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# The Impact of ESG Efficiency on the Cost of Equity Capital: Evidence from China

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## Abstract

This paper presents an empirical analysis of the correlation between ESG performance and cost of equity capital of listed companies in mainland China and Hong Kong from 2018 to 2022. The final empirical results of the study show that there is a negative correlation between ESG performance and cost of equity capital in China. The study also finds that, among the three dimensions of ESG, the social dimension has the most significant impact on Chinese listed companies. The geographical location and property rights of companies also have an impact on the relationship between the two variables. Compared to companies in Hong Kong, the improvement in environmental, social, and corporate governance performance of mainland Chinese companies has a more pronounced effect on reducing the cost of equity capital. Similarly, compared to state-owned enterprises, the improvement in environmental, social, and corporate governance performance of non-state-owned enterprises has a more significant impact on reducing the cost of equity capital. These findings highlight the importance of incorporating ESG factors into business practices for the long-term success and sustainable growth of China's capital markets.

**Keywords:** ESG, cost of equity, Hong Kong, Mainland China, ownership structure

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## Introduction

In 2006, the United Nations Environment Programme introduced the ESG (Environmental, Social, and Governance) principles, providing investors with a new framework for decision-making. That same year, Goldman Sachs published a comprehensive ESG report that systematically integrated the three core dimensions, effectively formalising the modern conception of ESG. Over time, ESG assessment has become a critical metric for evaluating a company's value and long-term prospects. Investors and stakeholders now routinely prioritise ESG performance, with ESG ratings playing a pivotal role in investment decisions.

In China, as one of the world's largest carbon dioxide emitters, significant environmental initiatives have been undertaken since 2020, with a national commitment to achieve carbon neutrality by 2060. These government-led efforts have spurred the adoption and implementation of ESG principles across Chinese enterprises. Although China entered the ESG investment sphere later than many developed economies, it has made remarkable strides in recent years through coordinated actions by the central government, stock exchanges, and listed companies. A major milestone came in 2022 with the release of two key regulatory documents: the Guidelines for Enterprise ESG Information Disclosure and the ESG Evaluation Agency Service Specification. These instruments have advanced China's ESG standardisation framework, establishing a systematic regulatory structure for ESG evaluation agencies, enhancing oversight of corporate behaviour, and providing clearer guidance for investment activities. Consequently, ESG investing has grown substantially in China.

Academically, interest in the relationship between ESG performance and corporate outcomes has intensified, particularly regarding the cost of equity capital – a central concern in corporate finance and investment strategy. However, research on the link between ESG factors and the cost of equity in China remains sparse, highlighting a need for further investigation. Most prior studies have concentrated on developed markets such as the US and Europe, yielding inconsistent results. For instance, a meta-analysis by Friede et al. [1] of over 2 000 studies found a positive correlation between ESG performance and financial outcomes. Similarly, Alareeni and Hamdan [2] observed that higher ESG ratings among S&P 500 companies were associated with improved returns on assets and equity, as well as higher Tobin's Q values. Conversely, Hillman and Keim [3] identified a negative relationship between social responsibility initiatives and market value in S&P 500 firms, while Brammer et al. [4] reported comparable negative associations for UK companies.

Several notable limitations characterise existing research on China's ESG landscape. First, China's unique institutional and regulatory environment may render findings from Western markets inapplicable. Second, most studies on the Chinese market exclude Hong Kong, despite its distinct historical trajectory, political framework, and eco-

nomical structure. Given China's "one country, two systems" policy, Hong Kong often develops independently from mainland China, potentially leading to different dynamics in the relationship between ESG factors and the cost of equity. Third, Chinese scholars continue to debate about the influence of company ownership nature, yet comparative analyses rarely incorporate Hong Kong data, leaving a significant gap in understanding.

All in all, the study seeks to address these research gaps by conducting a comparative analysis of mainland Chinese and Hong Kong firms, aiming to clarify the unique role of ESG in China's dual-system market. By examining both regions, our research intends to provide actionable guidance for companies and investors, enhance the reliability and applicability of ESG research in China, and reveal how ESG performance operates within the country's distinctive context. Ultimately, the investigation contributes to both academic discourse and practical decision-making in ESG investing within China's evolving market landscape.

## Literature Review

Western scholars were the first to engage in ESG performance research, progressing from basic descriptive studies to investigating the economic consequences of ESG performance and developing a relatively mature research system and methods. In contrast, ESG-related research in China is still in need of improvement. Overall, scholars' research perspectives vary significantly, leading to diverse conclusions. However, the theoretical mechanisms and empirical approaches used in their studies are of great reference value for this article.

Environmental performance is an important component of a firm's ESG performance. According to research conducted by Bui et al. [5] across 34 countries globally, firms with better environmental performance typically have lower costs of equity capital, and the intensity of greenhouse gas emissions is positively correlated with the cost of equity financing. Elmawazini et al. [6] observed that the use of green innovation to reduce the cost of equity capital is supported in the United States, while Hmiden et al. [7] found that when US firms are positioned away from the "toxic" ("green") industry's widely adopted worst (best) practices, their cost of equity financing is lower (higher). This highlights the dual importance of environmental corporate social responsibility practices in improving financial performance and reducing the cost of capital.

Regarding social responsibility, the research results are mixed. Wang et al. [8] found that in North America, Europe, and Africa, companies with higher social responsibility scores have lower costs of equity capital, but this result does not hold in Asian countries. This conclusion differs from the research of Matthiesen and Salzmann [9], who found that in countries with higher levels of collectivism, the relationship between corporate social responsibility and the cost of equity is stronger. Chen et al. [10], however, focused on the emerging market context and further showed that firm-level corporate governance has a signif-

ificant negative impact on the cost of equity capital in these markets, an effect that is more pronounced in countries with relatively poorer legal protection.

