable are 16.54, 0.30 and 3.25 respectively, which represents a large difference in the enterprise value of the sample enterprises. The mean value is 3.20, significantly greater than the median 2.01, indicating that the overall enterprise value of the sample enterprises is high. Relatively speaking, the ln cap difference of the sample firms is small. According to the core explanatory variables, the mean and median of ESG rating score are 6.68 and 6.62 respectively (full score is 10), indicating that the ESG performance of listed companies in CSI 300 index is better on the whole, in which the maximum, minimum and standard deviation are 9.33, 4.53 and 0.91 respectively, indicating that there are significant differences in the ESG performance of sample companies. The minimum value of total assets of sample enterprises is 21.61, the maximum value is 28.25, the median value is 24.15, and the average value is 24.37, indicating that the listed companies of CSI 300 index belong to medium and large enterprises with relatively average enterprise size. In addition, other control variables are also different among different enterprises. In general, the sample data are well differentiated.

TABLE 2. Descriptive statistics of variables

Variable	Obs	Mean	St.d	Med	Min	Max
Tobin Q	627	3.20	3.25	2.01	0.30	16.54
ln cap	627	24.88	0.92	24.80	22.50	27.33
ESG	627	6.68	0.91	6.62	4.53	9.33
Size	627	24.37	1.48	24.15	21.61	28.25
Lev	627	46.76	17.36	48.93	8.68	83.65
Asset_tur	627	0.79	0.44	0.69	0.12	2.37
Roe	627	16.04	10.73	15.30	-16.80	50.06
Top10	627	67.32	14.51	68.39	30.16	95.02

5.2 Correlation analysis

By observing Pearson's correlation coefficient in Table 3, we can understand the correlation between variables. When the significance level is 0.01, ESG and Tobin Q are negatively correlated, and the correlation coefficient is small, which may be because the influence of other variables, time effect and individual fixed effect is ignored, leading to the inconsistency between the results and hypothesis 1. In addition to the total asset turnover (Asset_tur), other control variables have a significant impact on enterprise value. It can also be seen from Table 3 that the correlation coefficients among all explanatory variables are small, so it can be considered that the variables selected in this paper are appropriate and there is basically no multicollinearity problem.

TABLE 3. Variable correlation analysis

Variable	Tobin Q	ln cap	ESG	Size	Lev	Asset _tur	Roe	Top 10
Tobin Q	1.000							
ln cap	0.172***	1.0000						
ESG	-0.226***	0.288***	1.000					
Size	-0.553***	0.599***	0.427***	1.000				
Lev	-0.536***	0.044***	0.243***	0.563***	1.000			
Asset _tur	0.002	0.013	0.019	-0.061	0.103***	1.000		
Roe	0.5062***	0.1627***	-0.219***	-0.321***	-0.269***	0.273***	1.000***	
Top10	-0.082**	0.183***	0.038	0.260***	0.0526	0.142***	-0.017	1.000

5.3 Full sample regression results and analysis

Considering that there may be individual random effects and individual fixed effects in the model, this paper conducts F test, Breusch-Pagan LM test and Hausman test on the model in advance. The results show that the F test set by the panel is significant at the 1% level, indicating the existence of individual fixed effects in the model. The Breusch-Pagan LM test on the mixed OLS model and the random effects model showed that the P value was 0.00, which was significant at the 1% level, indicating the existence of individual random effects

International Journal of Scientific Engineering and Science
Volume 7, Issue 2, pp. 46-53, 2023. ISSN (Online): 2456-7361

in the model. The Hausman test on the random effects model and the fixed effects model shows that the P value is 0.00, which is significant at the 1% level, indicating that the fixed effects model is more appropriate for estimation.

As can be seen from the regression results in Table 4, R2 of the uncontrolled time effect model 1 is 0.204, while that of the controlled time effect model 2 is 0.337, which indicates that the controlled time effect will make the model fit higher in the fixed effect model. Therefore, the regression results of Model 2 are used for analysis.

