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The relationship between ESG ratings and the performance of listed companies in China

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Abstract

ESG ratings refer to the investment philosophy and method of evaluating and screening companies from the three dimensions of environmental protection (Environment), social responsibility (Social) and corporate governance (Governance). To find out the relationship between the ESG rating and corporate performance, and further explore the moderating role of R&D expenditure in the relationship, and explore whether ESG has a different influence on enterprises of different nature, this paper collects financial data from A-share listed companies from 2018 to 2020. The results show that ESG rating has a significant positive impact on the company's financial performance. Further results show that with the increase of the company's R&D expenditure, the impact of ESG rating on the company's financial performance is gradually increasing. Besides, the analysis shows that the impact of ESG rating on the financial performance of non-state-owned enterprises is smaller than that of state-owned enterprises. Finally, this paper will provide recommendations on instructing companies on what measures they should take to improve their performance based on the above results. As the largest developing country, China has suffered from environmental and social problems in the process of achieving remarkable economic development achievements. China has the responsibility and

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obligation to participate in the solution of short-term issues and actively adapt to world development. In this context, the research in this article can help more people understand the ESG scoring system and green investment concepts, which enable the ESG system to enter the vision of more investors and company managers, thereby influencing China's investment structure and promoting economic structural transformation. Therefore, it is important to understand the impact of ESG on corporate performance.

JEL Classification: G31, G32

Keywords: ESG ratings, corporate performance, ownership, the concentration of equity

1. Introduction

In the modern investment environment, the environmental, social, and governance (ESG) factors have played an increasingly essential role in determining the performance and stock price of listed companies, as they directly lead to the sustainable development of the companies. Specifically, during the COVID-19 pandemic, the financial loss is lower for companies with higher ESG ratings than those with lower ESG ratings (Borovkova, 2020). In response, a growing number of companies are incorporating the ESG index in their annual reports, as required by local exchanges, and combining it with traditional expected earnings and volatility indices to provide investors with more accurate data on their portfolios and operating conditions. In China, the millennials and young customers pay increasing attention to ESG factors to determine whether the company is contributing to society apart from its primary business, especially during the COVID-19. However, some companies still believe that the only approach is to maximize the benefits and value of shareholders based on the shareholder theory. Therefore, it is necessary to identify and explore the dynamic relationship between the ESG rating and the corporate performance of listed companies in China to instruct companies on what measures they should take to improve their all-around performance.

Whereas a large number of companies have started to focus on ESG rating to enhance its level of company performance, most reports and research in the field were conducted before the year 2015, while there is exponential growth in the ESG rating and impact investing (Whelan and Clark, 2021). The COVID-19 crisis has brought a huge impact on the financial market, financial volatility has intensified, and stock prices have fallen sharply (Engelhardt et al., 2021). We cannot predict when this crisis will end. Therefore, it is necessary to study the impact of ESG ratings on company performance in this environment. Some research has shown that European

companies with better ESG ratings had higher cumulative abnormal returns in early 2020 (Engelhardt et al., 2021). However, there are few studies on the relationship between ESG ratings and the performance of Chinese listed companies in this environment. The lack of research in this field will lead to bias and give less information to Chinese companies, which tend to focus less on ESG and will lose market share and reputation compared to foreign companies and multinational brands.

By incorporating more Chinese companies into the model, this research narrows the time horizon into nearly a few years and selects several financial indexes and uses a fixed-effect model to study the relationship between the ESG rating and corporate performance. The data of the research contains two parts: first is the financial data of A-share listed companies, including Tobin's Q, company size, corporate leverage ratio, number of board members, R&D expenditure, liquidity ratio, earnings per share and shareholding ratio of top ten shareholders; second is the ESG score data of these companies. The results show that ESG rating has a significant positive effect on corporate performance, R&D expenditure has a moderating effect on the relationship between ESG and corporate performance, and ESG has a heterogeneous effect on companies of different nature.

This paper provides a particular reference for asset appraisers to evaluate the corporate value and provides a specific reference basis for market investors. In addition, this article can help companies recognize the impact of ESG on corporate value so as to attach importance to the company's business philosophy and pay attention to their sustainable development. In addition, it also helps regulators realize the importance of ESG indicators. Also, the listed companies in China would understand how to follow the relationship and what aspects they should focus on to gain loyalty and reputation, thus achieving better organizational performance.