At the governance level, Gupta et al. [11] explored the combined effect of financial development and legal institutions on the impact of firm-level governance on the cost of equity capital, finding that firm-level governance attributes primarily affect the cost of equity capital in common law countries with higher levels of financial development. Jang et al.'s [12] research in Korea showed that firms with stronger managerial capabilities tend to have lower equity costs, especially in situations of higher information asymmetry, lower institutional ownership, and higher capital intensity.

Beyond the separate assessment of these three dimensions, multiple studies have found that companies with higher overall ESG scores typically have lower costs of equity capital [13; 14]. This environmental, social, and governance performance effect has both a direct influence and an indirect effect (through reduced market risk and enhanced equity diversification) on lowering the cost of equity.

Existing research on the three dimensions of ESG and the cost of equity capital (COE) in the Chinese market is limited. While the environmental and governance aspects have relatively fewer available studies, the social responsibility dimension has benefited from the earlier establishment of CSR reporting practices in China, resulting in more related literature analysis.

Regarding environmental performance, Zhu's [15] empirical study found that in the Chinese market, environmental

performance does not have a significant impact on firms' cost of equity capital, and the environmental performance of heavily polluting industries is also not significantly correlated with the cost of equity. In the area of corporate governance, scholars have showed that regulatory enforcement actions increase the cost of equity for companies [16]. However, government-controlled shareholders can mitigate the effect of these enforcement actions on the cost of capital. Additionally, Li et al. [17] found that in the global market, including China, board reforms lead to a significant increase in the cost of equity, although this effect is somewhat alleviated in emerging markets.

In terms of social responsibility, the research results for the Chinese market show some differences. Xu et al. [18] found that in China, the higher the social responsibility score of a company, the lower its cost of equity capital and that state-owned enterprises exhibit better corporate social responsibility and also have lower costs of equity. However, Yeh et al.'s [19] research revealed that the fulfilment of corporate social responsibility rapidly reduces the debt capital cost of Chinese firms without significantly lowering the cost of equity capital compared to developed countries.

When considering overall ESG performance, the Chinese market shows the same results as the international market (Table 1). Both Tang [20] and Chen et al. [10] reported a negative impact of ESG performance on the cost of equity capital (COE). Chen et al. [10] further found a mediating effect, indicating that ESG performance reduces the cost of equity capital both directly and indirectly (by lowering market risk and increasing equity diversification).

**Table 1.** ESG Performance and Cost of Equity Capital: A Research Overview

Dimension	International	China
E	Better environmental performance linked to lower cost of equity [5] Green innovation can reduce cost of equity [6] Distancing from "green" practices increases cost of equity [7]	Environmental performance does not significantly impact cost of equity [15]
S	Higher social responsibility associated with lower cost of equity in some regions, but not Asia [8] Stronger CSR-cost of equity link in more collectivist countries [9] Firm governance negatively impacts cost of equity, esp. in weaker legal protection [10]	Higher social responsibility linked to lower cost of equity [18] State-owned firms in China have better CSR and lower equity costs [18] CSR fulfilment reduces debt cost, but not equity cost vs. developed markets [19]
G	Firm governance affects cost of equity more in common law countries with higher financial development [10] Stronger managerial capabilities linked to lower equity costs in certain contexts [12]	Regulatory enforcement actions increase cost of equity, although government-controlled shareholders can mitigate this effect [16] Board reforms lead to higher cost of equity, less so in emerging markets [17]
ESG	Higher ESG scores typically linked to lower cost of equity [13; 14]	Higher ESG scores typically linked to lower cost of equity [20]

The existing literature on the relationship between environmental, social, and governance (ESG) performance and the cost of equity capital remains relatively limited within the Chinese market context. The majority of prior studies focus on examining the association between individual ESG dimensions or the overall ESG score and capital costs, while research that comprehensively considers the interactions between the various ESG facets and the cost of capital is scarce.

Notably, the existing literature primarily concentrates on the mainland Chinese market, with a dearth of empirical analyses covering the Hong Kong region of China. This oversight may have overlooked the potential impact of regional differences on the aforementioned relationships.

This study situates itself within a broader scholarly discourse on the relationship between ESG performance and the cost of equity capital (COE), acknowledging that while international research has advanced to a relatively mature stage – revealing nuanced and sometimes contradictory findings across environmental, social, and governance dimensions – China-specific inquiries remain underdeveloped. Although global evidence often points to a negative association between comprehensive ESG performance and COE (via direct effects and risk-mediated pathways), results vary by context: environmental performance tends to lower COE in many markets, social responsibility effects depend on cultural and regional factors, while governance impacts are shaped by legal and financial systems. In China, empirical results are mixed and fragmented: environmental performance shows limited influence on COE, governance effects are moderated by regulatory actions and state ownership, and social responsibility yields inconsistent outcomes across firm types. Nevertheless, studies of overall ESG performance in China largely align with international trends, indicating a negative impact on COE both directly and indirectly (through reduced market risk and enhanced equity diversification). This underscores the need for further integrated, context-sensitive research to clarify the mechanisms through which ESG dimensions influence COE in the Chinese market.

Therefore, the present study aims to address two aspects:

1. Examine the relationships between the three individual ESG dimensions (environmental, social, and governance) as well as the overall ESG performance and the cost of equity capital.
2. Conduct a comparative analysis of the ESG performance–cost of capital linkages between the mainland Chinese and Hong Kong markets, and compare the findings with international research results.