TABLE 4. Regression results of the impact of ESG performance on enterprise value

Variable	Model1	Model 2
ESG	0.326*	0.324**
	(1.86)	(2.02)
Size	2.464***	0.013
	(8.05)	(0.03)
Lev	-0.041**	-0.032**
	(-2.52)	(-2.15)
Asset_tur	-0.194	0.490
	(-0.30)	(0.82)
Roe	0.024*	0.037***
	(1.74)	(3.00)
Top10	-0.007	0.038**
	(-0.35)	(2.10)
ydum	control	control
Constant	-56.916***	-2.306
	(-7.76)	(-0.26)
Obs	627	627
R^2	0.204	0.337
F test	17.55***	26.05***
（P value）	（0.00）	（0.00）
Hausman test	111.77***	32.43***
（P value）	（0.00）	（0.00）

According to the regression results of Model 2 in Table 4, there is a positive correlation between ESG performance and enterprise value (Tobin Q) at the significance level of 5%, which is consistent with existing research results, indicating that listed enterprises with better ESG performance can obtain higher ESG rating score, so as to improve their own enterprise value, so hypothesis 1 is accepted. In fact, for all listed companies, improving ESG performance can send a positive signal to the market, thus reducing corporate risks and accumulating more reputation, so that investors and other stakeholders can increase the valuation of enterprises, and the investment market and financing market can also benefit from it.

In terms of control variables, there is an insignificant positive correlation between enterprise Size (Size) and enterprise value (Tobin Q), which indicates that the larger the asset scale of an enterprise, the higher the enterprise value (Tobin Q) may be. The reason for the non-significant correlation may be that a listed enterprise with a larger asset scale will indeed have a higher reputation, which can reduce operating risks. Help finance debt, but at this time the profitability of its assets growth is less than the expansion rate of its asset size. The influence of asset-liability ratio (Lev) on enterprise value (Tobin Q) is significantly negative, indicating that the higher the debt ratio, the lower the comprehensive cost of capital and the higher enterprise value (Tobin Q). In addition, other control variables have a positive impact on enterprise value (Tobin Q), which indicates that enterprises with better profitability, capital operation ability and comprehensive management ability can have better financial performance.

5.4 Heterogeneity analysis

In view of hypothesis 2 and hypothesis 3, this paper classifies sample enterprises according to ownership characteristics and industry nature and conducts regression analysis to further explore the relationship between enterprise ESG performance and enterprise value. Table 5 reports the grouped regression results.

TABLE 5. Regression results of ESG performance on firm value from the perspective of firm heterogeneity

Variable	Ownership characteristics		Industry characteristics	
	Model 1	Model 2	Model 3	Model 4
	State-owned enterprises	Non-state-owned enterprises	Polluting enterprises	Non-polluting enterprises
	Tobin Q	Tobin Q	Tobin Q	Tobin Q
ESG	-0.196	0.421**	0.161	0.617***
	(-0.69)	(2.20)	(0.74)	(2.74)
Size	0.926	-0.607	0.353	-0.415
	(1.06)	(-1.29)	(0.64)	(-0.81)
Lev	0.007	-0.057***	-0.054***	0.005
	(0.23)	(-3.33)	(-2.63)	(0.22)
Asset_tur	-2.185**	2.004***	0.837	-1.097
	(-2.21)	(2.74)	(1.02)	(-1.28)
Roe	0.096***	0.020	0.019	0.072***
	(3.32)	(1.48)	(1.20)	(3.80)
Top10	-0.032	0.069***	0.003	0.072***
	(-0.78)	(3.25)	(0.13)	(3.29)
ydum	control	control	control	control
Constant	-18.197	10.290	-6.034	2.930
	(-0.94)	(0.95)	(-0.47)	(0.25)
Obs	246	381	396	231
Sample	82	127	132	77
R^2	0.286	0.435	0.338	0.425

