

## How Does ESG Performance Impact Corporate Financing Costs? An Empirical Study in China

**Wei LI**

*School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100190, China*

**Mei MEI\***

*Institute of Medical Information & Library, Chinese Academy of Medical Sciences, Beijing 100005, China*

*E-mail: meimei@imicams.ac.cn*

**Xiaoyan YU**

*School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100190, China*

**Jiahao WANG**

*Business and Management, Royal Holloway, University of London, Surrey TW20 0EX, UK*

**Tiangeng (Becky) GENG**

*Krieger School of Arts and Sciences, Johns Hopkins University, Baltimore MD 21218, USA*

**Abstract** In the background of the green transformation of the economy and society, the ESG performance of enterprises has been paid more and more attention in the investment decision-making. However, previous studies have inadequately explored how the ESG performance affects corporate financing costs. Based on the information asymmetry theory, this paper analyzes the impact mechanism of ESG performance on corporate financing costs. Then, taking 1044 A-share listed companies in 2016–2020 as a sample, through the sorting and analysis of ESG report disclosure and rating data, the company's ESG performance indicators are obtained, and an empirical model is built to test the relationship between ESG performance and corporate financing costs. This paper constructs a panel regression model using ESG rating data and corporate financial data and finds that in the overall sample, the higher the ESG performance, the lower the equity financing cost; The higher the ESG performance, the lower the debt financing cost. In addition, it also discussed the moderating effect of enterprise scale and media attention on the impact of ESG performance on enterprise financing costs. The empirical results show that the influence of company size on ESG performance on financing costs has a moderating effect and a positive moderating effect.

**Keywords** ESG performance; financing cost; corporate heterogeneity; media attention

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\*Corresponding author

## 1 Introduction

Driven by the need for the comprehensive green transformation of the economy and society, relevant government departments and financial regulators have issued regulatory policies for ESG (Environment, Social and Governance) management and disclosure of listed companies. Under the guidance of regulatory policies, the ESG information disclosure of listed companies in China has shown an increasing trend from 2009 to 2021. The number of ESG reports issued by all A-share listed companies has increased from 371 in 2009 to 1,025 in 2020, which indicates the head office has a strong awareness of ESG management and disclosure.

Driven by both policies and the market, all parties in society pay more attention to the ESG performance and other non-financial performance. They also use ESG rating as an indicator for investment decision-making. The rise of ESG investment in China is relatively late. Although the initial scale is small, the growth trend has been obvious in recent years. In 2021, the scale of China's ESG market is about 13.71 trillion yuan, an increase of 22.9% over 2019, where green loans account for over 80%. The capital market is paying more attention to investment in ESG-related fields.

Financing is an important factor that affects the development, growth, and effective allocation of resources in the quality of development process and decision-making of an enterprise. The level of financing costs directly determines the financing decisions and financing strategies, thereby affecting enterprises' growth and profitability. Currently, the external financing methods of listed companies in China mainly include debt financing and equity financing. Due to the late start of China's securities market and imperfect regulatory policies, problem such as information asymmetry that hinders the allocation of resources is widespread. The low quality of listed companies, imperfect information disclosure, and inadequate supervision restrict investors' investment behavior, resulting in companies generally bearing a high cost of equity capital. Debt financing is the main financing tool for listed companies in China. Factors will affect the financing cost such as the degree of information asymmetry and corporate governance characteristics. As a reflection of non-financial performance, ESG performance will affect corporate information asymmetry and other issues to a certain extent, thereby affecting corporate financing costs. Although the current research results shows that corporate ESG spending will reduce corporate financing cost (Dimson's, 2015), however, it is still lack of sufficient empirical analysis of how does enterprises' ESG performance impact on equity financing cost and debt financing cost.

This paper collects data from WIND and CSMAR. It takes 1,044 A-share listed companies from 2016 to 2020 as a sample to empirically analyze the impact of ESG performance on corporate financing costs. The moderating effect of firm size and media attention on the impact of ESG performance on firm financing costs will be analyzed and explored.

## 2 Related Work

### 2.1 Information Asymmetry Theory

According to the information asymmetry theory, it is difficult for external investors to understand all financial and non-financial information of the enterprise due to the lack of information channels. Therefore, the financial and non-financial information reports issued by

enterprises are the basis for external investors to understand the development of enterprises. The quantity and quality of information disclosed by the company will impact the capital return of external investors. High quality financial and non-financial information reports (such as social responsibility reports and ESG reports) can improve the transparency of enterprises, reduce information asymmetry, ultimately affect the financing costs of enterprises, and make their investors demand lower returns. The disclosure of the ESG report enables external investors to get more information about the company's non-financial performance, reducing the company's financing costs. Therefore, companies that actively improve ESG performance can invest more in the development needs of business risks, choose investment portfolios that can promote the company's development and reduce risks, and choose appropriate capital structures.