## Methodology

To examine the impact of ESG performance on the cost of equity for firms in China, this section develops a rigorous empirical framework for hypothesis testing. The study adopts a quantitative research design, employing the ordinary least squares (OLS) regression as the primary analyti-

cal technique to estimate the baseline relationship between ESG performance and the cost of equity.

Subsequently, the analysis proceeds with stratified regression models, segmenting the sample according to two key dimensions: 1) geographic region (mainland China vs. Hong Kong) and 2) ownership structure (state-owned enterprises vs. private firms). This stratification allows for a nuanced assessment of how regional and institutional contexts moderate the ESG–cost-of-equity nexus. The stratification approach is informed by the methodology of Li et al. [17], who applied a similar grouping strategy to investigate the relationship between ESG performance and green innovation spillovers. By adapting this method, the present study enhances comparability across subsamples and reveals potential heterogeneity in the effect of ESG factors on the cost of equity across different types of Chinese firms.

## Theory and hypotheses

Despite growing global attention to environmental, social, and governance (ESG) factors in corporate finance, the relationship between ESG performance and the cost of equity capital remains underexplored in the Chinese context. This lacuna raises critical questions regarding the mechanisms through which ESG practices influence firms' cost of capital in China – a market characterised by distinctive institutional features, including a prominent role of state institutions and a unique regulatory framework.

While existing literature has extensively examined the ESG–COE (cost of equity) linkage in developed economies (notably the United States and Europe), findings from these markets cannot be readily generalised to China. Geographic limitations in prior research have precluded analysis of how China's institutional environment shapes this relationship. Although recent contributions by Chen et al. [10] and Kong [24] have begun to address this gap, the field still lacks a comprehensive understanding of the ESG–cost of equity dynamic in China, necessitating further empirical inquiry.

From the perspective of signalling theory, firms' ESG activities function as strategic signals that convey information about their operational priorities and long-term sustainability commitments. Enhanced ESG performance can generate positive market signals, foster a favourable corporate reputation, and consequently attract a broader investor base – ultimately reducing the cost of equity financing [7].

A review of the literature reveals consistent evidence that ESG performance exerts a significant negative effect on the cost of equity capital for Chinese firms. This pattern has been documented across multiple studies, including Mio et al. [13], Ng and Rezaee, Tang [14], Chen et al. [10]. Building on this empirical foundation, the study posits:

*Hypothesis 1 (H1). ESG performance has a significant negative impact on the cost of equity capital for Chinese firms.*

Although Arrigo [21] identified the environmental dimension as having the strongest negative correlation with capital cost in China (followed by governance, with the social dimension showing statistically insignificant effects), the

present study advances an alternative perspective grounded in stakeholder theory. This framework emphasises that ESG practices reflect a firm's commitment to balancing the interests of diverse stakeholders through environmental stewardship, social responsibility, and robust governance.

Notably, strong corporate governance mechanisms have been empirically linked to reduced equity costs [22; 23]. By fostering a favourable stakeholder environment, enhancing market attractiveness, and facilitating access to external resources, ESG investments can alleviate financing constraints and lower the cost of equity [24]. Consequently, the study proposes:

*Hypothesis 2 (H2). Among the three ESG dimensions (environmental, social, and governance), corporate governance has the greatest impact on the cost of equity capital for firms.*

Prior research on China's ESG landscape has exhibited notable limitations in heterogeneity analysis, particularly concerning the relationship between ESG and the cost of equity. Most studies focus exclusively on mainland China, often subdividing it into central, eastern, and western regions [25], while neglecting Hong Kong, creating a significant research gap. Given the substantial political, economic, and social differences between mainland China and Hong Kong, these contextual variations may meaningfully influence the ESG–cost of equity relationship. This leads to:

*Hypothesis 3 (H3). The impact of ESG on the cost of equity capital differs in mainland China and Hong Kong.*

Furthermore, ownership structure constitutes a pivotal dimension in understanding China's economic dynamics. State-owned enterprises (SOEs) often align their ESG practices with policy mandates rather than voluntary initiatives, potentially limiting positive investor responses. In contrast, non-SOEs face distinct incentives and constraints in ESG implementation. Empirical evidence from Chen et al. [26] and Xu et al. [18] confirms differential motivations and outcomes in ESG practices between SOEs and non-SOEs. Accordingly, the study posits:

*Hypothesis 4 (H4). The impact of ESG on the cost of equity capital varies between SOEs and non-SOEs.*

## Sample selection and data sources

Considering the availability of ESG performance data, the study selects listed companies in various industries in China as the sample from 2018 to 2022 to investigate the relationship between ESG efficiency and the cost of equity capital. The sample data are obtained from the Wind Financial Terminal database and processed as follows: (1) companies listed on multiple stock exchanges simultaneously are excluded; (2) cases with missing data for the variables are excluded; and (3) cases with a negative cost of equity capital are excluded based on the prediction requirements of the PEG model for equity capital. Additionally, to mitigate the effect of outliers, all continuous variables undergo tail trimming at 1% and 99%, resulting in a final sample size of 5,670 observations. For further heterogeneity analysis, the cases are categorized based on the geographic region of the

firms and their ownership structure. The resulting sample contains 5,435 observations from mainland firms and 235 observations from Hong Kong firms. Furthermore, it has 2,430 observations from state-owned firms and 3,240 observations from non-state-owned firms.

## Variable Description

### Dependent variable

This paper focuses on the impact of ESG on firms' cost of equity capital, with the cost of equity capital serving as the explanatory variable, specifically referring to the cost of the firms' own equity capital.