(a) Ownership heterogeneity

This paper first classifies the ownership characteristics of sample enterprises, among which 82 are state-owned holding enterprises and 127 are non-state-owned holding enterprises. Model 1 and Model 2 in Table 5 show that ESG performance of non-state-owned enterprises is positively correlated with enterprise value (Tobin Q) at the significance level of 5%, while ESG performance of state-owned enterprises has no significant impact on enterprise value (Tobin Q), so hypothesis 2 is accepted. This indicates that non-state-owned enterprises can obtain higher ESG rating score by improving ESG conditions, thus significantly improving financial performance and increasing enterprise value, while state-owned enterprises cannot benefit from the special nature. Non-state-owned enterprises are more profit-oriented, have strong competition in the market, and shareholders and executives have a strong say in corporate governance, so it is easier to improve their ESG performance through internal control, so as to enhance their financial performance. However, due to the special equity nature and social status of state-owned enterprises, they need to shoulder more social responsibilities. As a result, their efforts in addressing environmental and social problems are often ignored by the public, and the improvement of their internal control system is highly concerned and expected. Moreover, due to government intervention, state-owned enterprises are non-competitive, which makes it difficult for external investors

International Journal of Scientific Engineering and Science
Volume 7, Issue 2, pp. 46-53, 2023. ISSN (Online): 2456-7361

to participate in corporate governance. Making it difficult for their ESG performance to translate into actual economic benefits.

As for state-owned enterprises, they have innate policy support and social responsibility. Regardless of whether it is conducive to the improvement of corporate value, they should play a leading role in environmental governance, social governance and enterprise innovation. They should actively consider social public interests in business decision-making, and give more consideration to social interests and value needs of stakeholders in development. More importantly, we should further pay attention to our own environmental performance, steadily promote energy conservation and emission reduction, and help achieve carbon peak carbon neutrality. Non-state-owned enterprises should not only consider financial performance, but also actively disclose environmental performance information and apply sustainable development theory in business decision-making, which can improve the social image and form competitive advantages, so as to enable the healthy and long-term development of enterprises.

(b) Industry heterogeneity

Based on the Industrial Classification Management List of Listed Enterprises for Environmental Protection Verification issued by the Ministry of Environmental Protection in 2008, this paper classifies the industrial nature of the sample enterprises, observing 132 polluting enterprises and 77 non-polluting enterprises in the sample. Model 3 and Model 4 in Table 5 show that the ESG performance of non-polluting enterprises in the sample is positively correlated with enterprise value (Tobin Q) at the significance level of 1%, while the ESG performance of polluting enterprises is not significantly correlated with enterprise value (Tobin Q), which is confirmed by hypothesis 3. Since polluting enterprises and non-polluting enterprises have different costs and attention levels to improve ESG performance, polluting enterprises need to invest more costs and social resources than non-polluting enterprises in the process of improving ESG performance. At the same time, polluting enterprises themselves have pollution and environmental violations, which will affect the improvement of enterprise value and investor confidence. On the contrary, the low cost required by non-polluting enterprises to improve their ESG performance is more conducive to their sustainable development, can accumulate more reputation, and their efforts in ESG are more valued by investors.

Compared with releasing positive information and concealing negative information, enterprises in polluting industries may spend more costs and resources to actively improve ESG performance and disclose real ESG information, but in the long run, enterprises' attitude towards ESG work and their business integrity can be clearly seen by the market. The disclosure of ESG information will enhance stakeholders' confidence in corporate ESG governance and contribute to the healthy and sustainable development of enterprises. However, enterprises in non-polluting industries spend less cost and resources on improving ESG performance. At this time, they should consider taking more social responsibilities and continuously increase their investment in improving ESG performance. In this way, they can not only improve their operating efficiency and establish their corporate image, but also deal with the instability of enterprise development and reduce moral hazard.

5.5 Robustness test

In order to make the empirical results more real and reliable, this paper adopts the logarithm cap of the total market value of enterprises as another method to measure enterprise value, and conducts robustness test. Model 1 of the regression results in Table 6 shows that ESG has a significant positive impact on enterprise value (Tobin Q) at the 1% level, which supports the regression results obtained by the bidirectional fixed-effect model in this paper. According to the observation of models 2 to 5, in the classification regression considering enterprise heterogeneity, ESG rating score of non-state-owned enterprises is positively correlated with ln cap at the significance level of 5%, while ESG rating score of non-polluting enterprises is positively correlated with ln cap at the significance level of 1%, which still supports the previous conclusion, indicating that the research results in this paper have a certain reliability.

