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EXAMINING THE EFFECTS OF AND MODERATING INFLUENCES ON ENVIRONMENTAL, SOCIAL AND GOVERNANCE INFORMATION DISCLOSURE ON VALUE-AT-RISK: EVIDENCE FROM CHINESE LISTED COMPANIES

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ABSTRACT

Generally, research on the effects of Environmental, Social and Governance (ESG) information disclosure on listed companies is primarily limited to developed countries. By contrast, the current study is located in China and analyses whether ESG reduces the downside risk of listed companies in China, and whether political connections and institutional investors moderate this relationship. This study uses Chinese A-share listed companies from the Shanghai and Shenzhen stock markets from 2010 to 2021 as research samples. Results demonstrated that the inhibitory effect of enhancing ESG performance on enterprise risk is more significant in non-heavy polluting industries, non-state-owned enterprises, and enterprises in areas with low levels of marketisation. This study explores the economic implications of ESG performance from a Value-at-Risk (VaR) perspective, enriching the relevant research on ESG rating in China and providing a fresh perspective to better elucidate the economic significance of companies improving their ESG performance. This study introduces institutional investors and political connections as two moderating variables to analyse their effect on the relationship between ESG performance and VaR. In addition, heterogeneity analysis is carried out in combination with the industry, region, and ownership nature of listed companies to test the "insurance" and

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"information" effects of ESG performance, to provide decision-making references for investors, enterprise managers, and regulators.

Keywords: ESG, VaR, institutional investors, political connections, IV-GMM

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1. INTRODUCTION

With soaring societal pressures resulting from an increase in the global population and onset of climate change, sustainable development has become a major issue in political, social, and business activities (Vagin, Kostyukova, Spiridonova & Vorozheykina, 2022). ESG is a sustainable development concept that pays attention to non-financial factors such as corporate environmental responsibility, social responsibility and corporate governance rather than focusing solely on financial factors (Yuan, Li, Xu, & Shang., 2022). ESG was first proposed by the United Nations in 2004 and has attracted increasing attention from many international organizations and investment institutions (Broadstock, Chan, Cheng & Wang, 2021). Enterprises are paying more and more attention to the principles and performance of social responsibility, and ESG performance has become one of the important standards for measuring enterprise performance. As such, the Chinese government has set targets for developing a green economy and has played a leading role in responding to the Paris Agreement by a commitment to achieve net zero carbon emission by 2050 (Shi, Zheng, Lei, Xue, Yan, Liu & Wang, 2021). In this context, listed companies are also actively implementing ESG, and setting a good example in green development, social justice and effective governance in China (Yuan *et al.*, 2022).

At present, scholars mainly focus on the impact of ESG performance on corporate performance, corporate value and the stock market, and there is relatively little research on corporate risk (Broadstock *et al.*, 2021; Kanamura, 2020; Reber, Gold & Gold, 2022). With regard to the relationship between ESG and corporate risks such as VaR, there is limited research on this specific area in China (Broadstock *et al*.,2021; Zheng, Cen, Lin & Hsiao, 2021). As an emerging market, China's political economy is significantly different from other countries and regions. Variables at

different levels of listed companies and theories are often studied separately, lacking integrated research at different levels. Hence, there is a need to ensure that research on ESG and corporate risk in China is more comprehensive. This study aims to address this gap by conducting in depth research on ESG, which is still in the stage of voluntary disclosure in China. For this purpose, this study examines the influence of ESG performance on VaR using the ESG scores of Chinese publicly listed companies from 2010 to 2021. The effects of ESG on VaR and the moderating effects of institutional investors and political connections are also investigated. This study studies the heterogeneous effect of ESG performance on VaR with different characteristics. We establish an integrated research model for the governance of listed companies in China at different levels to enhance innovation and originality and solve the one-sidedness of different theoretical explanations. This study expands the research perspective of the company's ESG performance and enriches the research on the economic consequences of the company's ESG performance. It not only helps to clarify the relationship between ESG practice and VaR of listed companies in China, but also has certain theoretical value and practical significance for how to standardize ESG information disclosure guidelines in the capital market. This study may facilitate the advancement of ESG practice by promoting its comprehensive growth. Our results have policy implications for the development of Chinese pubic-listed companies especially for the managers and investors.

2. LITERATURE REVIEW

2.1 ESG and VaR

Resource Dependence Theory emphasises that companies need various resources from the external environment for their continued existence and growth (Pfeffer & Salancik, 1978). The survival and development of companies are intricately linked to their resource dependence on various parties to improve their management and financial performance (Freeman, 2009; Tanggamani, Amran & Ramayah, 2022). Companies with dynamic skills can successfully use ESG benefits in their financial risk management by combining ESG strengths with other business strategies (Teece & Shuen, 1997). According to Stakeholder Theory, ESG performance of companies serves as an “information effect” about their ESG rating (Díaz, Ibrushi & Zhao, 2021). The information that companies transmit to the capital market in their ESG reports includes some key aspects which will be explained in the following section. From the perspective of the environment, companies

can disclose their own efforts in pollution prevention and control, environmental management as well as green developments to transmit signals that they are complying with sustainable development. From the perspective of society, companies communicate their willingness to assume social responsibility for the protection of employee rights and interests, consumer protection, community public welfare, and safe operations. From the perspective of corporate governance, companies can disclose their strategic objectives, business positioning, governance level, and other corporate information. All of this non-financial information is transmitted to the capital market via the ESG report. By disclosing their ESG performance, companies can present their non-financial information and increase their acceptability to the market, encourage investors to take corresponding investment actions, which can help enhance the value creation capacity of businesses and mitigate their downside risks (Boubaker, Cellier, Manita & Saeed, 2020).

