

# Exploring the Mediated-Moderated Impact in ESG-Value Nexus: The Role of Cost of Debt and Firm Size in Chinese Listed Companies

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## Abstract

ESG disclosures are critical aspects of corporate reporting, reflecting an entity's commitment towards sustainable and responsible business practices. In China, the increasing emphasis on the ESG practices tends to raise questions regarding their effect on the financial performance, specifically in case of the listed companies. The study aims to investigate the influence of ESG disclosures and Firm Value of the Chinese listed companies, directly, as well as through the mediating effect of cost of debt and size's moderating role. The study employs a fixed-effects regression for a panel dataset, consisting of 1065 observations, developed using 213 entities and 5 fiscal years (2018 to 2022). The independent variables of the study are the individual ESG components and the aggregate ESG score while Tobin's  $Q$  is the dependent variable. The control variables include leverage, profitability, growth, age, and liquidity. The cost of debt and size has been proxied by the interest costs and natural log of total assets respectively. ESG metrics, individually or collectively, do not influence Tobin's  $Q$  whereas the interaction effect of the size tends to influence the value negatively, only in case of the total ESG score. It states that the positive effect on market value declines as the size of the company increases. The cost of debt, on the other hand, is a significant mediator in the interaction aspect, adversely influencing Tobin's  $Q$ . The policy makers must support the smaller companies in their ESG adoption as they are more likely to benefit from the ESG practices due to their increase in the market valuation. Additionally, tailored ESG reporting as well as implementation strategies tend to maximise the financial benefits across different firm sizes. The novel insights provided by the study into the complicated dynamics of the ESG and Value in case of the Chinese companies highlights varied effects. The role of firm size and the importance of cost of debt are prominent in contributing to a broader understanding of the ESG's role in enhancing value of the enterprises.

**Keywords:** ESG, Tobin's  $Q$ , Cost of Debt, Size, Chinese Publicly Listed Companies, Mediated-Moderated Model.

## Introduction

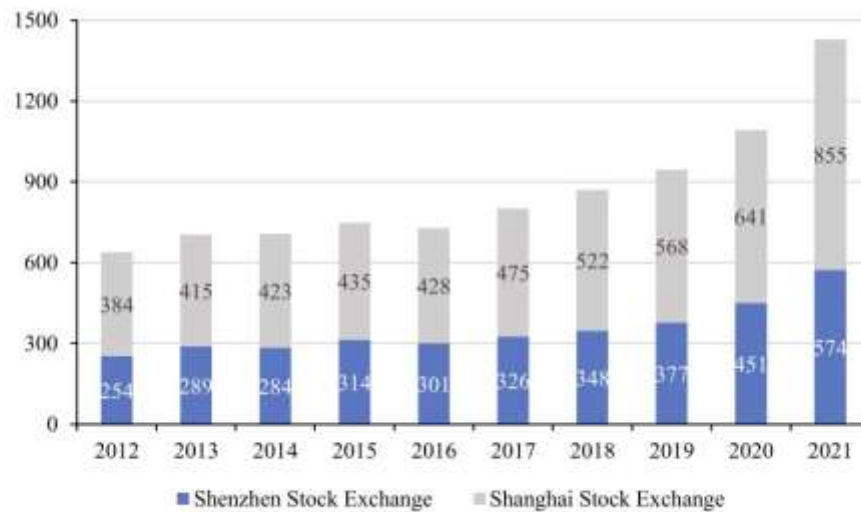
The ESG disclosures has received a significant attention in the contemporary business scenario, thereby emerging as a critical corporate reporting component. In China, the trend has been pronounced, considering the increased sustainability concerns due to the rapid economic growth. ESG disclosures refers to the practice through which the companies report their Environmental (E) impact, Societal (S) contributions, and Governance (G) practices, thereby providing a scope to the stakeholders to be aware of the company's impacts beyond the traditional financial metrics. The ESG scores which are calculated for the companies based on their disclosures tends to enhance their reputation and subsequently their financial values in the market.

China provides a captivating context for the current investigation, considering the unique economic landscape and the regulatory environment. The increasing emphasis of the Chinese government towards sustainable development has pushed the companies for stricter environmental regulations and CSR initiatives. For instance, ICMA (2023) indicated that the ascendancy of the ESG practices in Chinese companies is evident from the fact that more entities tend to incorporate the social and environmental benefits into the business objectives. The regulatory pressure, coupled with the investors and consumers' awareness regarding the importance of sustainability makes the country an ideal setting for investigating the ESG-VALUE nexus. The significant increase in the ESG reporting is indicated in the figure below:

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**Figure 1. ESG Reports disclosure by Chinese Companies****Fig. 2. Number of ESG reports disclosed by Chinese listed companies Data Source: Chinese Association for Public Companies (2022).**

(Source: Shen et al., 2023)

There is a diverse literature which have identified the causal relationship between ESG and Financial Performance or Value of the companies. Furthermore, Whelan et al. (2021) indicated that ESG leads to better financial performance over a long-term horizon and the indirect relationship is often mediated by factors related to innovation and risk management. However, the results of the studies lack consistency, considering that while some studies find ESG to be a positive determinant of value, while the others find the adverse relationship. While the positive effect is likely due to the improved operational efficiency, enhanced reputation, and risk profiles, the adverse effect is due to the possibility of the ESG-related costs outweighing the benefits. The current study, therefore, considers a distinct approach by providing empirical evidence from the Chinese market, by hypothesizing the cost of debt as the mediating variable and the size of the companies as the moderating variable.