## 2.2 Equity Financing Cost Perspective

Many studies found that corporate social responsibility performance (CSR) reduces equity-financing costs. With the improvement of the overall governance level in listed companies, the cost of equity financing and debt financing will decrease, and the negative impact of corporate governance on the cost of equity financing is more significant than debt financing, the higher the CSR score, the lower the equity financing cost of the enterprise. For listed companies, after increasing management compensation or using an equity incentive mechanism, increasing equity incentive and management compensation can reduce agency costs, which also helps to reduce equity financing costs. Using the sample of more than 3000 listed companies from 1990 to 2013, the financial and non-financial performance analysis (ESG) study concluded that there is a significant negative correlation between environment and corporate governance and equity financing costs, while the negative correlation between social responsibility and equity financing costs is not significant<sup>[1]</sup>. In the empirical research on the samples of listed companies with different cultural backgrounds, corporate behavior in corporate social responsibility can reduce the cost of equity financing. This finding is more significant in countries with low confidence and high humanistic orientation. Statistically and economically, corporate sustainability and equity financing costs have a significant negative correlation. The more a company participates in corporate social responsibility, the lower its cost of equity financing. The relationship between corporate social responsibility and fair cost is stronger in countries with low confidence, high social-humanistic orientation, and a high degree of collectivization of the political system<sup>[2]</sup>.

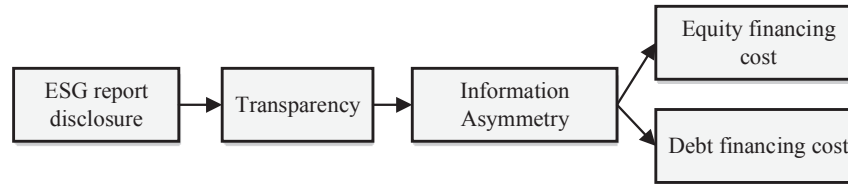
## 3 Empirical Analysis of the Impact of ESG Performance on Financing Cost

### 3.1 Study on the Impact of ESG Performance on Financing Cost

According to the stakeholder theory, good ESG performance is related to good stakeholder participation. The disclosure of corporate ESG reports improves the transparency of companies in the capital market, thereby reducing information asymmetry, which in turn reduces companies' access to capital in the capital market.

Equity financing channels are greatly affected by regulatory policies. In addition, equity investors are mainly stock investors in the market, and external investors have less access to company information. These investors pay more attention to listed companies' non-financial

information (such as CSR and ESG reports). At the same time, investors who focus on non-financial information are more sensitive to the information in the market and are more willing to respond to the call of ESG investment philosophy. ESG performance hurts the cost of equity financing of enterprises, and it also harms the cost of debt financing of enterprises<sup>[3-5]</sup>. Shi, Bao and Li<sup>[6]</sup> emphasized pointed that to meet the needs of government regulators and market investors, ESG performance will be included in the credit mechanism, because after being included in the credit mechanism, the compliance management of ESG risks can reduce investment costs, thereby enhancing investor confidence in the enterprise, which in turn affects the financing cost of the enterprise. See Figure 1.



**Figure 1** H1, H2 logical framework

Based on the above analysis, this paper proposes the following assumptions:

H1: Improving ESG performance can reduce companies' equity financing costs.

H2: Improving ESG performance can reduce companies' debt financing costs.

### 3.2 Data Sources

This paper selects all A-share listed companies as the research object and uses the five-year annual data from 2016 to 2020 as the empirical research sample. Since the disclosure of ESG reports of Chinese listed companies has grown in scale since 2016, the time range of the sample data in this paper is from 2016 to 2020. The financial data related to listed companies is obtained through the WIND and CSMAR databases, and the corporate ESG rating data comes from the wind Database SynTao Green Finance ESG Ratings.

In this paper, 1,044 companies' annual data and 3,484 sample observations are obtained to construct unbalanced panel data. This article uses Stata16 and Python for data processing. Continuous variables were tailed at the 1% and 99% levels. Based on the first-level industries of the China Securities Regulatory Commission, the selected companies cover 71 different industries. The sample data is grouped according to industry characteristics, size, and ownership attributes.