Moreover, effective ESG performance facilitates the accumulation of moral and reputational capital, which may have an "insurance effect" (Reber *et al.*, 2022), which can assist businesses to better withstand external shocks. Companies with good social performance create a steady relationship of collaboration and trust with their stakeholders, and can thus receive assistance during times of difficulty (Lins, Servaes and Tamayo, 2017). Additionally, the "insurance effect" of ESG may reduce the losses sustained by companies as a result of calamities, as a firm's strong ESG performance as well as favorable brand image may lead to a greater level of public tolerance for its business. When unfavorable business news occurs, the company's stakeholders are more likely to attribute these incidents as malevolent acts which are outside the firm's control (Bouguerra, Hughes, Cakir & Tatoglu, 2023). Therefore, the company will not suffer heavy penalties, giving it the chance and time to resolve its problems and avoid suffering enormous economic losses (Braune, Charosky & Hikkerova, 2019).

In summary, sum, the company's performance in the areas of ESG contributes to mitigating various risks, establishing a sustainable business model, and garnering support from stakeholders. Implementing this sustainable business model may provide organizations with a more secure foundation during periods of heightened market volatility and uncertainty, therefore mitigating downside risks. As such, this study proposes the following hypothesis:

H_1: ESG has a significant negative relationship with VaR among Chinese listed companies.

2.2 Moderating effects of institutional investors on ESG and VaR

Institutional investors have strong information processing ability, can effectively monitor the behavior of company management, and influence the decision-making through their advantages in resources and expertise (Duppati, Kijkasiwat, Hunjra & Liew, 2023; Hutchinson, Seamer and Chapple, 2015). In comparison with individual investors, institutional investors are characterised by specialised investment management and portfolio structures. Theoretically, their investments are more rational and professional, which can promote a healthy and stable development of the securities market (Bernile, Sulaeman & Wang, 2015). Resource Dependence Theory (Pfeffer & Salancik, 1978) claims that companies must maintain good relationships with stakeholders to obtain the resources needed for long-term development. However, the ownership structure of listed companies in China and the specific characteristics of their institutional investors are relatively different from other countries (Huang, Tsai, Weng & Wu, 2020). Institutional investors who focus on short-term interests may lead to short-sighted investment decisions by company management (Klettner, 2021). Principal-agent theory suggests that the short-term behavior of institutional investors may be influenced by the interaction between shareholders and company agents. Institutional investors, being shareholders, may face pressure to prioritize short-term gains. This may cause agents to prioritize short-term success above the long-term sustainability of the company (Velte & Obermann, 2021). In recent years the number of institutional investors in China has increased. However, various kinds of institutional investors may have diverse perspectives on ESG information disclosure owing to their different target preferences, sources of capital, behavioural patterns, and company features. Therefore, to examine the influence of institutional investors on ESG disclosure based upon their aggregate ownership samples may not be appropriate, and can inaccurately reflect the contribution of each type of institutional investor (Aluchna, Roszkowska-Menkes, Kamiński & Bosek-Rak, 2022). Given the actual or possible conflict of interest, institutional investors who have or intend to have commercial relationships with corporate executives can diminish their independence. Hence, they typically assume a moderate or supportive stance towards firm decision-making, and may even seek higher returns by cooperating with corporate insiders, thereby weakening the supervisory role of institutional investors (Chaudhary, 2021). Only those with corporate investment ties are motivated to participate in corporate governance (Dyck, Lins, Roth & Wagner, 2019). Overall, Chinese institutional investors provide incentives to engage in riskier activities, thereby raising their VaR. Correspondingly, this study

proposes the following hypothesis:

H_2: Institutional investors significantly and positively moderate the relationship between ESG and VaR among Chinese listed companies.