The following are the objectives of the study:

- To ascertain if there is an influence of the ESG scores (individually or collectively) on the value of the Chinese listed companies.
- To identify if the cost of debt mediates the relationship between ESG and Firm Value.
- To identify if the firm size, as an interaction variable, drives the relationship between ESG and Firm Value.

The study tends to be relevant for a wide range of stakeholders, such as investors, corporate managers, and policymakers. While the investors could use the findings for their investment decisions while the managers could use the insights to better understand the benefits of ESG disclosures and incorporate the practices in their strategic planning. The policymakers, on the other hand, could use insights into current regulations, and the need for enhancements in the policy.

## Literature Review & Hypothesis Development

### *Underlying Theories*

#### *Stakeholder Theory*

The stakeholder theory postulates that the success of a company depends on its ability to address the needs of different stakeholders. As per Freeman, Dmytriyev and Phillips (2021), the companies should enlarge their scope from the shareholders or the owners, and focus on the stakeholders' well-being and interest, such as employees, society, suppliers. In the ESG's context, the theory advocates regarding the transparent reporting of the ESG practices and their influence on the reputation of the companies, thereby fostering trust among stakeholders (Whelan et al., 2021). Furthermore, prioritization of the stakeholders' interests, the companies could reduce the different risks, improve efficiencies, and achieve better financial performance. Aydoğmuş, Gülay and Ergun (2022) found the prevalence of stakeholder theory, in case of all the variables, except E'score. The holistic approach, therefore, aligns with the increased demand for corporate sustainability and accountability, thereby leading to increased support and loyalty from the stakeholders, subsequently contributing to the long-term financial success.

#### *Agency Theory*

The conflict between the owners and the agents of the business is explored by the Agency theory. As per Jensen and Meckling (1976), the managers are unlikely to consider the benefits of the shareholders, thereby leading to agency costs. The role of ESG disclosures, in this case, tends to mitigate the conflicts to a considerable extent through transparency and reduced information asymmetry between the parties. The reporting of the ESG activities by the companies signal their commitment to ethics and sustainable practices, thereby aligning the managers' interests with that of the shareholders (Huang, 2022). The transparency, as a result, could enhance the confidence of the investors, reduce the perceived risks, and lower the cost of capital (Yu et al., 2021). Therefore, ensuring that the managers tend to be accountable for their ESG performance, companies are likely to reduce the agency costs and improve the overall financial performance, thereby addressing the concerns of shareholders as well as the other stakeholder groups.

#### *Legitimacy Theory*

The Legitimacy theory indicates that the companies focus on operating within the values and norms of the societies so that they gain legitimacy and can survive. As per Suchman (1995), legitimacy tends to be a perception about the company's actions being desirable as well as appropriate within a social system of beliefs and norms. The social contract between government and entities, which is important as it might lead to reduced demands of the customers and restrictions by the government (Whelan et al., 2021). The ESG disclosures, in this case, is a strategy used by the companies to align with the societal expectations and demonstrate their commitment towards the sustainable and responsible practices. The transparent reporting helps the companies to enhance their legitimacy, improve reputation, and build trust with the stakeholders (Higgins, Tang & Stubbs, 2020). Subsequently, such legitimacy leads to benefits such as better access to resources, lower regulatory scrutiny, and increased customer loyalty (Bu & Chen, 2023). Overall, legitimacy could contribute to improved financial performance by fostering supportive environment for the operations of the company.

### *Empirical Evidence from Past Studies*

#### *ESG and Firm Value*

The past studies have produced mixed findings regarding the ESG-Value relationship, such as a positive relationship, negative relationship, or insignificant relationship. Aydoğmuş, Gülay and Ergun (2022) found that while the combined ESG score, Social Score, and Governance scores were significant and positive determinants of the performance, the Environmental score was insignificant. This implied that the environment-related actions might take long time to produce results as compared to the governance and

social actions. The long-term influence makes it irrelevant in the immediate years, but may have a significant influence on the values. However, a study on Chinese companies by Yu and Xiao (2022) found that ESG score and the independent metrics were positive and significant. Additionally, the robustness test revealed that changing the dependent variable from Tobin's Q to MB Ratio led to consistent results, whereby there was no change in the results, apart from some minor changes in the level of significance. In another Chinese study, the findings by Cheng, Kim and Ryu (2024) revealed that in the post-pandemic era, the ESG disclosure significantly influences the value of the firm, especially in the post-pandemic time, thereby intensifying the relationship. However, while the E'score tends to have a significant influence, the S'score and G'score are insignificant. Similarly, the findings by Wu et al. (2022), through an adoption of ESG rating by Sino-Securities also found similar results. Duong and Huang (2022) implied that the value enhancement due to ESG is attributed to the increased support and trust of the customers when the companies tend to apply the social activities appropriately. However, Igbinovia and Agbadua (2023) argued that there is no direct influence of ESG on Value but the improved profitability, as a result of higher sales and reduced finance cost tends to define the indirect influence. Interestingly, Zhou, Liu and Luo (2022) indicated that the ESG-Value relationship is prominent when the profitability of the companies are considering as a mediating, thereby implying that good ESG performance leads to better financial outcomes such as lowered costs and increased sales, thereby translating into better values.