### 3.3 Variable Settings

The cost of equity financing is the transfer of control of the firm from the user of the capital (the firm) to the owner of the capital (the investor). It can also be described as the cost of acquiring equity capital (the rate of return required by the investor). There are several ways to calculate the cost of equity financing: The arbitrage pricing model, the discounted dividend model, the capital asset pricing model, the three-factor model, and the PEG model. Given that the derivative model of the dividend discount model fully reflects the concept of matter risk forecasting, this paper selects the PEG model, which has a relatively simple composition and

reflects the analyst's forecast of the company's future earnings future.

The PEG model assumes a positive short-term EPS growth rate and a zero long-term dividend growth rate and EPS. The specific calculation model is as follows.

$$EF = \sqrt{\frac{ESP2 - ESP1}{P0}}, \quad (1)$$

where EF represents the response variable cost of equity financing,  $P0$  denotes the stock price per share at the end of period  $t0$ , ESP1 denotes analysts' forecasted earnings per share in period  $t1$ , and ESP2 denotes analysts' forecasted earnings per share in period  $t2$ . This paper's analyst forecast indicator data are obtained from the CSMAR database. The composition of corporate debt financing costs is complex. Currently, the common calculation methods include the ratio of financial expenses to interest-bearing debts<sup>[7, 8]</sup>, the ratio of interest expenses to interest-bearing debts<sup>[9, 10]</sup>, and the ratio of the sum of expenditure plus interest income to the sum of short-term debt plus long-term debt is used as a proxy variable<sup>[11–13]</sup>. Based on the above summary analysis, this paper measures the cost of debt financing by the ratio of the net capital expenditure plus interest income to the sum of its short-term debt and long-term debt.

$$DF = (\text{capital expenditure} + \text{interest income}) / \text{sum of long and short-term debt}, \quad (2)$$

where DF represents the response variable equity financing cost, the sum of long-term debt is equal to the sum of long-term borrowings, bonds payable, and long-term payables. Short-term debt is equal to the sum of short-term borrowings, notes payable, long-term borrowings due within one year, and bonds payable within one year.

To control the potential confounding effect in the model, referring to existing research results, this paper selects return on equity (ROE), asset-liability ratio (ZCFZ), the shareholding ratio of the largest shareholder (top), total assets turnover (TAT), net cash flow from operating activities to liabilities (CFI), total assets growth (Growth), and proportion of independent directors (indepn) as control variables. At the same time, the annual dummy variable (year) is introduced for the year's impact.

Total assets turnover (TAT): In this paper, the total assets turnover of listed companies is selected as an indicator to measure the operating capacity of enterprises. Jiang<sup>[14]</sup> found that a low asset turnover represents a serious agency problem, leading to a higher equity financing cost.

Independent director ratio (indepn): Independent directors do not hold positions other than a director in the company but have an interesting relationship with the company. The independence and professional judgment of independent directors make them independent from shareholders and other company members, which helps to promote the impartiality and objectivity of the board of directors' operational decisions. Therefore, introducing a certain number of independent directors to the board of directors is of great significance to supervise and restrain the daily behaviors of the company's management to promote the improvement of the company's decision-making level and business performance to a certain extent.

Net cash flows generated by operating activities/total liabilities (CFI): The ratio of net cash flows generated by operating activities to total liabilities is used in this paper to represent the solvency of an enterprise. The solvency of an enterprise often has a significant impact on its

financing ability. The stronger the solvency, the more creditors' and shareholders' capital will be secure. Therefore, the lower the cost of equity financing and debt financing.

**Ownership concentration (top 1):** This paper uses the shareholding ratio of the largest shareholder at the end of the current year as a surrogate variable for corporate governance. Enterprises with sound corporate governance structures can effectively prevent major shareholders from infringing on minority shareholders and creditors. The relationship between the board of director's independence, ownership structure, and debt cost. The higher the ownership concentration, the higher the debt cost. The cost of equity financing is uncertain due to the single governance mechanism, which is related to the complexity and particularity of the Chinese corporate governance structure.

**Return on equity (ROE):** Net profit/shareholders' equity balance at the end of the year, a measure of profitability. The return on assets reflects the profitability of the company. Dhaliwal<sup>[6]</sup> found that enterprises with higher profitability have lower default risk and a higher possibility of debt repayment, and debtors require less risk premium. The more secure creditors' principal and interest are, the lower their debt financing costs may be. From the perspective of shareholders, the stronger the company's profitability, the higher the shareholders' expectations, thus making the company's equity financing cost higher.

