

# ESG Performance and Corporate Risk under Different Dimensions

## —An Empirical Study Based on A-share Listed Companies

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**Abstract.** The study empirically examines the impact of corporate ESG performance on corporate risk based on 4,829 listed companies in A-shares from 2009 to 2022. The results of the study show that enhancing corporate ESG performance can significantly reduce corporate risk. Heterogeneity analysis shows that compared with state-owned enterprises, non-state-owned enterprises' ESG performance has a more significant effect on corporate risk reduction. Further analysis reveals that the risk reduction effect of ESG mainly originates from the corporate governance dimension, the risk reduction effect of ESG mainly originates from corporate governance G, and the reduction effect of social responsibility S and environmental responsibility E on corporate risk is slightly lower than the former.

**Keywords:** ESG performance, Enterprise risk, Information transparency, Agency cost

## 1 Introduction

Among the three dimensions of ESG, there are two opposing schools of thought on how corporate environmental responsibility performance (E) and social responsibility performance (S) affect corporate risk: on the one hand, stakeholder-based and resource-based doctrines argue that corporate proactive commitment to environmental and social responsibility is conducive to reducing the potential dangers to the firm (Freeman, 1984)[1]. Meanwhile, proponents of the resource dependence theory emphasize that firms must absorb a variety of external resources in order to survive and grow (Pfeffer and Salancik, 1978)[2]. On the other hand, both trade-off and agency theories suggest that firms will increase the risk of the company when they take on environmental and social responsibilities. (Lee and Faff, 2009)[3].

Several literatures have examined the influence of individual levels of ESG on company risk, where there is basically no controversy about good corporate governance helping to reduce firm risk (Lee and Yeh, 2004)[4], but there is greater disagreement about the relationship between environmental and social responsibility and company risk. Orlitzky and Benjamin (2001)[5] conducted a sample of 18 U.S. firms conducted a meta-analysis, which showed that a firm's proactive commitment to social responsibility significantly reduces a firm's financial

risk. Most of the subsequent studies have found that good environmental or social responsibility performance helps to reduce corporate risk (Cai et al, 2016)[6].

In summary, this paper examines the impact of environmental responsibility, social responsibility and corporate governance on company risk and how the risk reduction effect of ESG depends on the nature of corporate property rights, and provides more targeted suggestions for improving the risk reduction effect of ESG.

## 2 Theoretical analysis and research hypotheses

Based on the tradeoff theory, in the case of resource limitation, enterprises should weigh the resource allocation among different economic and social activities. Although an enterprise's participation in various social welfare activities can improve its business performance, it will also increase its operating costs and occupy its resources, resulting in the loss of investments with more profitable potential (Salama et al. 2011)[7]. In addition, when the demands of enterprises and stakeholders conflict, enterprises may need to sacrifice their own interests in order to maintain a good social image.

Based on the principal-agent theory, first of all, in order to enhance personal reputation and social influence, managers will over-invest in social responsibility, resulting in waste of resources and affecting the development of enterprises' main business (Altman, 1968)[8]. Second, executives may gain more support by catering to stakeholders, thereby increasing their power and reducing the constraints of supervision(Albuquerque et al, 2019)[9]. Finally, social responsibility can become a means for executives to conceal corporate misconduct. Executives can use charitable donations to build a good image for their companies and divert public attention from issues such as earnings management and financial distress. In short, social responsibility may become a tool to satisfy the personal interests of senior executives, which wastes valuable resources of enterprises, covers up the problems existing in enterprises, and ultimately leads to the adverse consequences of increasing corporate risks.

Therefore, this paper proposes hypothesis H1: The better ESG performance, the higher the enterprise risk.

## 3 Empirical Research Design

### 3.1 Modeling and variable definition

So as to test the influence of ESG performance on enterprise risk, this paper uses ordinary least square method and combines Zscore model and KMV model to construct the following models respectively:

$$Zscore_{i,t} = \alpha + \beta ESG_{i,t-1} + \vec{\gamma} \vec{X}_{i,t-1} + \sum ind + \sum year + \varepsilon_{i,t} \quad (1)$$

$$DD_{i,t} = \alpha + \beta ESG_{i,t-1} + \vec{\gamma} \vec{X}_{i,t-1} + \sum ind + \sum year + \varepsilon_{i,t} \quad (2)$$

In terms of explained variables, on the one hand, based on Altman (2002), the revised Zscore is used to calculate the company's risk. Revised Zscore= (0.717× working capital +0.847× retained earnings +3.107× EBIT +0.998× sales revenue)/(total assets +0.42× book value of shares/total liabilities), the greater the value, the lower the company's financial risk. On the

other hand, the credit risk of listed companies is reflected based on the KMV model. DD represents the default distance between the asset value of listed companies and the debt value, where  $DD = (\text{asset value} - \text{short-term liabilities} - 0.5 \times \text{long-term liabilities}) / (\text{asset value} \times \text{asset value volatility})$ . The higher the value, the lower the risk of corporate default.