2. Literature Review and Hypotheses Development

Hartzmark and Sussman (2019) have found that the ESG rating has been shown as a positive prediction of the performance in the future. In the conference¹, ESG rating are found has boosted the overall satisfaction of the bond market investors and, therefore, market price and reputation of brands. Trust can also promote positive relationships, including the research by Lins et al. (2017). They have researched the Chinese markets during the financial crisis and find that the stock returns of companies with high ESG ratings are averagely 4 percent to 7 percent higher than those with low ESG ratings. Their studies have found that trust is easily established among companies and capital market investors. Scrivens and Smith (2013) have used the term of social capital to highlight the value of ESG rating and CSR during the financial crisis. This reveals how Chinese investors view the impact of ESG on brand image and reputation, and how their attitudes towards company performance have changed (Liang and Renneboog, 2016).

Dimson et al. (2015) have researched the database about how companies are rated in their ESG fulfilment. They find that institutional investors with more social awareness are more likely to take part in the ESG rating. Since Chinese companies tend to have stronger capabilities in transforming their businesses and responding to the current challenges, they tend to achieve mutual collaboration with each other and enhance the success of environmental and social participation. Bebchuk et al. (2013) find that, as a consequence, these firms typically enjoy the increase in institutional ownership, improvement in governance and the increase in accounting performance. However, these points of view contradict with the research conducted by Krueger

¹ AFA 2020 SAN DIEGO MEETINGS was held on January 3 - 5, 2020 (Friday, Saturday, Sunday) in San Diego, CA. The headquarters hotel was the San Diego Marriott Marquis & Marina and the co-headquarters hotel was the Manchester Grand Hyatt.

et al. (2020), who find a low level of perceived overvaluation towards the climate risks. Some of the investors believe that withdrawal capital is a direct tool to respond to the ESG rating, so the relationship between ESG ratings and corporate performance may only be weakly correlated (Becker et al., 2011).

From a single perspective, a company's environmental performance is positively correlated with its value (Hu, 2012), and the current environmental management has a more significant effect on improving the financial value of the next year (Song et al., 2017). The good performance of the corporate environment can send a signal to the society, that is, good company performance and responsibility. This signal is conducive to enhancing investor confidence and raising expectations of the company's market performance, thereby positively affecting the company's value (Wu and Zhang, 2018). As for the relationship between social responsibility and corporate value, the research has reached different conclusions. Surroca et al. (2010) and Kim et al. (2014) found that corporate social responsibility can significantly enhance corporate value. In terms of the impact of corporate governance on company value, the existing research conclusions are basically the same, and the improvement of corporate governance helps to enhance the value of the company.

Although from the existing research, most scholars start from a single dimension to study the impact of corporate environmental performance, social responsibility performance and corporate governance level on corporate value. However, recently, some scholars have studied ESG as a whole. Scholars found that the higher the ESG rating, the better the performance of the company (Zhang and Zhao, 2019; He, 2020). The ESG performance of non-state-owned enterprises, non-polluting enterprises and small-scale enterprises has a more obvious positive impact on corporate value. And this impact is stable at every stage of the enterprise life cycle (He, 2020). Ghoul et al.

(2017) found that in regions with imperfect market systems, ESG performance has a significant positive correlation with corporate value. However, some scholars have put forward different conclusions. The study of Brammer and Pav-elin (2006) found that companies with better ESG performance have lower corporate value. Sassen et al. (2016) examined the impact of environmental, social and governance factors on European corporate risks, and found that companies with better ESG performance have lower corporate value.

Therefore, this paper proposes the following research hypothesis:

Hypothesis 1: ESG performance has a positive effect on corporate performance.

Xu et al. (2020) found that research and development investment can help to stimulate green innovation performance, which indicates that companies always have better green innovation performance if ESG ratings are high. Further research shows that ESG performance regulates the relationship between research and development investment and green innovation performance.

Hypothesis 2: Research and development expenditure plays a positive role in regulating ESG ratings and corporate performance.