**Asset-liability ratio (ZCFZ):** This paper uses the asset-liability ratio as the index to measure the capital structure of enterprises. According to the theory of optimal capital structure, the higher the financial risk, the higher the return on risk required by shareholders; that is, the higher the cost of equity financing<sup>[15-17]</sup>.

**Growth rate (Growth):** In this paper, the growth rate of total assets is used to represent the growth capacity of enterprises. Enterprises with high growth rates are easier to obtain financing, and investors have good expectations for the future development of enterprises, so the risk premium required is lower. That is, growth and capital cost are negatively correlated.

To ensure the rationality of correlation analysis and multiple regression analysis, the sample variables are first described. To eliminate the possible impact of outliers, this paper reduces the continuous variables to 1% and 99% levels. The descriptive statistical results obtained are shown in Table 1. The expected variable ESG performance (score) is as follows: The average value is 5.158, representing the average level of the sample company's ESG performance. The minimum value (min) of the score is 3, the maximum value (max) is 7, and the standard deviation (sd) is 0.944, indicating that the variability of the explanatory variable ESG performance (score) level in the total sample company is relatively significant. The mean value of interpretative variable equity financing cost (EF) is 0.061, the standard deviation is 0.082, the median value of interpretative variable debt financing cost (DF) is -0.014, and the standard deviation is 0.229. Based on the above data analysis, it can be concluded that the sample companies have certain differences in equity financing costs (EF) and debt financing costs (DF), and the differences between debt financing costs are more obvious.

The correlation test results among the coefficients of the main variables are shown in Table 2. The maximum value of the absolute value of the correlation coefficients among the response variables, the explained variables, and the control variables is 0.481, which can be seen to be below 0.5, indicating that the correlation coefficients are relatively low. There is no significant

multicollinearity problem.

**Table 1** Descriptive statistical analysis

variable	<i>N</i>	mean	p25	p50	p75	sd	min	max
EF	3626	0.061	0	0	0.108	0.082	0	0.314
DF	3626	−0.014	0	0.03	0.051	0.229	−1.306	0.297
score	3626	5.158	5	5	6	0.944	3	7
ROE	3626	9.747	4.13	9.503	16.15	15.03	−47.76	47.43
TAT	3626	0.679	0.375	0.59	0.874	0.442	0.05	2.147
ZCFZ	3626	42.45	26.05	41.02	56.88	20.69	7.875	91.28
CFI	3626	0.219	0.029	0.136	0.321	0.332	−0.357	1.415
Growth	3626	19.05	1.895	10.91	26.39	30.29	−26.63	134.2
top1	3626	33.29	21.9	30.95	42.86	14.43	10	68.26
independ	3626	0.351	0.333	0.333	0.429	0.102	0	0.5

**Table 2** Analysis of the relationship

Variables	(EF)	(DF)	(score)	(ROE)	(TAT)	(ZCFZ)
EF	1.000					
DF	−0.009	1.000				
score	0.062***	−0.024***	1.000			
ROE	0.178***	−0.054***	0.023	1.000		
TAT	0.103***	0.049***	−0.045***	0.377***	1.000	
ZCFZ	0.053***	0.255***	0.110***	−0.131***	0.021***	1.000
CFI	0.075***	−0.221***	−0.040**	0.339***	0.131***	−0.481***
Growth	0.096***	−0.014**	−0.002	0.346***	0.154***	−0.125***
top1	0.078***	−0.059***	0.057***	0.171***	0.104***	0.004
independ	−0.020**	−0.017**	0.047***	−0.174***	−0.147***	0.002

Note: *p*-values in parentheses *p* < 0.1, \*\* *p* < 0.05, \*\*\* *p* < 0.01.

### 3.4 Model Building

According to the hypothesis of this paper, the cost of equity financing (EF) and the cost of debt financing (DF) are target response variables, the ESG score is the explanatory variable, and the control variables are: the return on net assets (ROE), the gearing ratio (ZCFZ), equity concentration (top1), total asset turnover (TAT), solvency (CFI), total asset growth (Growth), independent director ratio (independ), and the year dummy variable (*year<sub>it</sub>*) is added to control for time effects.

$$\begin{aligned}
 RES_{it} = & \beta_0 + \beta_1 score_{it} + \beta_2 ROE_{it} + \beta_3 CFI_{it} + \beta_4 TAT_{it} + \beta_5 top1_{it} + \\
 & \beta_6 CFI_{it} + \beta_7 independ_{it} + \beta_8 year_{it} + \beta_9 ZCFZ_{it} + \beta_{10} Growth_{it} + \epsilon_{it}.
 \end{aligned} \tag{3}$$