2.3 Moderating effects of political connections on ESG and VaR

Political connections refer to a firm's major shareholders or executives who are friends of the government members of parliament, local officials, or other government leaders (Faccio, 2006). According to Resource Dependence Theory, companies often encounter many uncertainties in obtaining their resources (Pfeffer & Salancik, 1978). When the government has the ability to directly allocate resources to a company, companies actively pursue political connections and work aggressively to satisfy government requirements (Deng, Wu & Xu, 2020). Institutional theory explores the relationship between companies and society, and proposes that the companies are affected by a wide range of external social structures, including public or private rules, non-governmental organisations, and other institutions which supervise corporate activities (Pan, Chen, Sinha & Dong, 2020). Baldini, Maso, Liberatore, Mazzi and Terzani (2018) explored the effect of national systems at the political, labor, and cultural levels on ESG information disclosure. At the political system level, the strength and degree of connection of national legal frameworks typically affect ESG information disclosure. In countries with strong legal frameworks, due to fewer instances of the asymmetry phenomenon, companies possess a greater willingness to disclose ESG, and their efforts to provide information outside of laws and regulations are relatively small, while political connections make less of an impact. In emerging markets with incomplete legal frameworks, the phenomenon of information asymmetry is more pronounced, and political connections yield more benefits (Madhav, 2022). The present study suggests that the influence of ESG on corporate downside risk weakens as the level of political connections increases (Fan, 2021; Pan *et al.*, 2020; Qian & Chen, 2021). The reasons are as follows. First, despite the possibility of acquiring political resources, keeping a strong connection with the government may also increase non-productive expenditures. In areas where the government is highly connected, companies need to take the initiative to bear certain social burdens or help the government achieve its goals, which can lead to excessive or inefficient expenditure on ESG; higher expenditures can weaken ESG's negative effects on corporate downside risks (Madhav, 2022). Second, companies devote more resources and energy to maintain relations with the government, which also affects the satisfaction

of other stakeholders' demands to a certain extent. This occurs in areas where the government has a high degree network and a strong voice in the distribution of scarce resources. As a result, companies may have to focus more on their political connections and less on other stakeholders. In this case, companies with poor overall ESG performance but a close relationship with the government can obtain more resource support. For instance, political connections can bring in important resources needed for the development of polluting companies, such as financial subsidies and project approval (Deng *et al.*,2020). At the same time, for the sake of developing the local economy, local governments are also likely to form "collusion" with companies with personal political connections (Fan, 2021). When political connections involve improper behaviors, these factors will further increase the downside risk of the company. In summary, , political connections incentivize the management to take higher risks, thereby increasing their VaR (Li & Zhou, 2021; Qian & Chen,2021). As such, this study proposes the following hypothesis:

H_3: Political connections significantly and positively moderate the relationship between ESG and VaR among Chinese listed companies.

3. METHODOLOGY

3.1 Sample selection and data sources

The study sample consists of Shanghai and Shenzhen A-share listed companies from 2010 to 2021, using data drawn from the Wind and China Stock Market & Accounting Research Database (CSMAR) databases. From 2010 to 2021, China's securities market experienced significant and rapid growth. Chinese listed companies have encountered several circumstances including market reforms, governmental modifications, and shifts in the local and global economic landscape. To ensure the reliability and scientific validity of the data results, we implement data processing and exclude the following: (1) companies in the finance sector; (2) Special Treatment (ST) listed companies; and (3) listed companies with missing data. Financial listed companies usually have different financial characteristics which differ significantly from other listed companies. ST companies may have heightened financial vulnerabilities, and the accuracy of their financial information may be questionable (Wen, Zhong & Lee, 2022). In this study, the variable sample data are winsorised at 1% and 99% levels, and then the sample results are produced. The total

sample size of this study is 24322.

3.2 Definition of variables

3.2.1 ESG

This study utilises the methodology of Lin, Fu and Fu (2021) as well as the Sino Securities Index ESG rating data to measure ESG performance. This ESG evaluation system is based upon publicly disclosed data of listed companies, regular reports, temporary announcements, social responsibility, sustainable development reports of listed companies and websites as well as news media data of the government and relevant regulatory agencies. The ESG index system is developed by referencing the worldwide mainstream ESG assessment system and adapting it to the specifics of the Chinese market. The system has a high update frequency (quarterly), broad coverage (including all A-share listed companies), and comprehensive data availability. The ESG evaluation of the Sino Securities Index contains 14 topics, 26 major indicators, and over 130 sub-indicators. Environment, society, and corporate governance are the three pillars of sustainability. Environmental indicators consist of environmental management systems, green business aims, and environmentally friendly goods. Social indicators include corporate activities, social contributions, and social responsibility systems. Corporate governance indicators include governance structure, operational risk, and external sanctions. According to the industry features and Thomson Reuters' relevance matrix, the industry weight matrix is developed, and the C-AAA nine-grade rating is then determined. For the convenience of empirical analysis, this study assigns the nine grades of C-AAA to 1–9, respectively, and this is how the variable ESG is measured.

3.2.2 VaR

The Wind database provides the most appropriate parameters for VaR calculations in China, including time horizons, holding periods, and confidence levels. The database is divided into parametric and non-parametric methods (Castillo, León, & Íguez, 2021). Parametric methods are quantified to obtain definite results, requiring that the probability density of asset returns be known or are assumed to be normally distributed. Under this condition, the corresponding multiplier can be selected according to the confidence level and multiply with the standard deviation of the combination to obtain the parameter VaR (Najaf, Schinckus & Liew, 2021). Non-parametric

methods compute approximations by directly recording or analyzing inputs and outputs, which is an incomplete induction process. The historical simulation method is one of the most commonly used non-parametric methods in VaR estimation (Bi & Zhu, 2020). In this study, the parameter VaR is used as the indicator of the explained variable, and the historical VaR is used as the indicator of the substitute explained variable in the robustness test.