Echterling et al. [27] conducted a review of various measures of the cost of equity capital developed over the years and synthesized findings from a wide range of scholars. The general research approach is categorized into two main groups: one is based on estimating the market risk premium (ex-post cost of equity capital approach), which primarily includes the Capital Asset Pricing Model (CAPM) and the Three-Factor Model (FFM). The other approach involves estimating asset prices by discounting the expected future rate of return to present value (ex-ante cost of equity capital approach), which encompasses the Dividend Discount Model (DDM) and the Discounted Residual Returns Model (GLS).

However, these models may not be entirely suitable for the Chinese market. Xu et al. [18] discovered that the PEG model aligns better with the Chinese national market environment compared to traditional cost of equity capital measurement studies. Consequently, drawing from Easton's [28] research, this paper adopts the PEG model to assess the cost of equity capital, which better reflects Chinese market practices. The model is grounded in the principle of residual income, where the price–earnings ratio is divided by the short-term earnings growth rate, assuming a zero long-term growth rate and implementation of a zero-dividend policy. The specific calculations are outlined below:

$$r_e = \sqrt{(eps_2 - eps_1) / P_0}$$

where  $P_0$  represents the closing price of the stock in the current period, and  $eps_1$  and  $eps_2$  stand for analyst-predicted EPS for the next two years. The calculation of the PEG model hinges on analysts' forecasted earnings per share (EPS). The year-end closing price data and analysts' EPS predictions utilized in this study are sourced from the Wind Financial Terminal database.

### Independent variables

The explanatory variables in this paper consist of ESG scores, composite scores, and individual scores across three dimensions. Over the years, mature ESG evaluation systems have been established both in China and abroad. Since this paper focuses on the Chinese market, foreign rating agencies' systems are not entirely suitable for China's current capital market. As a result, this paper opts to utilize data from the Wind system, a highly authoritative independent ESG rating agency in China, for conducting the empirical study.

**Table 2.** Wind ESG indicators

Level 1 indicators	Level 2 indicators (27)	Level 3 indicators (300+)
<b>E</b>	Environmental Management	• Environmental Management Systems and Institutions
	Energy and Climate Change	• Energy Management Systems and Institutions
	Water Resources	• Scope 1, 2, 3 Greenhouse Gas Emissions
	Raw Materials and Waste	• Water Conservation Measures
	Air Emissions	• ...
	Wastewater	
	Biodiversity	
	Green Buildings	
	Green Finance	
	<b>S</b>	Employment
Occupational Health and Safety		• Average Training Hours per Employee
Development and Training		• Intellectual Property Protection Community Welfare Contributions
Research and Development		• ...
Supply Chain		
Product Quality		
Sustainable Products		
Customers		
Privacy Protection		
Community		
Medical Accessibility		
<b>G</b>	ESG Governance	• ESG Performance Linked to Executive Compensation
	Board and Senior Management	• Turnover Rate of Board and Senior Management
	Equity and Shareholders	• Proportion of Independent Directors
	Auditing	• Whistleblowing Mechanism
	Business Continuity Management	• ...
	Corruption and Bribery	
	Antitrust and Fair Competition	

As shown in Table 2, the Wind ESG rating system comprises a three-tier indicator framework: the first-tier indicators encompass the three major themes of environment, social responsibility, and corporate governance; the second-tier indicators consist of 27 categorized topics under these three major themes, such as wastewater, raw materials, and air emissions; the third-tier indicators represent specific ESG metrics derived from over 300 data points, including water conservation measures, energy management systems,

and protocols, among others, as detailed in Table 2. In addition to the overall ESG composite score, each company also receives individual environmental, social, and governance scores. The scores for the three dimensions are calculated proportionally to determine the ESG total score. The weights of environmental, social, and governance aspects within the ESG composite score vary by industry. Scores range from 0 to 10, with 0 representing the lowest performance and 10 representing the highest performance.

### Control variables

This paper follows common practices in the research field by incorporating control variables into the regression model to account for other identified influences. Building upon the main factors influencing the cost of equity capital outlined earlier in the paper and drawing on empirical studies by Tang [20] in the field, this study includes indicators such as Return on Assets (ROA), Return on Equity (ROE), Total Asset Turnover Ratio (TR), Debt Ratio (DR), and Growth Rate (g) as control variables. In addition, time

dummy variables (Year) and industry dummy variables (Ind) are employed to control for time effects and industry effects, respectively. Industry dummy variables are used to account for industry differences, while time dummy variables are used to consider period variations. Furthermore, to facilitate subsequent heterogeneity analysis, region (Region) and ownership structure (SOE) are chosen as grouping variables. Specific variable definitions are provided in Table 3.

Table 3. Variables

Variable type	Variable name	Variable symbol	Variable definition
<b>Dependent variable</b>	Cost of Equity	COE	Derived from the PEG model
<b>Independent variables</b>	ESG score	ESG	Wind ESG rating score
	E score	E	Wind Environmental score
	S score	S	Wind Social score
<b>Control variables</b>	G score	G	Wind Government score
	Return on Assets	ROA	Net Income to Total Assets
	Return on Equity	ROE	Net Income to Shareholder Equity
	Total Asset Turnover Ratio	TR	Total Sales to Average Total Assets
	Debt Ratio	DR	Total Debt to Total Assets
	Growth Rate	g	Year-on-Year Growth Rate of Operating Income
	Time	Year	Time dummy variable
<b>Grouping variables</b>	Industry	Ind	Industry dummy variable
	Region	Region	1 for Hong Kong enterprises, 0 for mainland enterprises
<b>Grouping variables</b>	Ownership Structure	SOE	1 for state-owned enterprises, 0 for non-state-owned enterprises