In the above model,  $\beta_0$  denotes the constant term;  $\beta_i$  ( $i = 1, 2, \dots$ ) denotes the coefficient of each variable,  $i$  denotes the year,  $t$  denotes the sample firm, and  $\epsilon_{it}$  is the random error term. Model (3) tests the relationship between ESG score (score) and the cost of equity financing of the firm or the cost of debt financing, where  $RES_{it}$  represents EF or DF. To ensure the reliability of the regression results, the total sample variables are first tested for multicollinearity. Table 3 shows the variance inflation factors (VIF) of the fitted model (3). The fitted results of both models, VIF does not exceed 10, indicating that neither has serious multicollinearity.

**Table 3** Multicollinearity test of total samples

Variable	VIF
CFI	1.56
ZCFZ	1.52
ROE	1.39
Growth	1.28
TAT	1.09
score	1.07
top1	1.06
independ	1.01
Mean VIF	1.24

#### 4 Moderating Effect of Firm Size on ESG Performance Impacts Financing Costs

Firm size is also a key regulatory factor. From the perspective of information asymmetry, large firms provide more transparent information<sup>[18]</sup>. Therefore large firms can provide a wider variety of information on business risks than smaller firms that are less transparent. Larger firms are more mature and resistant to internal and external uncertainties, so market investors trust larger firms more and demand lower returns. The larger the firm, the more resilient it is to various risks and the lower the risk of default, so its cost of debt will be lower than that of a smaller firm<sup>[19]</sup>. Smaller firms face inherent disadvantages and resource constraints compared to larger firms. Smaller firms have less access to core resources and are more likely to experience negative business activity. Smaller companies are generally in the growth stage. As a firm grows, it establishes linkages with a variety of resource providers that may facilitate the resulting reduced business risk. Small-scale firms need non-financial information such as improved environmental, social responsibility, and corporate governance to help them access the resources they need to grow<sup>[20]</sup>. The final utility of organizational legitimacy and corporate reputation is greater for small firms than for large firms. See Figure 2.

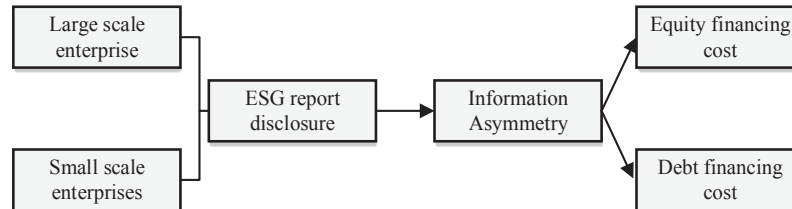
In short, for enterprises of different sizes, this paper proposes the following assumptions.

H3: Enterprise size has a moderating effect on the impact of ESG performance on financing costs.

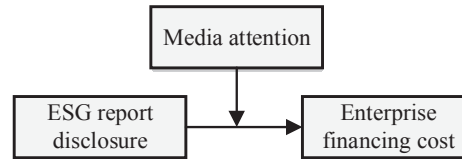
As far as the external governance effect of the media on the company is concerned, media pressure can limit the company's decision-making, while the media acts as an independent supervisory body. If a company's violations are found by the media, then its negative news is



easy to be exposed by the media, which will magnify the negative impact of this negative news, thus attracting more attention from government agencies. To prevent this, the company will standardize its internal management through long-term external media monitoring, and make the senior management of the company more cautious in making decisions. The company will develop on a long-term, healthy, sustainable path. It will be able to enhance the strength of companies in the same industry to a certain extent, enhance the trust of investors, and reduce financing costs. See Figure 3.



**Figure 2** H3 logic framework



**Figure 3** H4 logic framework

H4: Media attention has a moderating role in the effect of ESG performance on financing costs.

## 5 Analysis of Empirical Results

The total sample regression results are shown in Table 4. Column 1 shows the regression results for the cost of equity financing (EF) as a response variable, and the analysis finds that the regression coefficient between corporate ESG performance (score) and corporate equity financing cost (EF) is 0.00398 and negative and significant at the 5% level of significance, indicating that an increase in ESG score can significantly increase corporate equity financing cost, so, H1 is proved. Column 2 shows the regression results of debt financing cost (DF) as a response variable, and debt financing cost (DF) is negatively correlated with corporate ESG performance (score) with a correlation coefficient of 0.00922 and significant at 1% level of significance, indicating that the higher the ESG performance of a firm, the lower the debt financing cost of the firm, so, hypothesis H2 is confirmed.