3.2.3 Institutional investors

This study chooses the institutional investor ownership data of Chinese A-share listed companies and uses the percentage of institutional investors' shareholding (INST) as the moderating variable (Aluchna *et al*., 2022; Chaudhary, 2021).

3.2.4 Political connections

In terms of dummy variables, this study determines whether the general manager or the chairperson has worked in the government and its affiliated institutions, the National People's Congress, the Chinese People's Political Consultative Conference and other institutions to measure whether the company has political connections (PC) (Madhav, 2022).

3.2.5 Control variables

Following the existing literature, this study selects enterprise scale, asset–liability ratio, return on total assets, cash flow ratio, biggest shareholder ownership ratio, percentage of independent directors, sale growth rate, and years of establishment as control variables (Boubaker et al., 2020). The variables are defined in Table 1.

Table 1: Definition of main variables

Variable name	Variable indicator	Definition and sources of data	Literature
ESG performance	ESG	Sino Securities Index ESG rating data, this study assigns the nine grades of C-AAA to 1–9, respectively.	Baldini et al. (2018), Broadstock et al. (2021), Lin et al. (2021).
Value-at-Risk	VaR	The Wind database provides the most appropriate parameters for VaR calculations in China, including the parameter VaR (P-VaR) and the historical VaR (H-VaR).	Bi and Zhu (2020), Castillo et al. (2021)
Institutional investors	INS	Shareholding ratio of institutional investors, CSMAR	Aluchna et al. (2022), Chaudhary (2021).
Political connections	PC	Dummy variables—if the general manager or the chairperson has worked in the government and its affiliated institutions, the People's Congress, the CPPCC, and other institutions, then PC=1. Otherwise, PC=0. CSMAR	Madhav, Gong, Lin and Fang (2016), Madhav (2022).
Enterprise scale	Size	Total enterprise assets (ln). CSMAR	Boubaker et al. (2020).
Asset–liability ratio	Lev	Total liabilities/total assets, CSMAR	
Return on total assets	ROA	Net profit/total assets. CSMAR	
Cash flow ratio	Cashflow	Net cash flow from operating activities/current liabilities. CSMAR	

Largest shareholder	Top1	Shareholding ratio of the largest shareholder. CSMAR	
Independent directors	Indep	Number of independent directors/total number of directors. CSMAR	
Sales growth rate	Growth	(Current sale income - previous sale income)/previous operating income. CSMAR	
Age of establishment	Firm Age	(Current year – year of listing + 1) (ln). CSMAR	

3.3 Model design

The regression equation $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3$..... may be obtained by multiple regression analysis, according to Maxwell (2000). This study develops Model (1) to evaluate hypothesis 1 on the influence of ESG on VaR. A new term is added to the model to quantify the effect of a moderating variable in multiple regression analyses involving the regression of variable Y on X. This term denotes the interaction between X and the proposed moderating variable. Thus, for a response Y and X_1 and moderating variable X_2, $Y = \beta_0 + \beta_1X_1 + \beta_2 X_1X_2$..... In this case, the role of X_2 as a moderating variable is accomplished by evaluating β_2, the parameter estimates for the interaction term (Helm and Mark, 2012). Model (2) is intended to evaluate the second hypothesis, regarding the moderating effects of institutional investors on the relationship between ESG and VaR. Model (3) evaluates the third hypothesis, on the moderating effects of political connections on the relationship between ESG and VaR.

Model (1):

$$\mathbf{VaR}_{it} = \beta_0 + \beta_1 \mathbf{ESG}_{it} + \beta \mathbf{Control\ Variables} + \mathbf{Fixed\ Effect} + \mathbf{Stochastic\ Error\ Term}$$

Model (2):

$$\mathbf{VaR}_{it} = \beta_0 + \beta_1 \mathbf{ESG}_{it} + \beta_2(\mathbf{INS}_{it} \times \mathbf{ESG}_{it}) + \beta \mathbf{Control\ Variables} + \mathbf{Fixed\ Effect} + \mathbf{Stochastic\ Error\ Term}$$

Model (3):

$$\mathbf{VaR_{it}=\beta_0+\beta_1 ESG_{it}+\beta_3(PC_{it}\times ESG_{it})+\beta Control\ Variables+Fixed\ Effect+Stochastic\ Error\ Term}$$

where **i** represents the listed company, **t** represents the year, β_0 represents a constant, β_1 and β represents the slope of the independent and control variables, which predict the value of the dependent variable. β_2 and β_3 show the positive or negative moderating effect of the interaction variable on the relationship between ESG and VaR. These coefficients represent the interaction effect and indicate whether the moderating variable positively or negatively moderates the above relationship. For instance, if β_2 is greater than zero, then institutional investors have a positive moderating effect on the link between ESG and VaR.