TABLE 6. In cap is used to measure the robustness test results of enterprise value

Variable	Full sample	Ownership characteristics		Industry characteristics	
	Model1	Model 2	Model 3	Model4	Model 5
		State-owned enterprises	Non-state-owned enterprises	Polluting enterprises	Non-polluting enterprises
ESG	0.099***	0.066	0.092**	0.033	0.181***
	(3.00)	(1.10)	(2.49)	(0.80)	(3.24)
Size	0.822***	0.976***	0.565***	0.954***	0.664***
	(10.26)	(5.30)	(6.26)	(9.19)	(5.25)
Lev	-0.010***	0.005	-0.017***	-0.012***	-0.007
	(-3.40)	(0.73)	(-5.14)	(-2.97)	(-1.44)
Asset_tur	0.114	-0.329	0.415***	0.265*	-0.095
	(0.93)	(-1.57)	(2.95)	(1.69)	(-0.45)
Roe	0.014***	0.023***	0.010***	0.009***	0.022***
	(5.33)	(3.84)	(3.92)	(2.92)	(4.62)
Top10	0.011***	0.007	0.015***	0.010*	0.013**
	(2.85)	(0.84)	(3.74)	(1.89)	(2.33)
ydum	Control	Control	Control	Control	Control
Constant	3.359*	-0.973	9.467***	0.664	6.428**
	(1.81)	(-0.24)	(4.55)	(0.27)	(2.19)
Obs	627	246	381	396	231
Sample	209	82	127	132	77
R^2	0.726	0.644	0.805	0.719	0.758

VI. RESEARCH DESIGN

6.1 Research conclusions

Taking 209 listed companies of CSI 300 Index from 2018 to 2020 as examples, this paper explores the influence of different sample companies' ESG performance on enterprise value from two aspects of ownership nature and industry nature, and uses the two-way fixed effect model for empirical test. (1) On the whole, if listed enterprises actively improve their ESG performance, they can obtain more social resources and effectively avoid the impact of negative news on enterprises, which not only enables the healthy long-term development of enterprises, but also improves their social image, forms competitive advantages and increases their corporate value accordingly. (2) Positive improvement of ESG performance

International Journal of Scientific Engineering and Science
Volume 7, Issue 2, pp. 46-53, 2023. ISSN (Online): 2456-7361

and disclosure of true ESG information by non-state-owned enterprises can increase enterprise value, but this practice has no obvious promotion effect on the enterprise value of state-owned enterprises with special equity nature and social status; (3) The low cost required by non-polluting enterprises to improve their ESG performance is more conducive to their sustainable development and can accumulate more reputation, thus improving their enterprise value, while the high cost and social expectation of polluting enterprises will affect the improvement of their enterprise value.

6.2 Countermeasures and suggestions

According to the conclusion of this study, there are three suggestions proposed in this paper.