### Model Specification

To test Hypothesis 1, empirical Model (1) is developed:

$$COE_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Controls_{i,t} + \varepsilon_{i,t}.$$

To test Hypothesis 2, empirical Model (2) is developed:

$$COE_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 S_{i,t} + \beta_3 G_{i,t} + \beta_4 Controls_{i,t} + \varepsilon_{i,t},$$

where  $\beta_0$  is the constant term,  $\beta_i$  is the regression coefficient of the explanatory variables and each control variable, and  $\varepsilon_{i,t}$  is the random error term. Meanwhile, in order to explore the variability of the impact of ESG performance on the cost of equity capital under different locations, this paper also classifies the research samples and conducts group testing on the basis of Model (1) for checking Hypotheses 3 and 4.

## Empirical Results and Discussion

### Summary statistics

Table 4 presents the results of the descriptive analysis of the variables. As shown in Table 6, the maximum value of the Cost of Equity (COE) is 0.131, the minimum value is 0.000181, and the standard deviation is 0.0214, indicating a relatively small difference in the Cost of Equity among the target companies and a narrow range of variation. The mean value of ESG is 6.255, suggesting room for improvement, with a standard deviation of 0.809, indicating significant variation in ESG performance among the sampled companies. Similar situations are observed for individual ESG scores, especially with the lowest mean score in the

**Table 4.** Summary statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
COE	5.670	0.0143	0.0214	0.000181	0.131
ESG	5.670	6.255	0.809	4.590	8.530
E	5.670	2.822	2.113	0.180	9.620
S	5.670	4.402	1.801	0.680	9
G	5.670	6.623	0.930	4.190	9.110
ROA	5.670	6.469	6.149	-11.37	27.13
ROE	5.670	9.226	9.850	-26.33	42.03
TR	5670	0.669	0.401	0.0348	2.362
DR	5.670	45.77	18.51	8.652	91.82
G	5.670	14.29	25.28	-42.29	123.1

Environmental (E) component, indicating substantial data volatility and significant differences in ESG practices among the target companies, with an overall low level.

In terms of control variables, the standard deviations of Return on Assets (ROA) and Return on Equity (ROE) are 6.149 and 9.850, respectively, pointing to significant differences in the profitability of the selected sample companies. The mean value of Total Asset Turnover Ratio (TR) is 66.9%, indicating that the majority of companies have high operating efficiency and can create value more effectively by utilizing assets. The maximum value of Debt Ratio (DR) is 91.82%, the minimum value is 8.652%, and the difference between the two values indicates significant differences in the debt structure and business risk among different companies. The maximum value of Growth (g) is 123.1, and the minimum value is negative, suggesting that some companies are experiencing rapid growth while others are experiencing a decline in business performance.

### Correlation matrix and VIF

In this section, the relationship between variables is preliminarily examined through correlation analysis, with the test results presented in Table 5.

As Table 5 shows, the regression coefficient of the ESG score and the cost of equity capital for listed companies is equal to  $-0.056$  and passes the 1% significance test. This indicates a significant negative correlation between the two, suggesting that companies can achieve a reduction in the cost of equity by enhancing their ESG performance. In terms of control variables, the Return on Assets (ROA), Return on Equity (ROE), and Growth (g) have a significantly negative impact on the cost of equity capital, while the Debt Ratio (DR) also has a significantly negative impact on the cost of equity capital. The above correlation analysis results indicate the practical significance of the empirical analysis in this study.

**Table 5.** Correlation matrix with ESG

	COE	ESG	ROA	ROE	TR	DR	g
COE	1						
ESG	-0.056***	1					
ROA	-0.160***	0.0150	1				
ROE	-0.149***	0.035***	0.885***	1			
TR	-0.0100	0.00700	0.226***	0.232***	1		
DR	0.210***	-0.00700	-0.387***	-0.126***	0.040***	1	
G	-0.069***	0.00700	0.307***	0.336***	0.158***	0.037***	1

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

**Table 6.** VIF for variables

Variable	VIF	Tolerance, 1/VIF	Variable	VIF	Tolerance, 1/VIF
ESG	1.00	0.996977	E	1.24	0.805323
			S	1.21	0.828377
			G	1.12	0.891472
ROA	7.30	0.137002	ROA	7.33	0.136517
ROE	6.22	0.160892	ROE	6.23	0.160538
TR	1.08	0.925017	TR	1.08	0.923719
DR	1.62	0.616341	DR	1.65	0.607264
G	1.15	0.868668	g	1.16	0.864452
Mean VIF	3.06		Mean VIF	2.63	

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

In order to ensure the reliability and accuracy of the empirical results, this study further conducted a multicollinearity test on the empirical model using variance inflation factors (VIF), with the test results shown in Table 6. It can be observed that the maximum VIF of the model is 7.33, and all variables have VIF values below the critical threshold of 10, with average values not exceeding 3.1. Therefore, the empirical model constructed in this study does not exhibit multicollinearity.

### Regression results and discussion

The regression results in Table 7 provide partial support for the study's hypotheses. Model (1) confirms Hypothesis 1: the aggregate ESG score exhibits a negative coefficient ( $-0.0007$ ,  $p < 0.10$ ), indicating that higher overall ESG performance is associated with a lower cost of equity capital (COE), albeit at the marginal 10% significance level. This aligns with the theoretical expectation that strong ESG performance signals reduced risk and enhances investor confidence, thereby lowering financing costs.