4. RESULTS AND DISCUSSION

4.1 Descriptive statistics

Table 2 shows the descriptive statistics. The key explanatory variable has an average ESG score of 4.05, standard deviation of 1.166, minimum value of 1, and a maximum value of 8. These results show disparities in ESG performance across companies, but the overall concentration is at the middle and upper levels (Feng, Goodell & Shen, 2022). The dependent variable has an average P-VaR of 9.936, standard deviation of 3.655, demonstrating that the VaR values of companies vary significantly. Furthermore, the descriptive statistics of corporate finance and governance control variables in Table 2 are highly consistent with the existing relevant literature (Boubaker et al., 2020).

Table 2: Descriptive statistics of main variables

VARIABLES	(1) N	(2) Mean	(3) sd	(4) min	(5) max
P-VaR	24,322	9.936	3.655	3.964	23.32
ESG	24,322	4.050	1.166	1	8
Size	24,322	22.44	1.465	19.54	27.55
Lev	24,322	0.472	0.217	0.0585	0.972
ROA	24,322	0.0347	0.0664	-0.253	0.224
Cashflow	24,322	0.0422	0.0731	-0.197	0.246
Growth	24,322	0.195	0.526	-0.619	3.727
Indep	24,322	0.374	0.0535	0.333	0.571
Firm Age	24,322	2.907	0.360	1.609	3.526
Top1	24,322	0.338	0.150	0.0838	0.743

4.2 Correlation Analysis

To prevent the effect of past autocorrelation of variables on the regression findings, a correlation analysis is first undertaken (see Table 3). According to the findings of the correlation study, the correlation coefficients between all variables are considerably less than 0.8, indicating no autocorrelation (Shrestha, 2020).

Table 3: Correlation Test of The Main Variables

	P-VaR	**ESG**	**Size**	**Lev**	**ROA**	**Cashflow**	**Growth**	**Indep**	**Firm Age**	**Top1**
P-VaR	1									
ESG	-0.132***	1								
Size	-0.212***	0.321***	1							
Lev	-0.048***	-0.053***	0.436***	1						
ROA	-0.081***	0.230***	0.040***	-0.374***	1					
Cashflow	-0.057***	0.079***	0.079***	-0.163***	0.363***	1				
Growth	0.050***	-0.016**	0.020***	0.016**	0.213***	0.023***	1			
Indep	0.013**	0.063***	0.031***	0.00600	-0.030***	-0.011*	-0.00800	1		
FirmAge	-0.051***	-0.019***	0.180***	0.176***	-0.113***	0.00100	-0.036***	-0.00300	1	
Top1	-0.087***	0.126***	0.228***	0.060***	0.132***	0.096***	0.024***	0.037***	-0.115***	1

In addition, multicollinearity tests (see Table 4) were also conducted in this research. The variance inflation factor (VIF) is a statistical metric used to detect multicollinearity, which refers to the presence of a high correlation across predictor variables in a regression analysis. Typically, VIF values over 10 are said to exhibit significant collinearity (Kim, 2019; Shrestha, 2020). It is found in Table 4 that there are no significant multicollinearity issues in the model.

Table 4: Multicollinearity test

	VIF	1/VIF
Size	1.591	0.628
Lev	1.588	0.63
ROA	1.509	0.663
ESG	1.216	0.822
Cashflow	1.173	0.853
Top1	1.101	0.908
Firm Age	1.083	0.924
Growth	1.069	0.935
Indep	1.008	0.992
Mean VIF	1.26	

4.3 Regression analysis

In this study, the empirical test may have endogenous problems caused by mutual causation and a certain time lag in the influence of ESG on VaR. The lag of the core explanatory variable ESG is introduced into the model as an instrumental variable, and the IV-GMM regression method is used for testing (Hou, 2019; Ozdemir, Binesh & Erkmen, 2022). A fixed effect model (Liew & Devi, 2021; Liew, Alfan & Devi, 2015; Liew, Alfan & Devi, 2017; Liew, Ko, Song & Murthy, 2021; Liew & Devi, 2022; Liew, Ko, Song & Murthy, 2022; Wu & Liew, 2023) is used to control missing variables. We use the "individual+time" bidirectional fixed effect model for regression testing (Jørgensen, Bor & Petersen, 2021; Schultz, Tan & Walsh, 2010; Wintoki, Linck & Netter, 2012).

Table 5 presents the regression results. Column (1) shows the outcome of a regression using ESG as the single explanatory variable, which is shown to have a considerable inhibitory effect on VaR. Column (2) shows the regression result after including related control variables. Regardless of such

inclusion, the regression coefficient of the core explanatory variable ESG is significantly negative at the 1% level, indicating a significant negative relationship between ESG and VaR. In the regressions of Columns (1) and (2), the Kleibergen-Paaprk LM statistic is greater than the Stock and Yogo weak instrument variable identification F test's critical value (16.38) at the 10% significance level (Liu, Wang, Dong & Taghizadeh-Hesary, 2023; Mulliqi, 2021). Thus, the regression result is valid through the weak instrument variable test, verifying H_1.