In terms of core explanatory variables, on the one hand, based on the Huazheng's ESG rating score, the ESG performance of enterprises is measured, which is consistent with Xi Longsheng and Zhao Hui (2022)[10], and the ESG rating of China Securities Securities is converted into numerical form: The value is 1 when the rating is the lowest level C, and then 1 is added for each step up in the rating, such as 3 for CCC, 6 for BBB, and 9 for AAA. On the other hand, the ESG comprehensive score based on Wind calculates the ESG performance of enterprises.

For control variables, this paper adds firm size SIZE, which is the natural logarithm of total assets; leverage LEV, which is the ratio of total liabilities to total assets; corporate growth GR, which is the growth rate of corporate revenue from main business; and operating cash flow CF, which is the ratio of the net cash flow generated from operating activities in the current period to total assets at the beginning of the period; Tangible Assets to Total Assets TANG, the sum of fixed assets and inventories as a percentage of total assets; and the nature of equity SOE, which is taken as 1 if it is a state-owned enterprise, and 0 otherwise. Meanwhile, the benchmark model also controls for industry fixed effects and year fixed effects. To avoid the influence of firm-level aggregation effects on the standard errors, the regression is clustered at the firm dimension.

### 3.2 Data Source and Sample Selection

This study selects A-share listed companies from 2009 to 2022 as the primary research sample, and excludes the samples according to the following criteria: ①ignoring the companies in the financial and real estate industries; ②Eliminate the T-class listed companies with ST or ST\* status, which is an unbalanced panel data with N=4829 cross sections and T=13 time span. In terms of data sources, except for ESG rating from China Securities ESG Rating Database, other variables are from CSMAR database.

## 4 Analysis of empirical results

With the ESG rating score of Huazheng as the explained variable, the regression results obtained according to Zscore model and KMV model are shown in columns (1) and (2) of Table 1. The better ESG performance, the lower the company's risk. In order to further test the robustness of the results, Wind's ESG rating score is taken as the explained variable. As shown in columns (3) and (4) in Table 1 of the regression results obtained by Zscore model and KMV model, the better ESG performance is, the risk of the company can also be reduced.

**Table 1.** Sub-sample regression results

Huazheng's ESG rating score		Wind's ESG rating score	
(1)	(2)	(3)	(4)
Zscore model	KMV model	Zscore model	KMV model

ESG <sub>i,t-1</sub>	0.050*** (5.43)	0.037*** (2.80)	0.040*** (4.23)	0.041** (2.24)
SIZE <sub>i,t-1</sub>	0.024** (2.00)	-0.045*** (-3.40)	-0.017* (-1.72)	0.029 (1.08)
LEV <sub>i,t-1</sub>	-0.591*** (-9.17)	-0.048 (-0.47)	-0.213*** (-3.31)	-0.611*** (-4.32)
GR <sub>i,t-1</sub>	-0.084*** (-4.82)	-0.044** (-2.45)	-0.065*** (-4.24)	-0.149*** (-4.70)
ROE <sub>i,t-1</sub>	0.321* (1.94)	0.467*** (2.89)	0.614*** (3.61)	1.592*** (6.94)
CF <sub>i,t-1</sub>	2.261*** (14.63)	1.035*** (6.46)	1.644*** (12.33)	1.098*** (4.70)
TANG <sub>i,t-1</sub>	-0.057 (-0.81)	-0.257*** (-2.89)	-0.219*** (-3.23)	-0.035 (-0.23)
SOE <sub>i,t</sub>	0.046* (1.72)	0.002 (0.07)	-0.001 (-0.04)	0.110* (1.96)
Industry fixed effects	YES	YES	YES	YES
Time fixed effects	YES	YES	YES	YES
Observations	20797	20797	20797	20797

## 5 In-depth analysis

### 5.1 The influence of ESG on corporate risk: how does it differ between SOEs and non-SOEs?

Because of the different motivations of enterprises with different property rights to improve ESG performance, the resulting risk effects will also be different. Under different ownership forms, non-state-owned enterprises give priority to the demands of stakeholders who provide key resources, while state-owned enterprises are more inclined to make ESG practices in response to the country's call for social responsibility. As a result, soes face greater public pressure and social expectations when it comes to ESG performance than non-soes.

To sum up, this paper expects that ESG performance of state-owned enterprises has less influence on firm risk. On account of that property rights have the characteristics of grouping variables, two methods of grouping regression and interaction regression are used to test the property rights. As shown in Table 2, the results of grouping regression are reported in columns (1) and (2). The results reveal that, compared with the sample of non-state-owned enterprises (SOE=0), the regression coefficient of ESG in the sample of state-owned enterprises (SOE=1) is not significant. The results of cross-term regression are listed in column (3), and the cross-term of ESG and state-owned enterprise dummy variables is significantly negative at the 10% statistical level. The regression results show that ESG performance of non-state-owned enterprises has a more significant influence on risk than that of state-owned enterprises.