*H1: The ESG scores (individual and collective) have a significant and positive influence on the value of the companies.*

#### *Cost of Debt as a Mediator*

The greater level of ESG transparency is likely to reduce the financing costs for the companies. The findings by Raimo et al. (2021) indicated an inverse influence of the ESG disclosures on the cost of debt, implying that an increased transparency by the companies through disseminating ESG information leads to benefit them from accessing third party financing at better conditions. However, Duong and Huang (2022) indicated that the ESG tends to have a positive influence on cost of debt, implying that the increase in the ESG-related activities induces the companies to take more debt and thus, the cost of debt increases due to increased debt dependency. This could further be explained by the role of corporate reputation, which as per Maaloul et al. (2023) was found to mediate the influence of ESG on the cost of debt, whereby the cost of debt tends to reduce as a result of better ESG disclosures. Lavin and Montecinos-Pearce (2022) indicated that the adverse impact of the ESG on the cost of debt is due to the fact that despite of increasing risk as a result of increasing debt dependency, the growth of the companies tend to be predominant. Imperatively, good ESG scores, coupled with a lowered cost of debt tends to be very lucrative for the investors as it illustrates sustainable and low-risk investment profile.

*H2: The cost of debt mediates the relationship between ESG scores and value of the companies.*

#### *Company Size as the Moderator*

Firm Size tends to be one of the commonly applied company-specific attributes to assess the ESG-CFP relationship. The findings by Abdi, Li and Càmara-Turull (2022) found that the role of the size of the companies as moderator tends to be critical in the relationship between ESG and Value, thereby implying that the social initiatives planned by the company would be based on their size. However, the findings by Shakil (2022) argued that size of the companies does not moderate the influence of ESG and stock price, considering that the latter is a short-term metric caused by other factors, and might not incorporate ESG news completely like the value. Furthermore, Dihadjo and Hersugondo (2023) highlighted that the positive moderating effect of size is due to the fact that the big companies tend to invest in long-term projects beneficial for them. Moreover, the findings by Zaiane and Ellouze (2023), in case of the European firms revealed significant insights. In case of the non-environmentally-sensitive industries, the CSR tends to be symbolic by large firms and substantive by the smaller firms, whereas, in case of the environmentally-sensitive industries, the CSR measures by the larger firms are effective to meet the CSR initiatives, while in case of the smaller companies, the forceful involvement in expensive CSR activities tend to be reduce their interest. Lin et al. (2021) argued that the size tends to have an adverse moderating effect on the relationship, while the majority of the studies found it to be a critical drive, suggesting that the ESG-CFP links tends to

be better for the larger companies as compared to the smaller companies (Lee & Suh, 2022), despite of certain arguments regarding the stronger relationship for smaller firms (Huang, 2021). Imperatively, the companies with greater asset size are likely to have better ESG performance, thereby enhancing their values.

*H3: The company size moderates the relationship between ESG scores and value of the companies.*

### *Research Gap*

Despite of plethora of studies, the Chinese context is not quite studied in the context. Although there are certain studies which have currently focused on the Chinese scenario (Shen et al., 2023), there is a missing link regarding the ways in which cost of debt mediates the relationship and if the size is a critical moderator. Furthermore, the current study, rather than focusing on individual sectors or industries, has an enlarged focus on the non-financial companies in China. The intended contribution of the study is not only focused on providing insights regarding the Chinese market but also highlights the role of cost of debt as a mediator and the size of the company as a moderator.

## **Research Methodology**

### *Research Design*

The current study employs a causal research design to investigate the influence of ESG scores of a company on their values. The suitability of the research design lies in the fact that it not only identifies the magnitude of the association but also provides a scope to understand if the changes in the independent variables (ESG), could lead to influence the values. Additionally, the interaction term, i.e., Size, and the mediating variable, i.e., Cost of Debt would also be considered to check if the relationship is direct or being mediated or moderated by the speculated variables.

### *Data and Sample*

The current study collects ESG scores from the Wind Database and relevant financial metrics from the CSMAR database for five fiscal years i.e., 2018 to 2022. The initial raw dataset was cleaned and subsequently, 213 companies were found to have a complete dataset of five fiscal years. The dataset varies across industries, thereby ensuring representativeness and diversity. The timeframe considered for the study allows for an assessment of both the short-term and medium-term effects of the ESG, in addition to considering the scenario after the pandemic. The capturing or the potential trends and changes over time would provide several insights regarding the ways in which variables have changed.

### *Variables and Proxies*

- **Independent Variables:** The ESG scores provided by the Wind Database would be the independent variables. It would include the total ESG score as well as the individual component scores, considering that the study would identify if any of the factors are better than the other.
- **Dependent Variable:** The Tobin's Q has been considered as the proxy for value and indicates the ratio of a company's market value and the asset size. Dihadjo and Hersugondo (2023); Aydoğmuş, Gülay and Ergun (2022) considered this as a proxy, advocating its usefulness in determining whether a company is overpriced or under-priced.
- **Control Variables:** The study considers a wide range of control variables, namely Leverage, Sales Growth, Liquidity, Leverage, and Age of the firm. The leverage has been widely used as a control variable (), due to its importance is an indicator of an entity's financial risk and capital structure, which drives the performance of the companies. Secondly, the choice of sales growth as a control variable tends to be important, considering that it indicates the market competitiveness and operational performance of the company which would influence the performance and value of the



companies. Furthermore, the liquidity is also an important control variable, considering its importance for maintaining operational stability by generating cash from operations relative to the liabilities. Furthermore, the ROE has been used as the profitability proxy, due to its importance in highlighting the effectiveness of a company in using the shareholders' funds to generate profit, thereby leading to an overall value increase. Lastly, the age of the firm, proxied by the number of years since listing is considered because the older firms might have established market positions, reputations, and operational efficiencies, which could lead to influence their financial performance and ability to implement ESG practices.