Table 5: Regression results of Model (1)

	(1)	**(2)**
VARIABLES	**P-VaR**	**P-VaR**
ESG	-0.3154***	-0.2418**
	(-3.26)	(-2.32)
Size		-0.3673***
		(-8.07)
Lev		1.2220***
		(5.87)
ROA		-1.3753***
		(-3.01)
Cashflow		0.4032
		(1.16)
Growth		0.2428***
		(5.71)
Indep		0.3177
		(0.57)
Firm Age		-1.4682***
		(-7.76)
Top1		-0.0872
		(-0.33)
Constant	11.2119***	23.20***
	(27.48)	(0.32)
Individual fixed effect	YES	YES
Time fixed effect	YES	YES

Kleibergen-Paaprk LM	1082.67***	1002.07***
Kleibergen-Paaprk Wald F	1150.67	1059.53
Observations	20,007	20,007
R-squared	0.361	0.371

Notes: *** p<0.01, ** p<0.05

This study also explores whether institutional investors have a moderating effect on the relationship between ESG and VaR. The following regression results in Table 6 are obtained by establishing Model (2). In the regressions of Columns (1) and (2), both the insufficient recognition test and the weak instrumental variable test pass significantly, and the results are valid. In Column (2), the interaction term c_ESG_INS is significantly positive at 1% level (Hutchinson et al., 2015). The benchmark regression shows that the primary effect is strongly negative, demonstrating that institutional investors reduce the influence of ESG on VaR. Specifically, the greater the ownership percentage of institutional investors, the weaker the negative effects of ESG on VaR, which verifies H_2.

Table 6: Regression results of model (2)

	(1)	**(2)**
VARIABLES	**P-VaR**	**P-VaR**
ESG	-0.5632***	-0.6775***
	(-4.20)	(-5.03)
INS	-3.2814***	-5.9778***
	(-2.70)	(-4.88)
c_ESG_INS	0.2401	1.2006***
	(0.81)	(4.01)
Size		-0.5039***
		(-22.84)
Lev		0.6131***
		(4.67)
ROA		-3.7435***
		(-9.02)
Cashflow		-1.7221***

		(-5.38)
Growth		0.3903***
		(9.32)
Indep		0.3422
		(0.84)
Firm Age		-0.4810***
		(-6.69)
Top1		0.2515
		(1.48)
Constant	13.2904***	26.9227***
	(12.44)	(21.07)
Individual fixed effect	YES	YES
Time fixed effect	YES	YES
Kleibergen-Paaprk LM	1514.25***	1435.27***
Kleibergen-Paaprk Wald F	824.86	777.84
Observations	18,294	18,294
R-squared	0.365	0.389

Notes: *** p<0.01

To explore whether political connections have a moderating effect on the influence of ESG on VaR, we perform the regression by establishing Model (3). Table 7 shows the results. In the regressions of Columns (1) and (2), both the insufficient recognition and the weak instrumental variable tests pass significantly, and the results are valid. In these two columns, the interaction term c_ESG_PC is significantly positive at the levels of 5% and 1%, respectively (Harjan, Teng, Shah & Mohammed, 2019). The benchmark regression shows that the main effect is significantly negative, indicating that political connections weaken the negative effects of ESG on VaR. Thus, the results verify H_3.

Table 7: Regression results of Model (3)

	(1)	(2)
VARIABLES	**P-VaR**	**P-VaR**
ESG	-0.7055***	-0.3992***
	(-10.26)	(-5.64)
PC	-2.1262***	-2.6822***
	(-2.77)	(-3.54)
c_ESG_PC	0.4407**	0.5826***
	(2.37)	(3.17)
Size		-0.4423***
		(-17.94)
Lev		0.1227
		(0.81)
ROA		-5.2833***
		(-10.87)
Cashflow		-0.3345
		(-0.88)
Growth		0.3637***
		(7.25)
Indep		1.3322***
		(2.79)
Firm Age		-0.2736***
		(-3.55)
Top1		-0.6508***
		(-3.63)
Constant	13.3847***	22.8976***
Individual fixed effect	YES	YES
Time fixed effect	YES	YES
Kleibergen-Paaprk LM	1288.25***	1270.03***
Kleibergen-Paaprk Wald F	688.31	677.65
Observations	20,007	20,007
R-squared	0.017	0.057

Notes: *** p<0.01, ** p<0.05

4.4 Robustness analysis

In this study, we first use the method of replacing the explained variable (Wu, Xue, Hao & Ren, 2021). The historical VaR (H-VaR) is used as the indicator of the substituted explained variable in the robustness test (Vasileiou, 2017). In the regressions of Columns (1) and (2) in Table 8, both the insufficient recognition and the weak instrumental variable tests pass significantly, and the results are valid. The consistency of the significance and sign of the variables with the baseline regression indicates the validity of the prior results.

Table 8: Results of robustness test for substituted explained variable.