Analyzing the direction of the sign of the coefficients of the control variables, the coefficient of the estimated value of the parameter of profitability (ROE) is negative in the regressions of both EF and DF, which indicates that the higher the profitability of the firm, the better it is to reduce the financing cost of the firm; the coefficient of the estimated value of the parameter of total asset turnover (TAT) is positive in the regressions of both EF and DF, which indicates that the higher the turnover of the firm, the higher the financing cost of the firm; the debt

servicing capacity (The estimated coefficients of CFI are negative in the regressions of DF, indicating that the stronger the solvency of the firm, the lower the cost of debt financing; the estimated coefficients of top1 are positive in the regressions of EF and negative in the regressions of DF, showing that higher equity concentration is not conducive to the reduction of the cost of equity financing, but is beneficial to the reduction of the cost of debt financing; the estimated coefficients of Growth (Growth) is negative in both EF and DF regressions, indicating that the faster the growth ability of a firm, the lower its financing cost.

In summary, under the influence of other controlled factors, improving ESG performance can remarkably reduce the cost of equity financing and the cost of debt financing. Secondly, there are differences in the factors affecting the cost of equity financing and the cost of debt. There are differences in the impact direction of the same factor on the cost of equity financing and the cost of debt financing.

**Table 4** ESG performance and financing cost regression results

	(1)	(2)
	EF	DF
score	-0.00398** (0.020)	-0.00922*** (0.009)
ROE	-0.000703*** (0.000)	-0.000193 (0.522)
TAT	0.0146*** (0.000)	0.0401*** (0.000)
CFI	0.00702 (0.345)	-0.213*** (0.000)
top1	0.000261*** (0.010)	-0.00101*** (0.000)
independ	0.0404 (0.194)	-0.0134 (0.835)
Growth	-0.000183** (0.048)	-0.000412** (0.034)
ZCFZ	0.000504*** (0.000)	0.00151*** (0.000)
_cons	-0.00133 (0.931)	0.0213 (0.512)
Annual	Controlled	Controlled
N	2609	3484
R-square	0.1611	0.1359

Note:  $p$ -values in parentheses  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5** Test of total sample replacement explanatory variables

	(1)	(2)
	EF	DF
score	-0.0105*** (0.000)	-0.0176*** (0.000)
ROE	0.000488*** (0.000)	0.000105 (0.610)
TAT	0.0106*** (0.000)	0.0403*** (0.000)
CFI	0.0172*** (0.000)	-0.209*** (0.000)
top1	0.000171*** (0.001)	-0.00103*** (0.000)
independ	-0.0172 (0.195)	0.111* (0.066)
Growth	0.000127*** (0.000)	0.000150 (0.163)
ZCFZ	0.000486*** (0.000)	0.00326*** (0.000)
_cons	-0.0166*** (0.006)	-0.0822*** (0.003)
Annual	Controlled	Controlled
N	13393	16061
R-square	0.2105	0.1972

Note:  $p$ -values in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 6 Robustness Check

Replacing Shang Dao Rong Green ESG rating with CSI ESG rating (RATE), according to the results shown in Table 5. From the analysis, it shows that the regression coefficients of the corporate ESG performance on EF and DF are still significantly negative at the 1% level, which indicates that the ESG performance has a stable effect on reducing financing costs.

The new variable Tobin's  $Q$  (TBQ) replaces the response variable (ROE) and the new variable debt financing cost measure replaces the explanatory variable (DF) with the ratio of finance costs to interest-bearing debt (DF2). According to the results shown in Table 6, the regression coefficient of the corporate ESG performance to TBQ is still significantly negative at the 5% level, while the regression level to DF2 is negative, however, the significance level has decreased. The empirical analysis results are relatively stable.