- **Mediating Variable:** The cost of debt has been considered as a mediator, which is in line with the previous studies. Raimo et al. (2021), indicates the ways in which the ESG practices tends to lower the perceived risk, thereby reducing the borrowing costs, and subsequently enhancing the overall financial health.
- **Moderating Variable:** The natural log of the total assets has been considered as the proxy for Firm Size, which is the moderator or interaction variable. As per Dihadjo and Hersugondo (2023); Abdi, Li and Càmara-Turull (2022) the larger firms are likely to have more resources to invest in the ESG initiatives, thereby experiencing a positive influence on the financial outcomes and values.

The following table indicates the variables and relevant proxies which would be used for the statistical analysis.

**Table 1. Variables and Proxies**

Type	Variable	Proxy
Independent	Overall ESG performance	ESG Score
Independent	Environmental performance	E'Score
Independent	Social performance	S'Score
Independent	Governance performance	G'Score
Dependent	Value	Tobin's Q
Mediating	Cost of Debt	Interest Cost/Total Liabilities
Moderating	Size	Natural log of total assets
Control	Leverage	Total liabilities to total assets ratio.
Control	Sales Growth	Natural log of total sales.
Control	Liquidity	Cashflow Ratio
Control	Profitability	Return on Equity
Control	Age	Natural log of firm age since listing.

#### *Econometric Models and Techniques*

On the basis of the variables, employing a causal research design would focus on four models.

*Benchmark Model:* This model focuses on testing the direct causal relationship between the ESG scores and the value of the companies, without any intermediary or interaction variable.

$$\begin{aligned}
 TOBINSQ_{it} = & \beta_0 + \beta_1 (ESG_{it}) + \beta_2 (E'SCORE_{it}) + \beta_3 (S'SCORE_{it}) \\
 & + \beta_4 (G'SCORE_{it}) + \beta_5 (LEVERAGE_{it}) + \beta_6 (SALES\_GROWTH_{it}) \\
 & + \beta_7 (PROFITABILITY_{it}) + \beta_8 (LIQUIDITY_{it}) + \beta_9 (AGE_{it}) + \varepsilon
 \end{aligned}$$

*Mediating Model:* This model focuses on testing the indirect causal relationship between the ESG scores and the value of the companies, by including the mediating variable only.

*Step 1: Considering the Mediator as Dependent*

$$\begin{aligned} \mathbf{COST\_OF\_DEBTit} &= \beta_0 + \beta_1 (\mathbf{ESGit}) + \beta_2 (\mathbf{E'SCOREit}) + \beta_3 (\mathbf{S'SCOREit}) \\ &+ \beta_4 (\mathbf{G'SCOREit}) + \beta_5 (\mathbf{LEVERAGEit}) + \beta_6 (\mathbf{SALES\_GROWTHit}) \\ &+ \beta_7 (\mathbf{PROFITABILITYit}) + \beta_8 (\mathbf{LIQUIDITYit}) + \beta_9 (\mathbf{AGEit}) + \varepsilon \end{aligned}$$

*Step 2: Considering the Mediator as Independent and Testing the model*

$$\begin{aligned} \mathbf{TOBINSQit} &= \beta_0 + \beta_1 (\mathbf{ESGit}) + \beta_2 (\mathbf{E'SCOREit}) + \beta_3 (\mathbf{S'SCOREit}) \\ &+ \beta_4 (\mathbf{G'SCOREit}) + \beta_5 (\mathbf{LEVERAGEit}) + \beta_6 (\mathbf{SALES\_GROWTHit}) \\ &+ \beta_7 (\mathbf{PROFITABILITYit}) + \beta_8 (\mathbf{LIQUIDITYit}) + \beta_9 (\mathbf{AGEit}) \\ &+ \beta_{10} (\mathbf{COST\_OF\_DEBTit}) + \varepsilon \end{aligned}$$

*Moderating Model:* This model focuses on testing the indirect causal relationship between the ESG scores and the value of the companies, by including the moderating variable only, multiplied by each of the independent variables.

$$\begin{aligned} \mathbf{TOBINSQit} &= \beta_0 + \beta_1 (\mathbf{ESGit} \times \mathbf{SIZEit}) + \beta_2 (\mathbf{E'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_3 (\mathbf{S'SCOREit} \times \mathbf{SIZEit}) + \beta_4 (\mathbf{G'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_5 (\mathbf{LEVERAGEit}) + \beta_6 (\mathbf{SALES\_GROWTHit}) \\ &+ \beta_7 (\mathbf{PROFITABILITYit}) + \beta_8 (\mathbf{LIQUIDITYit}) + \beta_9 (\mathbf{AGEit}) + \varepsilon \end{aligned}$$

*Mediating-Moderated Model:* This model would consider the mediating as well as the moderating variable and would be testing the influence of the independent variables on the dependent variables.