Firstly, enterprises should integrate ESG strategy and strengthen ESG management. First of all, enterprises should continuously improve their environmental performance and fulfill their social responsibilities in business decision-making, strengthen the management of enterprises to attach importance to the concept of sustainable development, integrate the concept of ESG into the long-term strategic planning of enterprises, continue to improve the internal control system, improve the level of ESG governance, so as to enhance the value of enterprises and achieve a virtuous cycle. For example, enterprises can set up ESG work plan in daily operation, arrange special personnel to be responsible for ESG work, and build ESG corporate culture through concentrated learning and quality development, so as to provide a foundation for their own ESG decision-making and sustainable development, so as to enhance enterprise value. Secondly, non-state-owned enterprises lacking policy and financial support should actively practice ESG concept, actively provide jobs, create humanized products and services, protect employees' rights and interests, gain non-financial advantages by fulfilling ESG responsibilities and strengthening ESG governance, and present more real and detailed ESG reports to regulators and investors. Thus attracting external ESG investors, obtaining more social resources and enhancing enterprise value. Non-polluting enterprises have advantages in ESG governance costs, so they should take the initiative to shoulder ESG responsibilities, continue to do a good job in energy conservation, emission reduction, low-carbon environmental protection, and pass on positive information to the society through enhancing ESG information disclosure, so as to improve corporate reputation and enhance corporate value. Finally, although the positive improvement of ESG performance by state-owned enterprises with inherent advantages and high-cost polluting enterprises has no significant impact on enterprise value, in the long run, by fulfilling ESG responsibilities and disclosing ESG information, enterprises can gain a good social reputation and contribute industrial value, which is conducive to the sustainable development of social economy. State-owned enterprises can try to build internal ESG database, use big data technology to realize the normal management of ESG information collection, storage and update, help build ESG evaluation system, and strive to be the builder of ESG ecology. Polluting enterprises should continuously strengthen energy conservation and ecological environmental protection, strengthen inter-industry ESG communication and coordination, optimize industrial structure, promote industrial transformation and upgrading, establish corporate image, and become the pioneer of ESG governance.

Secondly, regulators should standardize ESG information disclosure, strengthen ESG supervision and provide positive policy guidance. Although the ESG evaluation system has gradually developed into a new standard to measure the sustainable development ability and prospect of enterprises and the investment criteria followed by investors, the domestic ESG started late, and the current ESG evaluation system in the market is uneven, lacking a unified standard, and the information disclosure system is not perfect. Therefore, the improvement of ESG evaluation system and information disclosure system is the first issue that regulators should consider. At the same time, the regulatory authorities should continuously strengthen the supervision and active policy guidance on the ESG information disclosure of listed enterprises, consider the ESG performance of enterprises when they are listed in the IPO, and establish a penalty system that links negative ESG events with loan reduction, administrative fines, delisting and other ways. Preferential policies such as subsidies, tax rate reduction and loan increase are provided to enterprises that actively undertake ESG responsibilities, so as to promote listed enterprises to continuously enrich their ESG report content, force enterprises to strengthen their awareness of their ESG responsibilities and improve their ESG management level, so as to reduce the risks caused by market fluctuations and promote the sustainable development of relevant enterprises and the improvement of corporate value. Improve the efficiency of resource allocation and bring more social welfare.

Thirdly, for investors, ESG investment decisions should be adopted and ESG responsible investment should be emphasized. Listed enterprises with high ESG rating have higher enterprise value, which is conducive to improving the return on investment. Therefore, when considering the financial performance of listed enterprises, investors should also consider the non-financial performance of enterprises in environmental protection, social responsibility fulfillment and benign operation, and strengthen exchanges and cooperation with ESG regulators, research institutions and intermediaries. Then provide financial support or investment decisions according to the specific situation to reduce the impact of sudden financial risk events. Among them, state-owned capital investment enterprises should strive to be the creators of ESG value, further strengthen the awareness of ESG investment, improve their own internal structure, at the same time, carry out in-depth research on ESG responsibility of the capital market, adopt scientific measurement methods, and take environmental, social and ethical standards into consideration in various aspects. Establish ESG report evaluation system, ESG database and ESG investment index in collaboration with enterprises and regulatory authorities for ESG responsible investment, which can not only reduce information asymmetry, but also guide the market to pay more attention to green and sustainable enterprises, improve the enterprise value of related enterprises, thus reducing investment risks and obtaining more investment returns. We promoted the optimization and upgrading of the industrial chain.

REFERENCES

[1] Wu Mengyun, Zhang Linrong. Research on characteristics, environmental responsibility and Enterprise value of top management team [J]. East China Economic Management,2018,32(2):122-129.

[2] Zhu Qingxiang, Cui Xiaomin, Zou Tao. Study on the impact of environmental performance on firm value: Based on the dual consideration of industry concentration and firm competitive position [J]. Finance and Economics,2020(1):42-49.

[3] Tang Pengcheng, Yang Shuwang. Environmental protection and enterprise development really can not go hand in hand? [J]. Management Review,2018,30(8):225-235.