According to the expectation theory, the higher the expectations of stakeholders on the company's ESG performance, the easier it is to respond positively to the company's ESG performance, and the easier it is to profit from the company's ESG performance. The intrinsic motivation of state-owned enterprises to fulfill their social responsibilities is to support national policies. Stakeholders are accustomed to the ESG performance of state-owned enterprises and have lowler expectations; non-state-owned enterprises pay more attention to survival and development, and stakeholders have higher expectations of ESG performance. Therefore, once a

non-state-owned enterprise has a better ESG, it is easier to get the attention and support of the market. Based the above discussion, this article proposes another hypotheses:

Hypothesis 3: Compared with state-owned enterprises, the improvement of ESG of non-state-owned enterprises has a greater positive impact on corporate value.

3. Data and Methodology

3.1 Data Sources

This article uses A-share listed companies on the Shanghai and Shenzhen stock exchanges from 2018 to 2020 as the initial sample and select ESG scoring gardes and industry classification data. The data of each listed company comes from the China Stock Market & Accounting Research (CSMAR) and Wind database. The sample data is processed as follows: first, remove companies with missing data during this period; second, remove ST companies; third, remove companies without ESG rating information. Finally, 6109 observations are obtained as the data basis for this analysis. The development of the ESG scoring system in China has been relatively slow. At present, the most effective scoring systems are the "SynTao Green Finance Listed Companies ESG Rating System" and the "Sustainable Development ESG Rating", both of which were released in 2015. ESG score is not only a "green" evaluation system, but also a comprehensive indicator that can have a complex impact on corporate earnings. Therefore, ESG is supported to explain the profitability of Chinese companies.

3.2 Variable Definition

Tobin's Q reflects investors' perceptions of the future of the company by estimating the comprehensive capabilities of the company's operations and profitability in the future. The profit expectation comprehensively reflects the evaluation of listed companies in the virtual economy and the real economy. It not only includes the performance created by the company in the past but also reflects the future performance and value of the company.

The ESG evaluation system of Huazheng is based on the core content and development experience of ESG, combined with the actual situation of the domestic market. It has established a three-level indicator system, involving a total of 9 AAA-C levels. This paper selects the China Securities ESG rating data from the wind information financial database to investigate the comprehensive performance of listed companies in the sample. For the nine grades of rating results given by Huazheng ESG, they are assigned according to AAA-C, involving AAA, AA, A, BBB, BB, B, CCC, CC, C. The order of the rating results is from high to low. The highest AAA level indicates a rating of 9, and so on, the lowest C level indicates a rating of 1.

Referring to the research of Ruan and Liu Friede (2021), Busch and Bassan (2015), and Brooks and Oikonomou (2018), this report will adopt number of board members, R&D expenditure, liquidity ratio and shareholding ratio of top ten shareholders as the control variables.

3.3 Model

$$TobinQ_{i,t} = \alpha + \beta_1 ESG_{i,t} + \sum \beta_k control_{i,t} + Firm Fixed Effects + Year Dummies + \varepsilon_{i,t} \quad (1)$$

Tobin's Q represents the performance of the company in the t period. ESG represents the rating of the company at the end of the t period. i represents a individual company, t represents a year, and Industry and Year are dummy variables. β_1 is the regression coefficient. Control represents control variables.

4. Results and Discussions

4.1 Descriptive statistics

Table 1 reports the descriptive statistical analysis results of corporate financial performance, ESG rating, company size, corporate leverage ratio, number of board members, R&D expenditure, liquidity ratio, earnings per share and shareholding ratio of top ten shareholders. According to the descriptive statistical analysis results of each variable in Table 1, the effective sample size of each variable was 6109. The table reports the mean, standard deviation, minimum and maximum values of these variables. Sample period is from January 2018 to December 2020.

4.2 Correlation results

Table 2 reports the results of the correlation analysis of variables. According to the correlation analysis results in Table 2, the correlation coefficient between ESG rating and corporate financial performance is -0.013, which preliminarily indicated that ESG rating may have no significant impact on the company's financial performance. In addition, company size, corporate leverage ratio and the number of board members may have a significant negative

impact on the company's financial performance; liquidity ratio may have a significant positive impact on the company's financial performance, and the company's R&D expenditure and the proportion of top ten shareholders may have no significant impact on the company's financial performance. However, the above analysis is only the preliminary results of correlation analysis. To investigate the causal relationship between ESG rating and corporate financial performance, the econometric model needs to be established later for further analysis and verification.