However, Model (2), which disaggregates the three ESG dimensions, yields a more nuanced picture regarding Hypothesis 2 (which posits governance as the most influential dimension). Contrary to this prediction, the governance (G) component shows a small, statistically insignificant coefficient ( $-0.0002$ ,  $p > 0.10$ ). Instead, the social (S) dimension emerges as the strongest predictor, with a large and highly significant negative effect ( $-0.0008$ ,  $p < 0.01$ ), while the environmental (E) dimension displays a positive and significant coefficient ( $0.0006$ ,  $p < 0.01$ ), suggesting that higher environmental performance is linked to a higher COE in this sample.

This result supports findings by Fedorova et al. [29] that underscore a notable shift in investor behaviour during 2021–2022, when social ESG factors began to exert a stronger influence on the investment appeal of Chinese firms. By employing panel regression analysis alongside

**Table 7.** Regression Results for Hypotheses 1 and 2

VARIABLES	(1)	(2)
	COE	COE
ESG	$-0.0007^*$ (-1.85)	
E		$0.0006^{***}$ (4.14)
S		$-0.0008^{***}$ (-4.70)
G		$-0.0002$ (-0.53)
ROA	$0.0005^{***}$ (3.05)	$0.0005^{***}$ (3.04)
ROE	$-0.0005^{***}$ (-4.88)	$-0.0005^{***}$ (-4.92)
TR	$-0.0006$ (-0.82)	$-0.0007$ (-0.92)
DR	$0.0003^{***}$ (10.50)	$0.0003^{***}$ (10.01)
Growth (g)	$-0.0000^{***}$ (-2.81)	$-0.0000^{**}$ (-2.50)
_cons	$0.0060^*$ (1.94)	$0.0051^*$ (1.91)
Year effect	Yes	Yes
Industry effect	Yes	Yes
Observations	5.670	5,670
R-squared	0.113	0.118

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

textual assessment of corporate disclosures, Fedorova et al. [29] demonstrate that enhanced transparency in social performance metrics, such as labour practices, community engagement, and employee welfare, serve as credible signals that shape investor perceptions and decision-making.

This empirical confirmation of the heightened relevance of social factors lends further credence to signalling theory, suggesting that firms' transparent communication of social initiatives meaningfully influences market perceptions, ultimately contributing to lower equity financing costs. Meanwhile, the unexpected positive association between environmental performance (E) and COE underscores the complexity of ESG dynamics in the Chinese context, warranting deeper inquiry into the mechanisms through which different ESG pillars affect firm valuation.

When examining the three ESG dimensions (environment, social, and governance) separately, Model (2) regression results reveal a nuanced and somewhat counterintuitive pattern. Environmental factors exhibit a statistically significant positive coefficient (0.0006,  $p < 0.01$ ), implying that higher environmental performance is associated with a higher cost of equity capital – a finding that runs counter to conventional expectations, although the value

of this coefficient is very small. In contrast, the social dimension displays a strong negative and highly significant effect ( $-0.0008$ ,  $p < 0.01$ ), indicating that improved social performance meaningfully reduces firms' cost of equity. The governance dimension, while also negative ( $-0.0002$ ), lacks statistical significance ( $p > 0.10$ ), suggesting it does not exert a discernible influence on the cost of equity in this sample.

These results directly challenge Hypothesis 2, which posits governance as the most impactful ESG dimension. Instead, the data underscore the predominant role of social factors in lowering the cost of equity, thereby corroborating the theoretical insights from Fedorova et al. [29] on the growing importance of social signals in the Chinese market. While the findings diverge from Kong [24] and Ramirez et al. [22], who emphasised governance effects, and also contrast with Wang et al. [16]'s observation of weaker social-COE linkages in Asian markets, they align closely with Xu et al. [18]'s evidence of a negative CSR-COE relationship in China. Moreover, the strong social effect resonates with Matthiesen and Salzmann [9], who argued that in collectivist societies, corporate social responsibility carries greater weight in investor valuations.

**Table 8.** Regression Results for Hypothesis 3

	(1) Hong Kong	(2) Mainland
ESG	0.0014 (0.43)	-0.0014*** (-3.69)
ROA	0.0014 (1.20)	0.0003* (1.86)
ROE	-0.0026*** (-4.40)	-0.0004*** (-3.48)
TR	0.0114** (2.12)	-0.0006 (-0.85)
DR	-0.0000 (-0.17)	0.0002*** (10.24)
Growth (g)	0.0000 (0.38)	-0.0000** (-2.45)
_cons	0.0104 (0.43)	0.0117*** (3.96)
Year effect	Yes	Yes
Industry effect	Yes	Yes
Observations	235	5435
R-squared	0.398	0.108

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

To probe deeper into contextual heterogeneity, the study proceeds with sub-sample regressions, stratifying the data by geographical region and ownership structure. The following section presents the results of this heterogeneity analysis, shedding light on how regional and institutional factors moderate the ESG-cost of equity relationship in the Chinese market.

The regional heterogeneity analysis, presented in Table 8, examines how the relationship between ESG performance and the cost of equity capital (COE) varies between Hong Kong and mainland China. The sample is stratified by geographic location, with Regression (1) covering Hong Kong firms ( $N = 235$ ) and Regression (2) focusing on mainland Chinese enterprises ( $N = 5435$ ). Key findings reveal a striking divergence between the two regions. For Hong Kong listed companies, the ESG coefficient is positive (0.0014) but statistically insignificant ( $t = 0.43$ ), indicating no discernible effect of ESG performance on COE in this subsample. In contrast, mainland Chinese firms exhibit a strong negative and highly significant relationship: the ESG coefficient stands at  $-0.0014$  ( $p < 0.01$ ;  $t = -3.69$ ), suggesting that improved ESG performance meaningfully reduces the cost of equity capital.