[4] Gao Jianlai, Wang Youyuan. Study on the impact of environmental information disclosure index on enterprise value [J]. Ecological Economy,2019,35(6):157-161.

[5] MCWILLIAMS A,SIESEL D.Corporate social responsibility:A theory of the firm perspective[J].The Academy of Management Review, 2001, 26 (1) : 117-127.

[6] KIM M C,KIM Y H.Corporate social responsibility and shareholder value of restaurant firms[J].International Journal of Hospitality Management,2014,40:120-129.

[7] Han Xian, Qiu Shuping. Research on the influence of executive compensation and social responsibility on corporate value effect [J]. Journal of Finance and Accounting,2018(15):82-85.

[8] Paint red, Zheng Hao. Corporate Social responsibility, ownership and Corporate value [J]. Nankai Journal (Philosophy and Social Sciences),2018(6):147-156.

[9] Wu Mai Erjiang Aishan, Alizati Turhong, Zheng Hui. Research on the Influence of Institutional investors' Shareholding on corporate Value: An Analysis of the mediating effect based on ESG Performance [J]. Price Theory and Practice,2021(3):79-82.

[10] Liu Yinguo, Zhu Long. An empirical study on Corporate governance and corporate Value [J]. Management Review,2011,23(2):45-52. (in Chinese)

[11] Chen Xia, Ma Lianfu. The Relationship between Corporate Governance Level, Corporate Growth and Corporate Value: from the perspective of Internal Control [J]. Prediction,2015,34(6):28-32,50.

[12] Fan Lu. Corporate Governance, use of Foreign exchange derivatives and enterprise value [J]. Finance and Accounting Monthly,2018(12):64-71.

[13] Wang Linlin, Lian Yonghui, Dong Jie. Research on the influence mechanism of ESG performance on firm value [J]. Securities Market Review,2022(4):1-12.

[14] Xu Guanghua, Zhuo Yaoyao, Zhang Yimeng, et al. Does ESG Information Disclosure improve enterprise value? [J]. Journal of Finance and Accounting,2022(4):33-37.

[15] Xu Mingyu, Liu Cancan, Hu Yixiang, et al. An empirical study on the Impact of ESG performance on Enterprise Value: A Case study of A-share Listed Enterprises [J]. China Assets Evaluation,2021(7):27-37.

[16] Qiu Muyuan, Yin Hong. Corporate ESG performance and financing cost under the background of ecological civilization construction [J]. Journal of Quantitative and Technical Economics,2019,36(3):108-123. (in Chinese)

[17] Ruhaya A, Md-Mahmudul A,Jamaliah S ,et al. The impacts of environmental, social, and governance factors on firm performance: Panel study of Malaysian companies[J].Management of Environmental Quality: an International Journal of Science,2018,29(2):182-194.

[18] Zhang F,Qin X,Liu L. The interaction effect between ESG and green innovation and its impact on firm value from the perspective of information disclosure[J].Sustainability,20,12(5):1866.

[19] Fatemi A,Glaum M,Kaiser S.ESG performance and firm value:the moderating role of disclosure[J].Global Finance Journal,2017, 38:45-64.

[20] Sassen R, Hinze A,Hardeck I.Impact of ESG factors on firm risk in Europe[J].Journal of Business Economics, 2016, 5 (8) : 867-904.

[21] TAO B,MENG L.Does CSR signal the firm value? [J].Sustainability, 2019,11(15) : 4255.]

[22] Zhang Lin, Zhao Haitao. Do corporate environmental, social and corporate governance (ESG) performance affect corporate value? : Empirical research based on A-share listed enterprises [J]. Wuhan Finance,2019(10):36-43.

[23] Cheng Shi, Cao Haimin. An empirical study on social responsibility and financial performance: Based on empirical data of food industry [J]. Science and Management,20,40(1):102-109.

[24] KAO E H,YEH C C,WANG L H,et al.The relationship between CSR and performance:Evidence in China[J].Pacific-basin Finance Journal,2016,51:155-170.