4.3 Regression results

Table 3 reports the estimated impact of ESG ratings on the company's financial performance. Column 1 of Table 3 reports the results without putting in any control variables. In the absence of any control variables, the estimated coefficient of the impact of ESG rating on corporate financial performance is 0.074, which is positively significant at a 1% significance level, indicating that ESG rating has a significant positive impact on corporate financial performance. Column 2 reports the estimated results of controlling variables such as company size, corporate leverage ratio, number of board members, R&D expenditure, liquidity ratio, earnings per share and the shareholding ratio of top ten shareholders. After controlling the control variables, the estimated coefficients of the impact of ESG rating on the company's financial performance is 0.088 respectively, which is still positively significant at the 1% significance level, further indicating that ESG rating has a significant positive impact on the company's financial performance, consistent with hypothesis 1.

In order to investigate whether R&D expenditure has a significant impact on ESG rating, this paper adds the interaction term between R&D expenditure and ESG rating. Table 4 reports the estimated results. The coefficient of the interaction term between R&D expenditure and ESG rating is 0.024, which is positively significant at the significance level of 5%, indicating that with

the increase of the company's R&D expenditure, the impact of ESG rating on the company's financial performance is gradually increasing. The result is consistent with hypothesis 2.

In order to investigate the heterogeneity of the impact of ESG rating on the financial performance of state-owned enterprises and non-state-owned enterprises, the heterogeneity analysis is conducted in Table 5. The results show that ESG rating has a significant positive impact on the financial performance of state-owned enterprises and non-state-owned enterprises. The estimated coefficient of the impact of ESG rating on the financial performance of non-state-owned enterprises is 0.084, and the estimated coefficient of the impact of ESG rating on the financial performance of state-owned enterprises is 0.127. The result indicates that the impact of ESG rating on the financial performance of non-state-owned enterprises is smaller than that of state-owned enterprises, which is the opposite of hypothesis 3.

4.4 Robustness check

In order to test the robustness of the above-estimated results, this paper conducted two robustness tests by replacing the control variable and altering the independent variable. Table 6 adds the quick ratio as another control variable. Table 7 alters the independent variable. The test defined another independent variable esgnd. If the ESG rating of a company is greater than the mean of ESG rating of all samples, the value is 1; otherwise, it is 0. According to the result, the estimated coefficients of the impact of ESG rating on the company's financial performance are 0.088 and 0.134, respectively. Both are positively significant at the 1% significance level, indicating that the above-estimated results are robust.

5. Conclusion

This paper takes the data of A-share listed companies from 2018 to 2020 as samples and adopts regression analysis to study the relationship between the ESG rating and the performance of listed companies in China. Research shows that ESG rating is significantly positively correlated with corporate performance, which means that with the improvement of ESG rating, corporate performance is significantly improved. Further research shows that R&D expenditure has a moderating effect on the relationship between ESG rating and corporate performance, meaning that the higher the expenditure on R&D, the more significant the impact of ESG rating on corporate performance. The research also found that ESG rating has a greater impact on the performance of state-owned enterprises than that of non-state-owned enterprises.

As the basic unit of economic and social operation, enterprises play an essential role in developing and transforming the economy and society. The topics covered by ESG are the practice of the green development concept in the new development concept. First, ESG can provide guiding principles for the development of enterprises in the three aspects of environment, society and governance; secondly, ESG can provide methods and indicators for evaluating the performance of enterprises in the three aspects of environment, society and governance. In order to enhance the competitiveness of listed companies' ESG ratings, this article puts forward the following three suggestions based on the research results.

First, the company should actively disclose and communicate in a manner recognized by the capital market and regularly understand the company's ESG rating results. Companies should establish a complete ESG management mechanism, standardize and clarify ESG management performance goals. If there is information that has apparent discrepancies from the facts, promptly communicate with the rating agency to correct it and predict the upward or downward

space of the company's rating results in the next few years to adjust the corporate governance plan.

Second, the company should implement the concept of green development and innovative development, encourage the application of green technology, research and develop energy-saving and environmentally-friendly technologies, and participate in the construction of a resource-saving and environment-friendly society. At the same time, companies should attach importance to innovative talents and increase R&D and the application of educational technology.