This pronounced regional disparity supports Hypothesis 3: the impact of ESG on COE differs significantly between mainland China and Hong Kong. Several factors may explain this divergence such as distinct regulatory environments (mainland China's stronger policy push for

ESG adoption as Hong Kong is using a market-driven approach), differences in investor expectations and market maturity or varying degrees of state influence on corporate behaviour in the mainland.

The control variables further illuminate regional nuances:

- ROE shows a robust negative effect in both subsamples, consistent with profitability reducing financing costs;
- DR (debt ratio) is highly significant ( $p < 0.01$ ) in the mainland model but insignificant in Hong Kong, reflecting different capital structure dynamics;
- TR (total revenue) is significant only in Hong Kong ( $p < 0.05$ ), possibly capturing scale effects in a smaller, more concentrated market.

Notably, the model fit differs substantially: the Hong Kong regression explains 39.8% of the variance ( $R^2 = 0.398$ ), while the mainland model has a lower  $R^2$  (0.108), likely due to greater heterogeneity in the larger mainland sample.

In sum, the results confirm that ESG's influence on COE is context-dependent within China. While mainland firms benefit from ESG improvements through lower equity costs, Hong Kong companies do not exhibit this linkage, underscoring the importance of regional institutional factors in shaping ESG–finance relationships. Therefore, Hypothesis 3 is confirmed.

**Table 9.** Regression Results for Hypothesis 4

	(1) SOE	(2) Non-SOE
ESG	-0.0002 (-0.24)	-0.0014*** (-3.30)
ROA	0.0006** (2.23)	0.0002 (1.35)
ROE	-0.0007*** (-4.06)	-0.0003*** (-2.82)
TR	-0.0032*** (-2.83)	0.0010 (0.87)
DR	0.0003*** (8.19)	0.0002*** (6.77)
Growth (g)	-0.0001** (-2.48)	-0.0000 (-0.98)
_cons	-0.0000 (-0.01)	0.0143*** (4.22)
Year effect	Yes	Yes
Industry effect	Yes	Yes
Observations	2430	3240
R-squared	0.147	0.082

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

The sub-sample regression analysis presented in Table 9 reveals a pronounced divergence in the relationship between ESG performance and the cost of equity capital (COE) across firms with different ownership structures in China. For state-owned enterprises (SOEs), the ESG coefficient is negative ( $-0.0002$ ) but statistically insignificant ( $t = -0.24$ ,  $p > 0.10$ ), indicating that ESG initiatives do not translate into measurable reductions in equity financing costs. This finding suggests that investors may perceive ESG activities in SOEs primarily as compliance-driven rather than value-enhancing, potentially discounting their strategic significance given the implicit state backing these firms enjoy. In contrast, non-state-owned enterprises (non-SOEs) demonstrate a robust negative and highly significant relationship: the ESG coefficient reaches  $-0.0014$  ( $t = -3.30$ ,  $p < 0.01$ ), implying that improved ESG performance meaningfully lowers the cost of equity. This pronounced effect likely reflects non-SOEs' greater reliance on market signals to attract capital; their ESG disclosures may effectively mitigate information asymmetry and signal long-term viability, thereby reducing perceived risk and required returns. Control variables further corroborate these patterns: while ROA and ROE exhibit expected significant effects in both subsamples, the debt ratio (DR) remains consistently significant ( $p < 0.01$ ) across ownership types, underscoring the universal relevance of leverage in capital pricing. Notably, the model fit differs between groups, with SOEs explaining 14.7 % of the variance ( $R^2 = 0.147$ ) versus 8.2 % for non-SOEs ( $R^2 = 0.082$ ), possibly reflecting greater heterogeneity in the latter group. Collectively, these results strongly support Hypothesis 4, confirming that ownership structure critically moderates the ESG–COE nexus in China: non-SOEs derive substantial financial benefits from ESG investments, whereas SOEs do not exhibit this linkage, highlighting the importance of institutional context in evaluating ESG's capital market implications. Thus, Hypothesis 4 is confirmed.

The post-estimated heterogeneity analysis reveals that the impact of the social factor on the cost of equity capital varies significantly across different regions and ownership types of firms. This result suggests that the role of the social factor in Chinese firms' ESG practices is not uniform, exhibiting considerable heterogeneity.

The robustness check results indicate that the research conclusions remained relatively stable despite changes in model specifications, reflecting the high reliability of the aforementioned model results.

The analysis yields four key conclusions regarding ESG's impact on the cost of equity capital (COE) in China. Hypothesis 1 receives partial support: aggregate ESG performance negatively correlates with COE, though marginally ( $p < 0.10$ ). Hypothesis 2 is rejected: governance (G) shows no significant effect, while social (S) emerges as the strongest predictor ( $\beta = -0.0008$ ,  $p < 0.01$ ). Hypothesis 3 is confirmed: mainland firms exhibit a significant ESG–COE linkage ( $\beta = -0.0014$ ,  $p < 0.01$ ), unlike Hong Kong firms ( $\beta = 0.0014$ ,  $p > 0.10$ ), highlighting regional institutional differences. Hypothesis 4 is also upheld: non-SOEs show

a strong negative ESG–COE relationship ( $\beta = -0.0014$ ,  $p < 0.01$ ), whereas SOEs display no significant effect ( $\beta = -0.0002$ ,  $p > 0.10$ ), underscoring ownership structure as a critical moderator.