*Step 1: Considering the Mediator as Dependent*

$$\begin{aligned} \mathbf{COST\_OF\_DEBTit} &= \beta_0 + \beta_1 (\mathbf{ESGit} \times \mathbf{SIZEit}) + \beta_2 (\mathbf{E'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_3 (\mathbf{S'SCOREit} \times \mathbf{SIZEit}) + \beta_4 (\mathbf{G'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_5 (\mathbf{LEVERAGEit}) + \beta_6 (\mathbf{SALES\_GROWTHit}) \\ &+ \beta_7 (\mathbf{PROFITABILITYit}) + \beta_8 (\mathbf{LIQUIDITYit}) + \beta_9 (\mathbf{AGEit}) + \varepsilon \end{aligned}$$

*Step 2: Considering the Mediator as Independent and Testing the model*

$$\begin{aligned} \mathbf{TOBINSQit} &= \beta_0 + \beta_1 (\mathbf{ESGit} \times \mathbf{SIZEit}) + \beta_2 (\mathbf{E'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_3 (\mathbf{S'SCOREit} \times \mathbf{SIZEit}) + \beta_4 (\mathbf{G'SCOREit} \times \mathbf{SIZEit}) \\ &+ \beta_5 (\mathbf{LEVERAGEit}) + \beta_6 (\mathbf{SALES\_GROWTHit}) \\ &+ \beta_7 (\mathbf{PROFITABILITYit}) + \beta_8 (\mathbf{LIQUIDITYit}) + \beta_9 (\mathbf{AGEit}) \\ &+ \beta_{10} (\mathbf{COST\_OF\_DEBTit}) + \varepsilon \end{aligned}$$

The above model would be tested using a fixed effects model, which is suitable for a well-balanced panel dataset. Stata software would be used due to its advantage of ease in usage and eliminating multicollinear variables in case of a regression analysis. Furthermore, the robustness analysis of the study would be conducted by taking an alternative valuation variable, i.e., the MV/BV ratio, which is also a key proxy for valuation of an entity.

## Results

### *Descriptive Statistics*

The mean ESG score is 5.65, with a standard deviation of 0.83, suggesting moderate variation in ESG practices among the sampled companies. The environmental score (E score) has a mean of 1.48 and a higher standard deviation of 1.91, indicating greater variability in environmental practices. The social score (S score) and governance score (G score) have means of 3.01 and 6.24, respectively, with standard deviations of 1.92 and 0.99, showing different levels of emphasis and variation in social and governance practices across companies. The size of the firms, measured by the natural log of total assets, has a mean of 23.14 and a standard deviation of 1.45, reflecting significant differences in company sizes within the sample. Leverage, measured by the total liabilities to total assets ratio, averages 0.51, with a standard deviation of 0.20, indicating that firms have a relatively high level of debt financing. Profitability, represented by ROE, has a mean of 0.04 and a standard deviation of 0.16, suggesting that while some firms are highly profitable, others face significant losses. Sales growth has a mean of 0.10 and a standard deviation of 0.35, indicating varied growth rates among the firms. Tobin's Q, a measure of market valuation, has a mean of 1.59 and a standard deviation of 1.19, showing substantial variation in how the market values these firms relative to their asset replacement costs. The age of the firms, measured in years since listing, has a mean of 3.23 and a standard deviation of 0.13, suggesting that most firms in the sample are relatively young. The cost of debt, which has a mean close to zero and a standard deviation of 0.06, indicates that some firms face higher interest expenses relative to their liabilities. Finally, the liquidity ratio has a mean of 0.04 and a standard deviation of 0.07, reflecting diverse liquidity positions among the companies.

**Table 2. Descriptive Statistics**

Variable	N	Mean	STANDARD DEVIATION	MINIMIM	MAXIMUM
ESG	1065	5.6540	0.8332	3.3200	9.1600
E'SCORE	1065	1.4806	1.9090	0.0000	10.0000
S'SCORE	1065	3.0105	1.9163	0.0000	10.0000
G'SCORE	1065	6.2428	0.9901	1.2000	9.6000
SIZE	1065	23.1371	1.4504	19.8099	26.4523
LEVERAGE	1065	0.5141	0.1957	0.0521	0.9244
PROFITABILITY	1064	0.0385	0.1568	-0.8192	0.4151
SALES GROWTH	1065	0.1003	0.3454	-0.6535	2.0324
TOBINS Q	1062	1.5918	1.1910	0.8024	9.8173
AGE	1065	3.2253	0.1347	1.7918	3.4012
COST OF DEBT	1065	-0.0008	0.0622	-0.2976	1.0999
LIQUIDITY	1064	0.0423	0.0685	-0.3976	0.3157

### *Correlation Analysis*

The ESG score shows a strong positive correlation with its sub-components: the environmental score (E score), social score (S score), and governance score (G score). Specifically, the ESG score correlates with the E score at 0.6745, the S score at 0.8256, and the G score at 0.5540. These strong correlations indicate that improvements in any of these individual components are likely to enhance the overall ESG score, reflecting their integrated nature in contributing to a company's ESG performance. Firm size, measured by the natural log of total assets, exhibits a moderate positive correlation with the overall ESG score (0.3733), E score (0.3610), S score (0.3255), and G score (0.2251). This suggests that larger firms tend to have better ESG scores, possibly due to greater resources and capabilities to implement comprehensive ESG initiatives. Leverage shows a notable correlation with firm size (0.4631), indicating that larger firms are more likely to have higher leverage. This could be due to their ability to access debt markets more readily. However, leverage has a relatively weak correlation with the overall ESG score (0.0826), suggesting that a company's debt level is not strongly related to its ESG performance. Profitability, represented by ROE, is positively