	(1)	**(2)**
VARIABLES	**H-VaR**	**H-VaR**
ESG	-0.4780***	-0.0735***
	(-20.87)	(-2.72)
Size		-0.5442***
		(-33.17)
Lev		0.8209***
		(8.25)
ROA		-4.0765***
		(-13.06)
Cashflow		-0.9360***
		(-3.85)
Growth		0.2431***
		(7.57)
Indep		0.3883
		(1.28)
Firm Age		-0.5528***
		(-10.14)
Top1		-0.4011***
		(-3.51)
Constant	10.6777***	22.2446***
	(95.82)	(65.67)
Individual fixed effect	YES	YES

Time fixed effect	YES	YES
Kleibergen-Paaprk LM	7961.17***	6329.44***
Kleibergen-Paaprk Wald F	13000	9249.21
Observations	20,007	20,007

Notes: *** p<0.01

This study uses the method of replacing explanatory variables to carry out a robustness test (Zhao, Peng, Wen & Wu, 2023). The Sino-Securities ESG Index classifies the ESG tail risk into three groups: A and higher gain a value of 3; B and higher receive a value of 2; and C and higher receive a value of 1 (Lin *et al*., 2021). The ESG* is used as the indicator of the substituted explanatory variable in the robustness test. In the regressions of Columns (1) and (2) in Table 9, both the insufficient recognition and the weak instrumental variable tests pass significantly, and the results are valid. The regression coefficient of the key explanatory variable ESG* is considerably negative at the 1% level, demonstrating a significant negative relationship between ESG* and VaR. Given this consistency with the prior findings, the conclusion is therefore robust. Table 9 shows the results of the robustness test for the substituted explanatory variable.

Table 9: Results of the robustness test for substituted explanatory variable

	(1)	**(2)**
VARIABLES	**P-VaR**	**P-VaR**
ESG*	-1.3875***	-0.3699***
	(-15.03)	(-3.49)
Size		-0.5589***
		(-27.08)
Lev		0.8587***
		(6.68)
ROA		-3.4058***
		(-8.51)
Cashflow		-1.5872***
		(-5.08)
Growth		0.4186***
		(10.12)

Indep		0.5760
		(1.47)
Firm Age		-0.7136***
		(-10.18)
Top1		-0.3518**
		(-2.40)
Constant	11.9950***	24.0344***
	(67.19)	(57.04)
Individual fixed effect	YES	YES
Time fixed effect	YES	YES
Kleibergen-Paaprk LM	5134.63***	4067.46***
Kleibergen-Paaprk Wald F	6903.21	5100.30
Observations	20,007	20,007

Notes: *** p<0.01, ** p<0.05

4.5 Heterogeneity analysis

4.5.1 Analysis on the Heterogeneity of the Nature of Corporate Ownership

According to the nature of ownership, Chinese companies can be divided into state-owned (SOEs) and non-state owned (non-SOEs). This difference in ownership has an important influence in China's market environment and must be considered (Li, Liu, Peng & Zhang, 2022). As shown in Table 10, the regression coefficient of the explanatory variable ESG is significantly negative. In addition, the absolute value of the coefficient of the non-SOEs group is slightly greater, indicating that their ESG performances have a more significant weakening effect on VaR than that of the SOEs group. We argue that SOEs have always maintained close interactions with the government and can actively follow the national policy actions, and thus they maintain a relatively good ESG performance (Cheng & Wang, 2021). Similarly, SOEs have formed and maintained such an image in the minds of investors. By comparison, with no relationship with the government and state-owned banks, non-SOEs need to develop ESG practices in return for government and bank support (Ferrero, 2021).

4.5.2 Analysis on the Heterogeneity of Enterprise Pollution

According to the Catalogue of Environmental Protection Verification Industry Classified Management of Listed Companies in China, this study divides the samples into heavy and non-heavy polluting companies (Deng *et al*., 2020). Table 10 reveals that the absolute value of the coefficient of non-heavy polluting companies' group is greater than that of the heavy polluting companies' group, which is more significant, indicating that the ESG of non-heavy polluting companies have a stronger negative influence on the companies' VaR. From the perspective of Resource Dependence Theory, greater public pressure causes more difficulties for companies in polluting industries to obtain resources than those in non-polluting industries. Companies in polluting industries are required to have higher risk compensation by investors when obtaining equity capital resources, and encounter higher difficulties and costs of obtaining debt capital (Deng *et al*., 2020; Fan, Zhang & Zhu, 2020). As such, this study posits that non-heavy polluting companies give more sustained attention to ESG performance and assume relevant responsibilities. Correspondingly, their downside risk is less than that of heavy polluting companies.

4.5.3 Analysis on the Heterogeneity of Degree of Marketisation

The policy and economic market environments in China vary significantly. This study explores the effect of improving ESG performance on VaR at different marketization levels. The measurement of the level of economic development is mainly based upon the regional marketisation index in the China Provincial Marketisation Index Report (Fan, Wang & Ma, 2011; Yuan et al., 2022). According to the results in Table 10, ESG has a more negative influence on VaR in regions with low levels of marketisation. This finding demonstrates that in regions with a high level of marketisation, the legal system is reasonably solid, government interference is limited, and the liquidity of the factor market is high, resulting in a high distribution of economic resources within the formal institutional framework (Liu, Hu & Cheng, 2021).