## Conclusions and Implications

### Conclusions

This study employs an empirical model grounded in prior literature and drawing on five-year ESG data from the Wind database to examine the relationship between corporate ESG performance and the cost of equity capital (COE) among Chinese listed firms, controlling for ROA, ROE, TR, DR, and Growth. The findings reveal a significant negative correlation between overall ESG performance and COE, confirming that enhanced ESG practices reduce equity financing costs. However, results diverge from initial hypotheses in key respects. Contrary to the expectation that governance (G) would exert the strongest influence (Hypothesis 2), the social (S) dimension emerges as the most impactful, a finding at odds with Arrigo [21], Ramirez et al. [22], and Ashbaugh et al. [23] but consistent with Mathiesen and Salzmann [9]. This alignment may reflect China's collectivist context, where investor valuations prioritise social responsibility (e.g., employee welfare, community engagement) over environmental or governance metrics. Regional analysis (Hypothesis 3) further shows that mainland firms experience a more pronounced COE reduction from ESG improvement than Hong Kong counterparts, challenging assumptions that high marketisation (as in Hong Kong) strengthen this linkage. Instead, Hong Kong's robust regulatory framework and market orientation may constrain ESG's financial impact, as suggested by Zhu et al. [15] regarding marketisation's complex role in agency cost dynamics. Finally, ownership structure (Hypothesis 4) proves critical: non-SOEs exhibit a significant ESG–COE nexus (at  $p < 0.01$ ), whereas SOEs show no such effect, likely due to differing incentives and investor perceptions of ESG as compliance-driven rather than value-creating.

### Recommendations

For Chinese companies, the improvement of ESG performance can lead to a reduction in the cost of equity capital, particularly for non-state-owned enterprises and companies in mainland China, where this impact is more pronounced. Therefore, companies should actively enhance their ESG performance and integrate the improvement of the three dimensions of environmental protection, social responsibility, and corporate governance into their business strategies to achieve positive economic benefits. In line with the findings of this study, companies should proactively assume social responsibility, respond to national policies, and conduct activities in accordance with the Chinese government's social responsibility guidelines. Additionally, companies should genuinely focus on and maintain relationships with stakeholders, as well as strengthening communication with investors by enhancing the quality of information disclosure.

During China's past economic development, there have been long-standing issues such as excessive resource consumption and environmental pollution. The Chinese government has recognized the need to explore more sustainable and environmentally friendly development approaches as the economy enters a phase of high-quality development. This study shows that companies are linking higher E-pillar score with the COE values.

However, ESG-related systems in China still require further improvement. This study found that many ESG indicators are difficult to collect, and uniform, comprehensive standards are lacking. Therefore, the Chinese government should play a supervisory role, improve the ESG information disclosure system, establish corresponding guidelines and standards, and urge companies to regularly publish ESG reports. Encouraging support from various sectors of society for companies and projects with good ESG performance and providing technical or financial assistance to companies that fulfil social responsibilities can further guide the market, promote the concept of responsible investment and green finance, and build a green and sustainable financial system.

ESG rating agencies have played an important role in this field. Their ESG rating reports provide a comprehensive assessment of the ESG performance of listed companies and are an important means for various sectors of society to evaluate the non-financial performance of listed companies. Over the years, several rating agencies in China have introduced their own distinctive rating systems. While most rating agencies describe the indicators they use, the basis for selecting these indicators and their weights are not disclosed. In optimizing indicators to better align with China's national conditions, it is important to seek common ground while preserving differences and to consider incorporating rating comparisons with foreign companies. Rating agencies can also consider collaborating with government departments to increase data acquisition channels as well as utilizing big data and other technological means for tracking data more comprehensively from companies worldwide. This should not only cover ESG rating data for well-performing companies in the stock market and those with strong overall capabilities, but also consider more small and medium-sized enterprises, continually expanding the number of companies being evaluated to meet the needs of more investors, and provide more objective and accurate references.

### Limitations & prospects

This paper discusses the relation between corporate ESG performance and cost of equity capital from a theoretical perspective, putting forward research hypotheses and then testing these hypotheses through panel regression models in the empirical process. However, due to the limitations of research level and objective conditions, this paper still has some limitations.

The research sample in this study only includes data from Chinese listed companies from 2018 to 2022. Despite the short time period, there are still many cases of missing data,

resulting in a relatively limited sample size. Additionally, the research sample is focused solely on listed companies in China. Therefore, further exploration would be necessary to understand the situation of non-listed companies. Furthermore, since the ESG ratings from the Wind Financial Terminal are specific to Chinese listed companies, it is not possible to compare them with companies from other countries, potentially limiting the generalizability of the results to other countries or regions.

Although this study examines the three dimensions of ESG, it places less emphasis on the sub-elements of ESG and does not adjust the weights of corresponding indicators based on industry differences. Many institutions adjust the weights of indicators based on industry differences to more accurately reflect a company's ESG performance. Considering that setting weights for industries often requires more comprehensive information disclosure, this study did not adjust indicator weights for different industries. Future research is encouraged to further investigate the sub-elements of each standard to determine if any one standard plays a predominant role in reducing the cost of equity capital for companies in different industries. Regional differences emerged: mainland firms benefit more from ESG improvements than Hong Kong counterparts, likely due to regulatory and marketisation disparities. The research also highlights systemic challenges including inconsistent ESG data disclosure and a lack of uniform standards, underscoring the need for stronger government oversight, clearer guidelines, and enhanced corporate transparency. Ultimately, the findings advocate for strategic ESG integration to lower financing costs and advance sustainable finance in China.

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