correlated with the overall ESG score (0.1227) and its components, though the correlations are relatively modest (0.1209 with E score, 0.1017 with S score, and 0.0364 with G score). These positive correlations imply that firms with better ESG practices might achieve higher profitability, albeit the relationship is not very strong. Sales growth shows minimal correlation with ESG scores and other financial variables, with the highest being a correlation of 0.074 with firm size. This indicates that sales growth is relatively independent of ESG performance and other financial metrics in this sample. Tobin's Q, a measure of market valuation, is negatively correlated with firm size (-0.4411) and age (-0.1705), suggesting that larger and older firms may have lower market valuations relative to their asset replacement costs. This could reflect market perceptions of growth potential and risk. Interestingly, Tobin's Q shows very weak or negligible correlations with ESG scores, indicating that market valuation does not straightforwardly reflect ESG performance in this sample. The cost of debt has a weak negative correlation with the overall ESG score (-0.0624) and its components, suggesting that firms with better ESG performance might enjoy slightly lower borrowing costs, though the relationship is weak. Liquidity, measured by the cash flow ratio, has a minor positive correlation with profitability (0.2819) and a negative correlation with leverage (-0.1311), indicating that more profitable firms tend to be more liquid, while those with higher debt levels tend to have lower liquidity.

Table 3. Correlation Analysis

	ESG	E'SCORE	S'SCORE	G'SCORE	SIZE	LEVERAGE	PROFITABILITY	SALES GROWTH	TOBINS Q	AGE	COST OF DEBT
	1.0000										
	0.6745	1.0000									
	0.8256	0.4891	1.0000								
	0.5540	0.2646	0.1860	1.0000							
	0.3733	0.3610	0.3255	0.2251	1.0000						
	0.0826	0.0818	0.0456	0.0951	0.4631	1.0000					
Y	0.1227	0.1209	0.1017	0.0364	0.1786	-0.2440	1.0000				
	0.0166	0.0031	0.0410	0.0286	0.0740	0.0568	0.1940	1.0000			
	-0.1322	-0.0874	-0.1199	-0.0677	0.4411	-0.2901	0.0240	0.0160	1.0000		
	-0.0216	-0.0238	-0.0889	0.0904	0.1705	-0.0422	-0.1272	-0.0393	0.0722	1.0000	
T	-0.0624	-0.0722	-0.0635	0.0025	0.0974	0.1646	-0.5008	-0.1088	0.0441	0.0748	1.0000
	0.0304	0.1197	0.0448	0.0015	0.1259	-0.1311	0.2819	0.0104	0.0439	-0.0622	-0.154

#### *Fixed-effects Regression Analysis*

#### *Fixed-effects Regression Analysis*

**Model 1:** The fixed-effects regression model investigates the impact of ESG scores and their components on Tobin's Q, controlling for leverage, profitability, sales growth, firm age, and liquidity. The overall R-squared value of 0.0531 indicates that the model explains about 5.31% of the variance in Tobin's Q. The coefficients for the ESG score (-0.1604) and its components (E score: -0.0095, S score: 0.0049, G score: 0.0144) are not statistically significant, suggesting that ESG performance and its individual components do not have a strong direct impact on Tobin's Q within this sample. Among the control variables, leverage has

a marginally significant negative effect on Tobin's Q ( $-0.5174$ ,  $p < 0.10$ ), implying that higher leverage may slightly reduce the market valuation of a firm. Profitability, sales growth, and liquidity do not show significant impacts on Tobin's Q, indicating that these factors do not notably influence market valuation in this context. Firm age, however, has a highly significant positive coefficient ( $1.3423$ ,  $p < 0.001$ ), indicating that older firms tend to have higher Tobin's Q. This suggests that market valuation improves with the maturity of the firm, reflecting possibly accumulated reputation, stability, and operational experience over time. While the ESG scores and their components do not significantly influence Tobin's Q, firm age stands out as a significant factor, positively affecting market valuation. Leverage shows a marginal negative effect, while other control variables do not have significant impacts.

**Model 2:** The overall R-squared value is 0.2364, indicating that the model explains approximately 23.64% of the variance in the cost of debt. The coefficients for the ESG score (0.0025) and its components (E score:  $-0.0071$ , S score:  $0.0002$ , G score:  $-0.0012$ ) are not statistically significant, suggesting that ESG performance does not have a strong direct impact on the cost of debt. Among the control variables, profitability is significantly negative ( $-2.2084$ ,  $p < 0.001$ ), indicating that more profitable firms tend to have lower borrowing costs. Other control variables, such as leverage, sales growth, age, and liquidity, do not show significant impacts on the cost of debt.

The overall R-squared value is 0.0472, slightly lower than the previous model. The cost of debt has a significant negative effect on Tobin's Q ( $-0.8701$ ,  $p < 0.05$ ), indicating that higher borrowing costs reduce market valuation. The ESG score ( $-0.1587$ ) and its components (E score:  $-0.0101$ , S score:  $0.0053$ , G score:  $0.0135$ ) remain non-significant. Leverage shows a marginally significant negative impact on Tobin's Q ( $-0.5252$ ,  $p < 0.10$ ), and firm age continues to have a significant positive effect ( $1.3075$ ,  $p < 0.001$ ). Other control variables do not significantly influence Tobin's Q.

Including the cost of debt in the model provides additional insights. In the previous model, ESG scores and their components were not significantly related to Tobin's Q. By introducing cost of debt as a mediator, it becomes clear that cost of debt significantly affects Tobin's Q. This highlights the indirect effect ESG practices might have on financial performance through their impact on borrowing costs. The inclusion of cost of debt strengthens the model by revealing how financial mechanisms can mediate the relationship between ESG performance and market valuation, providing a more nuanced understanding of these dynamics.