**Table 2.** Influence of ESG on company risk: heterogeneity in the nature of firms' property rights

	(1) SOE=1	(2) SOE=0	(3) Full sample
ESG <sub>i,t-1</sub>	0.011 (0.84)	0.063*** (7.07)	0.055*** (6.01)
SOE <sub>i,t</sub> ×ESG <sub>i,t-1</sub>			-0.026* (-1.69)
SOE <sub>i,t</sub>			0.137* (1.95)
SIZE <sub>i,t-1</sub>	0.008 (0.55)	-0.016 (-1.43)	-0.005 (-0.49)
LEV <sub>i,t-1</sub>	-0.574*** (-5.95)	-0.293*** (-4.52)	-0.373*** (-6.64)
GR <sub>i,t-1</sub>	-0.071*** (-3.50)	-0.063*** (-4.11)	-0.067*** (-5.14)
ROE <sub>i,t-1</sub>	0.876** (2.11)	0.306** (2.26)	0.363** (2.41)
CF <sub>i,t-1</sub>	1.321*** (5.68)	1.949*** (14.30)	1.802*** (14.68)
TANG <sub>i,t-1</sub>	-0.177* (-1.68)	-0.092 (-1.48)	-0.157*** (-2.78)
Individual fixed effects	YES	YES	YES
Time fixed effects	YES	YES	YES
Observations	7308	13489	20797

## 5.2 The influence of ESG on enterprise risk: what are the differences among the three dimensions E, S and G?

The ESG rating covers the scores of the three parts of the rating, namely, the environmental rating, the social rating and the governance rating. The regression results with E, S and G as the key explanatory variables are listed in columns (1)-(3) of Table 3. In general, the results show that the coefficients of the three sub-indexes are significantly positive at 1% level. In terms of intersection, the coefficient of corporate governance score is the largest, which is 0.038; The coefficient of social responsibility score is 0.020; The coefficient of environmental responsibility score was the smallest, 0.019. In column (4), we further listed the regression results of adding E, S and G subitems as explanatory variables at the same time, in which only S and G coefficients were positive at the 1% significant level, while E coefficients were not significant.

To sum up, the corporate governance dimension has the largest effect on reducing enterprise risk, while the social responsibility level and the environmental responsibility level have a smaller effect on reducing corporate risk. Salama (2011) made use of the data of 5,716 enterprises around the world to show that social performance is negatively correlated with company risk, but environmental performance has no impact on enterprise risk, which is consistent with the conclusion of this study.

**Table 3.** Influence of E, S, and G on business risk

	(1)	(2)	(3)	(4)
$E_{i,t-1}$	0.020*** (2.96)			0.011 (1.53)
$S_{i,t-1}$		0.019*** (4.07)		0.014*** (3.02)
$G_{i,t-1}$			0.038*** (6.14)	0.035*** (5.73)
$SIZE_{i,t-1}$	-0.000 (-0.01)	-0.001 (-0.07)	-0.001 (-0.12)	-0.006 (-0.68)
$LEV_{i,t-1}$	-0.418*** (-7.37)	-0.415*** (-7.34)	-0.334*** (-5.80)	-0.343*** (-5.93)
$GR_{i,t-1}$	-0.066*** (-5.02)	-0.067*** (-5.11)	-0.064*** (-4.91)	-0.065*** (-5.01)
$ROE_{i,t-1}$	0.375** (2.42)	0.370** (2.42)	0.364** (2.41)	0.360** (2.40)
$CF_{i,t-1}$	1.827*** (14.64)	1.818*** (14.67)	1.802*** (14.63)	1.793*** (14.67)
$TANG_{i,t-1}$	-0.160*** (-2.84)	-0.153*** (-2.72)	-0.150*** (-2.66)	-0.150*** (-2.65)
$SOE_{i,t}$	0.030 (1.39)	0.035 (1.61)	0.016 (0.74)	0.022 (0.99)
Individual fixed effects	YES	YES	YES	YES
Time fixed effects	YES	YES	YES	YES
Observations	20797	20797	20797	20797

## 6 Conclusion and Implications

This paper selected 4829 A-share listed enterprises from 2009 to 2022 to study the influence of ESG performance on corporate risk based on different dimensions. It is found that good ESG performance is of obvious significance to reduce company risk. Heterogeneity analysis shows that, compared with state-owned enterprises, ESG performance of state-owned enterprises with the main purpose of profit is more effective in reducing corporate risk. In addition, by examining the impact of environment, social and governance on company risk, it is found that the risk reduction effect of ESG is mainly from corporate governance G, while the reduction effect of social responsibility S and environmental responsibility E on corporate risk is slightly lower than that of the former.

Although environmental performance has not had a significant influence on enterprise risk, it may be related to the extensive growth mode in the initial stage of economic development, and enterprises can temporarily sacrifice the ecological environment for survival and development

without being severely punished by public opinion or law. With the pursuit of high-quality economic development, the government will pay more and more attention to the construction of ecological civilization, environmental standards and law enforcement will become increasingly strict, and enterprises must pay attention to environmental protection and improve environmental performance in the development process.

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