Finally, while pursuing profits, state-owned enterprises also need to consider national strategies and social interests. State-owned enterprises are characterized by high market value and large-scale, more prevalent in the market, and they bear primary social responsibilities. Therefore, state-owned enterprises should actively establish a green image, improve their sense of social responsibility and management capabilities, and win a better reputation. Under the background that A-shares are increasingly favored by the international capital market, Chinese listed companies should learn from global perspectives and combine local practices to improve their ESG risk and performance management capabilities.

References

- Bebchuk, L., Cohen, A., Wang, C.C. Y., 2013. Learning and the disappearing association between governance and returns. *Journal of Financial Economics* 108, 323–48.
- Becker, B., Cronqvist, H., Fahlenbrach, R., 2011. Estimating the effects of large shareholders using a geographic instrument. *Journal of Financial and Quantitative Analysis* 46, 907–42.
- Brammer, S., Pavelin, S., 2006. Voluntary Environmental Disclosures by Large UK Companies. *Journal of Business Finance and Accounting* 33, 1168-1188.
- Brav, A., Jiang, W., Partnoy, F., Thomas, R., 2008. Hedge fund activism, corporate governance, and firm performance. *Journal of Finance* 63, 1729–1775.
- Brooks, C., Oikonomou, I., 2018. The effects of environmental, social and governance disclosures and performance on firm value: A review of the literature in accounting and finance. *The British Accounting Review* 50, 1–15.
- Clark, C., Whelan, T., Atz, U., 2021. ESG and financial performance: Uncovering the relationship by aggregating evidence from 1,000 plus studies published between 2015–2020, NYU Stern Center for Sustainable Business and Rockefeller Asset Management.
- Dimson, E., Karakas, O., Li, X., 2015. Active Ownership. *The Studies of Financial Studies* 28, 3225–3268.
- Engelhardt, N., Ekkenga, J., Posch, P., 2021. ESG Ratings and Stock Performance during the COVID-19 Crisis. *Sustainability* 13, 7133.
- Friede, G., Busch, T., Bassen, A., 2015. ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment* 5, 210–233.
- Ghoul, S., Guedhami, O., Kim, Y., 2017. Country-Level Institutions, Firm Value, and the Role of Corporate Social Responsibility Initiatives. *Journal of International Business Studies* 48, 360–385.
- Hartzmark, S., Sussman, A., 2019. Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *Journal of Finance* 74, 2789–2837.
- He, L., 2020. Research on the Correlation between ESG and Enterprise Value Based on Enterprise Life Cycle. *Hefei University of Technology*.
- Hu, Q., 2012. Research on the Correlation between Environmental Performance and Financial Performance of Listed Companies. *China Population, Resources and Environment* 22, 23–32.
- Krueger, P., Sautner, Z., Starks, L., 2020. The Importance of Climate Risks for Institutional Investors. *The Journal of Financial Studies* 33, 1067–1111.
- Liang, H., Renneboog, L., 2016. On the Foundations of Corporate Social Responsibility. *The Journal of Finance* 72, 853–910.

- Lins, K., Servaes, H., Tamayo, A., 2017. Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *The Journal of Finance* 72, 1785–1824.
- Preliminary Program, 2020, AFA 2020 SAN DIEGO MEETINGS EIGHTIETH ANNUAL MEETING AMERICAN FINANCE ASSOCIATION San Diego, California. *The Journal of Finance*, 74: 3262–3317.
- Ruan, L., Liu, H., 2021. Environmental, Social, Governance Activities and Firm Performance: Evidence from China. *Sustainability* 13, 767.
- Sassen, R., Hinze, A. K., Hardeck, I., 2016. Impact of ESG Factors on Firm Risk in Europe. *Journal of Business Economics* 86, 867–904.
- Scrivens, K., Smith, C., 2013. "Four Interpretations of Social Capital: An Agenda for Measurement", OECD Statistics Working Papers
- Song, H., Zhao, C., Zeng, J., 2017. Can Environmental Management Improve Financial Performance: An Empirical Study of A-Shares Listed Companies in China. *Journal of Cleaner Production* 141, 1051–1056.
- Surroca, J., Tribo, J. A., Waddock, S., 2010. Corporate Responsibility and Financial Performance: The Role of Intangible Resources. *Strategic Management Journal* 31, 463–490.
- Wu, M., Zhang, L., 2018. Study on the characteristics of the senior management team, environmental responsibility and corporate value. *East China Economic Management*, 122–129.
- Xu, J., Liu, F., Shang, Y. 2020. R&D investment, ESG performance and green innovation performance: evidence from China. *Kybernetes*.
- Zhang, L., Zhao, H., 2019. Does corporate environmental, social and corporate governance (ESG) performance affect corporate value?—An empirical study based on A-share listed companies. *Wuhan Finance*, 36–43.