**Model 3:** This regression model examines the interaction effects of ESG scores and firm size on Tobin's Q, explaining 7.92% of the variance (R-squared = 0.0792), which improves upon previous models. The significant negative coefficient for the ESG x Size interaction term ( $-1.0402$ ,  $p < 0.05$ ) suggests that the positive impact of ESG on Tobin's Q diminishes as firm size increases. This indicates that smaller firms benefit more in terms of market valuation from high ESG scores compared to larger firms. The interaction terms for the environmental (E score x Size), social (S score x Size), and governance (G score x Size) scores are not significant, implying that firm size does not significantly moderate these individual components' effects on Tobin's Q. Among the control variables, firm age remains a significant positive predictor of Tobin's Q ( $1.6043$ ,  $p < 0.001$ ), indicating that older firms tend to have higher market valuations. Other control variables, such as leverage, profitability, sales growth, and liquidity, do not show significant impacts on Tobin's Q in this model. Overall, the inclusion of interaction terms reveals that firm size significantly moderates the overall ESG effect on market valuation, highlighting the complex dynamics between ESG practices and firm characteristics. This interaction model provides a more detailed understanding of how ESG performance impacts financial outcomes differently across firms of varying sizes.

**Model 4:** This model investigates the impact of the interaction terms between ESG components and firm size on the cost of debt. The R-squared value is 0.2372, indicating that the model explains approximately 23.72% of the variance in the cost of debt. None of the interaction terms (ESG x Size, E score x Size, S score x Size, G score x Size) are statistically significant, suggesting that firm size does not significantly moderate the impact of ESG components on the cost of debt. Among the control variables, profitability has a significant negative effect on the cost of debt ( $-2.0864$ ,  $p < 0.001$ ), indicating that more profitable firms enjoy lower borrowing costs.

This model includes the cost of debt as an independent variable to examine its impact on Tobin's Q. The R-squared value is 0.0736, explaining 7.36% of the variance in Tobin's Q. The cost of debt has a significant negative effect on Tobin's Q (-0.8919,  $p < 0.05$ ), indicating that higher borrowing costs reduce market valuation. The ESG x Size interaction term is significant (-1.0398,  $p < 0.05$ ), suggesting that the positive impact of ESG on Tobin's Q decreases with firm size. Firm age remains a significant positive predictor of Tobin's Q (1.5713,  $p < 0.001$ ).

Including the cost of debt in the model provides additional insights. In the second model, the significant negative impact of the cost of debt on Tobin's Q highlights the mediating role of borrowing costs. The significant ESG x Size interaction term suggests that the diminishing positive effect of ESG on market valuation with increasing firm size is consistent with previous findings. Overall, incorporating the cost of debt as a mediator offers a more nuanced understanding of how financial mechanisms influence the relationship between ESG performance and market valuation, enhancing the explanatory power of the model.

Table 4. Fixed-effects Regression

	Model 1	Model 2		Model 3	Model 4	
	TOBINS Q	COST OF DEBT	TOBINS Q	TOBINS Q	COST OF DEBT	TOBINS Q
ESG	-0.1605 (0.1268)	0.0025 (0.0105)	-0.1587 (0.1265)			
E'SCORE	-0.0095 (0.0260)	-0.0007 (0.0022)	-0.0101 (0.0260)			
S'SCORE	0.0049 (0.0411)	0.0002 (0.0034)	0.0053 (0.0411)			
G'SCORE	0.0144 (0.0442)	-0.001 (0.0037)	0.0135 (0.0441)			
ESG*SIZE				-1.0402** (0.4107)	-0.0001* (0.0342)	-1.0394** (0.4098)
E'SCORE*SIZE				-0.0362 (0.0231)	-0.0013 (0.0019)	-0.0374 (0.0231)
S'SCORE*SIZE				0.0240 (0.0561)	0.0039 (0.0047)	0.0275 (0.0560)
G'SCORE*SIZE				0.0828 (0.1901)	-0.0021 (0.0158)	0.0804 (0.1897)
COST OF DEBT			-0.8701** (0.4159)			-0.8919** (0.4138)
LEVERAGE	-0.5173*** (0.2875)	-0.0086 (0.0238)	-0.5252* (0.2869)	-0.4475 (0.2868)	-0.0077 (0.0239)	-0.4548 (0.2862)
PROFITABILITY	-0.0766 (0.1853)	-0.2088* (0.0153)	-0.2595 (0.2045)	-0.0183 (0.1843)	-0.2086* (0.0153)	-0.2058 (0.2034)
SALES GROWTH	-0.0859 (0.0602)	-0.0012 (0.0050)	-0.0871 (0.0601)	-0.0880 (0.0598)	-0.0013 (0.0050)	-0.0894 (0.0597)
AGE	1.3423* (0.3748)	-0.0415 (0.0310)	1.3074* (0.3745)	1.6043* (0.3692)	-0.0388 (0.0304)	1.5713* (0.3688)
LIQUIDITY	0.4968 (0.3575)	0.0142 (0.0291)	0.5081 (0.3568)	0.4846 (0.3555)	0.0152 (0.0291)	0.4971 (0.3548)
R-Squared	5.78%	26.92%	4.91%	8.76%	26.98%	7.93%

Note: (\*), (\*\*), (\*\*\*) indicates significance at 1%, 5%, and 10% level significantly. Numbers in parentheses are standard errors. Standard Errors in parentheses.