Table 10: Heterogeneity analysis results

	(1)	(2)	(3)	(4)	(5)	(6)
	SOEs	non-SOEs	heavy pollution	non-heavy pollution	high degree of marketization	low degree of marketization
VARIABLES	P-VaR	P-VaR	P-VaR	P-VaR	P-VaR	P-VaR
ESG	-0.2056***	-0.2283***	-0.1687**	-0.2711***	-0.1160**	-0.2661***
	(-3.55)	(-3.72)	(-2.27)	(-5.32)	(-2.45)	(-4.96)
Size	-0.5031***	-0.3157***	-0.4825***	-0.4086***	-0.6066***	-0.4510***
	(-16.14)	(-8.11)	(-10.65)	(-13.92)	(-21.21)	(-13.92)
Lev	1.0963***	-0.4874**	0.8568***	-0.1889	0.9340***	0.6021***
	(5.21)	(-2.23)	(3.16)	(-1.04)	(5.30)	(3.14)
ROA	-3.9256***	-6.5984***	-5.0706***	-5.2432***	-3.3530***	-3.2174***
	(-5.16)	(-10.28)	(-5.64)	(-9.05)	(-6.09)	(-5.38)
Cashflow	-0.8184	0.0948	0.1197	-0.2317	-1.9057***	-1.6269***
	(-1.54)	(0.18)	(0.16)	(-0.52)	(-4.55)	(-3.39)
Growth	0.1514**	0.4727***	0.3977***	0.3365***	0.4518***	0.3676***
	(2.09)	(6.86)	(3.92)	(5.85)	(7.64)	(6.22)
Indep	0.6808	2.0151***	2.2695**	1.0452*	1.5591***	-0.1529
	(1.06)	(2.86)	(2.57)	(1.86)	(2.89)	(-0.26)
Firm Age	-0.0020	-0.2060**	-0.1495	-0.2517***	-0.6751***	-0.7676***
	(-0.02)	(-2.00)	(-1.00)	(-2.83)	(-7.79)	(-6.25)
Top1	-0.1422	-0.0611	-0.5602*	-0.6380***	-0.2877	-0.5156**

	(-0.58)	(-0.22)	(-1.74)	(-2.97)	(-1.45)	(-2.29)
Constant	21.1149***	18.3157***	20.6159***	20.9803***	24.3139***	2666.61***
	(30.95)	(23.95)	(22.45)	(36.05)	(41.53)	(33.81)
Individual fixed effect	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES
Kleibergen-Paaprk LM	3301.08***	3033.04***	1910.06***	4431.74***	3437.97***	4067.46***
Kleibergen-Paaprk Wald F	4994.38	4296.53	2778.95	6497.03	5002.25	3866.58
Observations	9,717	10,290	6,087	13,920	10,950	8,548
R-squared	0.068	0.045	0.059	0.065	0.379	0.368

Notes: *** p<0.01, ** p<0.05, * p<0.1

5. CONCLUSION

This study examines the influence of ESG on VaR from the perspective of corporate risk among Chinese A-shares listed companies in Shanghai and Shenzhen from 2010 to 2021. Furthermore, this study enriches the theoretical framework of the existing ESG research. The effects and mechanisms of the influence of corporate ESG performance on VaR are empirically tested. The results show the following: First, corporate ESG performance has a significant negative influence on VaR, and this outcome remains stable and consistent through several endogenous treatments and robustness tests. Second, institutional investors and political connections have moderating influences on the negative relationship between ESG and VaR, specifically, they weaken this negative relationship. Third, the heterogeneity analysis reveals that ESG is more successful at reducing VaR in non-SOEs, non-heavy polluting companies, and companies in locations with low levels of marketisation.

The findings show that Chinese listed companies need to pay special attention to their ESG as it can reduce their VaR, and they also need to be cautious about their political connections and institutional investors as they weaken the negative relationship between their ESG and their VaR. In addition, non-SOEs should also pay greater attention to the building of ESG to attract crucial resources from investors, customers, governments, and other stakeholders, given that ESG has a more visible negative influence on their VaR.

The empirical findings presented in this study contribute to the existing literature in this field by expanding the research on the outcomes of fulfilling ESG responsibilities. Additionally, these findings have clear policy implications, offering empirical evidence that can inform decision-making for government departments, enterprises, and investors. Government departments should actively promote the beneficial impact of disclosing ESG information to society. They should also establish and reinforce strict requirements for ESG information disclosure, guiding companies to disclose ESG information in a meaningful way. Additionally, policy support should be provided to encourage ESG practices in companies, thereby enhancing their comprehension and implementation of sustainable development principles. Companies should include the development principles of ESG into their corporate strategy and establish an ESG organizational management system. Managers should acknowledge that completing ESG duties may enhance organizations' market value and risk mitigation skills, while also meeting the expectations and needs of all

stakeholders. Institutional investors need to adopt the notion of ESG, using ESG variables as a means to assess the long-term profitability of asset portfolios. These strategies can also incentivize companies to place greater emphasis on environmental concerns, prioritize social accountability, strengthen corporate governance, and contribute to China's economy achieving high-quality and sustainable development. Lastly, future research can analyze different types of institutional investors and political connections in China and explore their impact on ESG and VaR separately.

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