**Table 6** Test of total sample substitution for explained variables

	(1)	(2)
	TBQ	DF2
score	−0.0561** (0.012)	−0.488 (0.591)
ROE	0.00809*** (0.000)	−0.0636 (0.300)
TAT	0.0706 (0.120)	2.526 (0.172)
CFI	1.285*** (0.000)	−2.936 (0.500)
top1	−0.00743*** (0.000)	−0.00765 (0.885)
independ	0.834** (0.022)	2.836 (0.848)
Growth	0.00871*** (0.000)	0.00949 (0.839)
ZCFZ	−0.0183*** (0.000)	0.0856* (0.085)
_cons	2.844*** (0.000)	−5.925 (0.451)
Annual	Controlled	Controlled
$N$	3605	3406
$R$ -square	0.2014	0.1735

Note:  $p$ -values in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 7 Analysis of Moderating Effect

This section reports the test of moderating effect of H3 and H4. This paper uses the interaction method of the explanatory variable (EF or DF) and moderating variable (SIZE or MEDIO) to verify hypotheses, where SIZE is the total assets of a firm, and MEDIO is the total news of a firm.

**Table 7** Regression results of enterprise-scale adjustment effect

	(1) EF	(2) EF	(3) DF	(4) DF
score	-0.0104* (0.044)	-0.0105** (0.005)	-0.00783** (0.030)	-0.0920** (0.050)
SIZE	-0.0207*** (0.000)	-0.0246*** (0.000)	-0.00707* (0.060)	-0.00653 (0.323)
score×SIZE		0.00874* (0.017)		0.00300** (0.012)
ROE	0.000359*** (0.010)	0.000368*** (0.008)	-0.0000729 (0.813)	-0.0000346 (0.911)
TAT	0.0204*** (0.000)	0.0204*** (0.000)	0.0379*** (0.000)	0.0381*** (0.000)
CFI	0.00398 (0.583)	0.00371 (0.609)	-0.211*** (0.000)	-0.212*** (0.000)
top1	0.000120 (0.226)	0.000120 (0.227)	-0.000951*** (0.000)	-0.000951*** (0.000)
independ	0.0313 (0.302)	0.0310 (0.306)	-0.0110 (0.865)	-0.0126 (0.845)
Growth	0.000147 (0.106)	0.000143 (0.115)	-0.000415** (0.033)	-0.000429** (0.027)
ZCFZ	-0.000327*** (0.004)	-0.000323*** (0.005)	0.00180*** (0.000)	0.00182*** (0.000)
yr1	0.00121 (0.838)	0.00149 (0.801)	-0.0244** (0.046)	-0.0237* (0.053)
yr2	-0.00127 (0.822)	-0.00124 (0.827)	-0.0111 (0.345)	-0.0107 (0.361)
yr3	0.0107** (0.018)	0.0108** (0.017)	-0.00939 (0.302)	-0.00919 (0.312)
yr4	0.0219*** (0.000)	0.0220*** (0.000)	-0.00178 (0.841)	-0.00140 (0.874)
_cons	-0.228*** (0.000)	-0.279*** (0.000)	0.100* (0.059)	-0.0798 (0.372)
N	2609	2609	3484	3484

Note:  $p$ -values in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

It showed the moderating effect results of H3 in Table 7. The first column of Table 7 shows the direct influence of ESG performance and firm size on the cost of equity financing. The regression coefficients are  $-0.0104$  and  $-0.0207$ , respectively, which are significant at the level of 5% and 1%, indicating that ESG and firm size have a significant effect on reducing the cost of equity financing.

In Table 7, the second column is the regression result of moderating effect on EF. Enterprise SIZE (SIZE) is used as the regulating variable. It is found that the cross-multiplication coefficient between SIZE and ESG score is  $-0.00874$ , and its regression coefficient is positive and significant at the 5% level. Demonstrates that firm size has a positive moderating effect on the influence of ESG performance on equity financing costs.

The third column of Table 7 indicates the direct impact of ESG performance and firm size on debt financing costs, with the regression coefficients being  $-0.00783$  and  $-0.00707$ , respectively, which are significant at the level of 1% and 5%, indicating that ESG and firm size have a significant effect on reducing the cost of debt financing.

In Table 7, the fourth is the regression result of the moderating effect on DF. Similarly, enterprise SIZE (SIZE) is used as the regulating variable. It is found that the cross-multiplication coefficient between SIZE and ESG score is  $-0.003$ , and its regression coefficient is positive and significant at the 5% level. Demonstrates that firm size has a positive moderating effect on the impact of ESG performance on debt financing costs.

In conclusion, firm size plays a moderating role in the impact of ESG performance on financing costs, and the moderating role is positive.

Table 7 reports the moderating effect of media attention. The first column of Table 7 shows the direct impact of ESG performance and media attention on the cost of equity financing. The correlation coefficients are  $-0.00352$  and  $-0.00390$ , respectively, which are significant at the level of 5% and 1%, indicating that ESG and media attention have a significant effect on reducing the cost of equity financing.