## Discussion and Conclusion

As per the empirical results, while the null hypothesis could not be rejected in case of H1, it could be rejected partially in case of H2 and completely in case of H3. The results indicated that while ESG does not influence the value of the companies directly or mediated by the cost of debt, the role of interaction term tends to be significant. The findings are contradictory to two of the Chinese studies, conducted by Yu and Xiao (2022); Cheng, Kim and Ryu (2024), who found that there is a significant and positive influence of the ESG on the value of the companies. Nevertheless, the current study focused majorly on the post-pandemic timeframe, which could skew the results in favour of the fact that the majority of the companies might have to face a lower value due to their enlarged focus on ESG, rather than the value creation through prominent activities. The interaction effect of the size on the ESG was significant, directly, as well as mediated by the cost of debt. Firstly, the findings are partially consistent with that of Raimo et al. (2021) who found that the role of ESG tends to be adverse on the cost of debt. This study, however, found that the interaction effect was important, thereby suggesting that if the smaller companies tend to focus on ESG, the cost of debt might not reduce significantly but if the larger companies invest in ESG, the cost of debt would be lower, due to their ESG performance and the economies of scale as well as the brand reputation, evident from the larger size. The findings are however contradictory to that of Duong and Huang (2022), who found that ESG influences cost of debt favourably as more debt is induced to finance ESG activities. This, however, is not prevalent in case of the large-cap Chinese companies, whereby the focus, perhaps, is to finance the ESG activities through internal sources, rather than being dependent on any external financing. The findings of the study are also partially consistent with Maaloul et al. (2023), who found that the cost of debt, as a mediator, tends to reduce due to the better ESG performance, even if the companies are smaller in size. Similarly, the consistency of the results with Lavin and Montecinos-Pearce (2022) implied that despite of the increasing risk for the companies, when the infuse debt, the growth is predominant, thereby leading to a better performance and values. Abdi, Li and Càmara-Turull (2022) opined that the company's social initiatives tend to be dependent on their size, which was prevalent in this case, considering the positive correlation between size and the ESG. Additionally, the findings by Dihardjo and Hersugondo (2023) were also somewhat in line to the current study, implying that the big companies tend to invest in projects which are beneficial for them. Such projects tend to be long-term in nature and lead to generate positive financial performance. Lin et al. (2021), however, found inverse, but insightful findings with the current study, implying that the ESG-CFP nexus tends to be better for the larger companies as compared to the smaller companies. Similarly, the relationship tends to be stronger for the smaller companies (Lee & Suh, 2022; Huang, 2021). Thus, the findings are in line with majority of the past studies, and provide significant insights even if it diverges with the others.

On considering the theoretical relevance of the findings, the adverse influence of the ESG on Tobin's Q, in case of increasing company size is aligned with the Stakeholder theory. It implies that the comparatively smaller companies tend to be more effective in ESG initiatives, thereby enhancing stakeholder engagement. Furthermore, in case of the legitimacy theory, the negative interaction is in line with the theoretical premise. The companies which are larger in size might gain legitimacy as in case of the smaller companies. One of the key reasons could be that the larger companies might have reached a saturation point of legitimacy whereby the positive impact tends to be diminishing as compared to the smaller companies. Additionally, another reason could be the higher scrutiny of the larger companies, which tends to reduce the ESG's legitimacy need. In case of the Agency theory, the negative effect of the cost of debt on the Tobin's Q reflects the alignment with the theory. Since the lower borrowing costs, as a result of the better ESG performance, reduces the agency costs and aligns the managers' interests with that of the shareholders, the market valuation tends to increase.

In conclusion, the empirical results provided significant insights regarding the ESG-VALUE relationship in case of the Chinese companies. While the ESG does not have a direct influence on the value of the companies, and the cost of debt does not play the mediator role, the interaction of the overall ESG score tends to be significant and a negative determinant. The cost of debt, therefore, acts as a mediator, which tends to adversely influence the valuation. The findings, overall, imply that the smaller companies might leverage the ESG performance in an effective way as compared to the larger companies, thereby leading to

enhance their market value. Practically, the findings provide several key insights for the different stakeholder groups, such as managers, investors and policy makers. For the managers of the smaller companies, the ESG investments are likely to drive the market value. Furthermore, the investors must consider the size of the companies and focus on investing in only those companies which have larger size and invest in ESG, considering that these companies tend to provide higher benefits of the ESG practices. The policymakers, on the other hand, could design a targeted support for the smaller companies so that they adopt to the ESG practices, thereby recognising their initiatives for enhancement of market value. An understanding of the firm size's moderating role could help to tailor the ESG reporting and implementation strategies so that the financial performance and value could be maximised.

The study, however, has several limitations. Firstly, the focus on only a selected companies might limit the generalisability to the other contexts. Secondly, the study uses Wind's ESG scores, which might be different from the other studies, which have used a different evaluation criterion. This was one of the key reasons behind the fact that the study did not have similar findings to two other Chinese studies conducted in a similar timeframe. Thirdly, the focus of the study, although is relevant, considering the latest timeline, the potential long-term effects of the ESG practices might be missing, considering that majority of the ESG activities tend to have long-term implications. Therefore, the future researchers could use a similar research design and extend it to other countries, either in the APAC region, or other countries, especially the countries whereby the size of the companies are relatively small. Furthermore, another approach could be to use the same sample companies, and consider scores provided by different rating agencies. This could be more insightful as a comparative study to the current one. Additionally, an extended timeframe, possible a 10-year timeline, could be considered to gain a more comprehensive understanding. Lastly, the qualitative studies, specifically focused on interviewing the key decision makers regarding an entity's ESG policy or case studies of good or bad ESG companies could provide deeper insights into the mechanisms, thereby giving insights regarding the ways in which financial outcomes are influenced by the ESG across different firm sizes.

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