Table 1: Descriptive Statistics

The table reports the descriptive statistical analysis results of corporate financial performance (*TobinQA*), ESG rating (*esgn*), company size (*size*), corporate leverage ratio (*lev*), number of board members (*boardnum*), R&D expenditure (*lnrd*), liquidity ratio (*lr*), earnings per share (*eps*) and shareholding ratio of top ten shareholders (*ttr*). According to the descriptive statistical analysis results of each variable in Table 1, the effective sample size of each variable was 6109. The table reports the mean, standard deviation, minimum and maximum values of these variables. Sample period is from January 2018 to December 2020.

Variables	Obs	Mean	Std. Dev.	Min	Max
<i>tobinqa</i>	6,109	1.851	2.057	0.0409	33.230
<i>esgn</i>	6,109	6.381	1.244	1.000	9.000
<i>size</i>	6,109	22.500	1.347	19.130	28.640
<i>lev</i>	6,109	0.429	0.193	0.0289	1.123
<i>boardnum</i>	6,109	8.387	1.673	0	17.000
<i>lnrd</i>	6,109	18.270	1.734	0	24.090
<i>lr</i>	6,109	2.297	2.296	0.110	39.450
<i>eps</i>	6,109	0.455	1.240	-7.671	37.170
<i>ttr</i>	6,109	60.310	15.890	8.780	100.000

Table 2: Correlations

Table 2 reports the correlation analysis results. *tobinqa* represents corporate financial performance, *esgn* represents the ESG rating, *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share and *ttr* represents the shareholding ratio of top ten shareholders. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

Variables	tobinqa	esgn	size	lev	boardnum	lnrd	lr	eps	ttr
<i>tobinqa</i>	1								
<i>esgn</i>	-0.013	1							
<i>size</i>	-0.320***	0.375***	1						
<i>lev</i>	-0.403***	0.042***	0.496***	1					
<i>boardnum</i>	-0.116***	0.150***	0.294***	0.136***	1				
<i>lnrd</i>	-0.006	0.176***	0.452***	0.134***	0.099***	1			
<i>lr</i>	0.376***	-0.014	-0.312***	-0.623***	-0.107***	-0.113***	1		
<i>eps</i>	0.266***	0.163***	0.138***	-0.151***	-0.007	0.116***	0.125***	1	
<i>ttr</i>	-0.007	0.008	-0.018	-0.005	-0.003	0.009	-0.033***	-0.025*	1

Table 3: Main Regression Results

Table 3 reports the regression results of the impact of ESG ratings on the company's financial performance. *esgn* represents the ESG rating, *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share and *ttr* represents the shareholding ratio of top ten shareholders. The first column shows the results without adding control variables. The third column shows the result after adjusting all remaining control variables such as R&D spending, liquidity ratio, and ownership of the top 10 shareholders. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

	tobinq	tobinq
<i>esgn</i>	0.074*** (3.065)	0.088*** (3.690)
<i>size</i>		-0.378*** (-4.737)
<i>lev</i>		-1.486*** (-5.225)
<i>boardnum</i>		0.014 (0.573)
<i>lnrd</i>		-0.002 (-0.096)
<i>lr</i>		-0.025 (-1.330)
<i>eps</i>		0.230*** (8.847)
<i>ttr</i>		-0.004 (-1.067)
firm fixed effect	Yes	Yes
year fixed effect	Yes	Yes
<i>constant</i>	1.069*** (6.746)	10.184*** (5.990)
<i>Observations</i>	6109	6109
<i>R-squared</i>	0.069	0.110