In the second column of Table 7, regression results of moderating effect on DF are obtained using MEDIO as the moderating variable. They found that the cross-multiplication coefficient between Medio and ESG score is  $-0.00486$ , and its correlation coefficient is positive and significant at the 5% level. It shows that media attention has a positive moderating effect on the influence of ESG performance on equity financing costs.

The third column of Table 7 shows the direct impact of ESG performance and media attention on debt financing costs. The correlation coefficient between ESG performance and debt financing cost is  $-0.00931$ , which is significant at the 1% level; the correlation coefficient between ESG performance and debt financing cost is  $-0.0109$ , which is significant at the 10% level. This means that the improvement of ESG performance can significantly reduce the cost of corporate debt financing, but the relationship between media attention and debt financing cost is not very significant.

The fourth column in Table 7 is the regression result of the moderating effect on DF. Similarly, media attention (MEDIO) is used as the moderating variable, and it is found that the cross-term coefficient between Medio and ESG score is  $0.00478$ , and its correlation coefficient is positive, which is significant at the significance level of 10%. It shows that the mediating

effect of media attention on the influence of ESG performance on debt financing cost is not very significant.

**Table 8** Media attention moderating effect regression results

	(1)	(2)	(3)	(4)
	EF	EF	DF	DF
score	-0.00352** (0.040)	-0.00193** (0.007)	-0.00931*** (0.009)	-0.0109* (0.090)
MEDIO	-0.00390*** (0.000)	-0.00171* (0.037)	-0.000778 (0.727)	-0.00137* (0.057)
scoreMEDIO		0.00486** (0.028)		0.00478* (0.068)
ROE	0.000685*** (0.000)	0.000689*** (0.000)	-0.000198 (0.514)	-0.000195 (0.519)
TAT	0.0135*** (0.000)	0.0132*** (0.000)	0.0399*** (0.000)	0.0396*** (0.000)
CFI	0.00543 (0.465)	0.00566 (0.447)	-0.213*** (0.000)	-0.213*** (0.000)
top1	0.000304*** (0.003)	0.000304*** (0.003)	-0.00100*** (0.000)	-0.00100*** (0.000)
independ	0.0328 (0.291)	0.0338 (0.278)	-0.0147 (0.820)	-0.0137 (0.832)
Growth	0.000169* (0.068)	0.000171* (0.066)	-0.000415** (0.033)	-0.000413** (0.034)
ZCFZ	0.000466*** (0.000)	0.000477*** (0.000)	0.00150*** (0.000)	0.00151*** (0.000)
yr1	0.00875 (0.146)	0.00896 (0.137)	-0.0268** (0.028)	-0.0266** (0.029)
yr2	0.00609 (0.291)	0.00638 (0.270)	-0.0141 (0.228)	-0.0138 (0.237)
yr3	0.0110** (0.017)	0.0111** (0.016)	-0.00935 (0.304)	-0.00920 (0.313)
yr4	0.0223*** (0.000)	0.0225*** (0.000)	-0.00165 (0.852)	-0.00153 (0.863)
_cons	-0.0121 (0.440)	-0.00586 (0.752)	0.0191 (0.563)	0.0253 (0.518)
N	2609	2609	3484	3484

Note:  $p$ -values in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

In conclusion, media attention has a moderating effect on the impact of ESG performance on equity financing costs, and it is positive. However, the mediating effect of media attention on the impact of ESG performance on debt financing cost is not significant.

## 8 Conclusion

Based on the existing literature. Taking 1044 A-share listed companies from 2016 to 2020 as samples, this paper constructs a panel regression model using ESG rating data and corporate financial data to study the relationship between corporate ESG performance and its financing costs. The empirical study found that, in the overall sample, the higher the ESG performance, the lower the equity financing cost; The higher the ESG performance, the lower the debt financing cost. Enterprise size has a positive moderating effect on the relationship between ESG performance and financing costs. This is because large companies provide more transparent information so that they can provide more extensive business risk information than small companies with less transparency. Therefore, market investors trust large companies more. Larger companies have stronger resistance to various risks and lower default risks so that they will pay lower debt costs than smaller companies. Media attention has a significant positive moderating effect on the impact of ESG performance on equity financing costs, however, the moderating effect on debt financing costs is not significant, which indicates that the behaviors and decisions of equity investors are more likely to be influenced by media attention. In the future, we will further study the heterogeneity of relationship between ESG performance evaluation and financing in different industries, explore the ways of impact at the industry level.

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