Table 4: Main Regression Results

Table 4 reports the estimated impact of R&D spending on ESG ratings. *esgn* represents the ESG rating, *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share, *ttr* represents the shareholding ratio of top ten shareholders and *lnrd-esgn* represents an interaction item added between R&D expenditure and ESG rating. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

	tobinqa
<i>esgn</i>	-0.357 (-1.596)
<i>size</i>	-0.361*** (-4.487)
<i>lev</i>	-1.458*** (-5.124)
<i>boardnum</i>	0.014 (0.571)
<i>lnrd</i>	-0.165* (-1.946)
<i>lr</i>	-0.025 (-1.300)
<i>eps</i>	0.228*** (8.776)
<i>ttr</i>	-0.004 (-1.088)
<i>lnrd*esgn</i>	0.024** (2.002)
firm fixed effect	Yes
year fixed effect	Yes
<i>constant</i>	12.750*** (5.990)
<i>Observations</i>	6109
<i>R-squared</i>	0.111

Table 5: Heterogeneity Test

Table 5 reports the heterogeneity of the impact of ESG ratings on the financial performance of soes and non-soes. *esgn* represents the ESG rating, *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share and *ttr* represents the shareholding ratio of top ten shareholders. The first column reports the impact of ESG rating on the financial performance of non-state-owned enterprises, and the second column reports the impact of ESG rating on the financial performance of state-owned enterprises. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

	tobinq Non state-owned	tobinq State-owned
<i>esgn</i>	0.084*** (3.048)	0.127*** (2.612)
<i>size</i>	-0.402*** (-4.354)	-0.351** (-2.122)
<i>lev</i>	-1.994*** (-6.122)	0.947 (1.546)
<i>boardnum</i>	0.021 (0.681)	-0.008 (-0.199)
<i>lnrd</i>	0.007 (0.239)	0.007 (0.179)
<i>lr</i>	-0.045** (-2.251)	0.220*** (3.439)
<i>eps</i>	0.200*** (6.803)	0.379*** (6.631)
<i>ttr</i>	-0.006 (-1.621)	0.006 (1.006)
firm fixed effect	Yes	Yes
year fixed effect	Yes	Yes
<i>constant</i>	10.996*** (5.701)	6.841* (1.846)
<i>Observations</i>	4466	1643
<i>R-squared</i>	0.123	0.107

Table 6: Additional Control Variable

Table 6 is the first robustness test. The test adds the quick ratio as another control variable. *esgn* represents the ESG rating, *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share, *ttr* represents the shareholding ratio of the top ten shareholders and *sdr* represents the quick ratio. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

	tobinq
<i>esgn</i>	0.088*** (3.671)
<i>size</i>	-0.376*** (-4.695)
<i>lev</i>	-1.465*** (-5.123)
<i>boardnum</i>	0.014 (0.575)
<i>lnrd</i>	-0.002 (-0.081)
<i>lr</i>	0.044 (0.416)
<i>eps</i>	0.230*** (8.841)
<i>ttr</i>	-0.004 (-1.070)
<i>sdr</i>	-0.074 (-0.667)
firm fixed effect	Yes
year fixed effect	Yes
<i>constant</i>	10.088*** (5.912)
<i>Observations</i>	6109
<i>R-squared</i>	0.110

Table 7: Alternative Independent Variable

Table 7 is the second robustness test. The test defined another independent variable *esgnd*. If ESG of a company is greater than the mean of ESG of all samples, the value is 1; otherwise, it is 0. The test changes the independent variable from *esgn* into *esgnd*. *size* represents the size of the company, *lev* represents the corporate leverage ratio, *boardnum* represents the number of board members, *lnrd* represents the research and development expenditure, *lr* represents the liquidity ration, *eps* represents earnings per share, *ttr* represents the shareholding ratio of the top ten shareholders. *- stat. sign. at 10% level; **- stat. sign. at 5% level; ***- stat. sign. at 1% level. Sample period is from January 2018 to December 2020.

	tobinq
<i>esgnd</i>	0.134*** (2.451)
<i>size</i>	-0.350*** (-4.408)
<i>lev</i>	-1.543*** (-5.433)
<i>boardnum</i>	0.017 (0.677)
<i>lnrd</i>	-0.000 (-0.013)
<i>lr</i>	-0.025 (-1.320)
<i>eps</i>	0.226*** (8.683)
<i>ttr</i>	-0.004 (-1.147)
firm fixed effect	Yes
year fixed effect	Yes
<i>constant</i>	10.045*** (5.903)
<i>Observations</i>	6109
<i>R-squared</i>	0.108