Exploring the Impact of ESG Performance on Corporate Financial Outcomes

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ABSTRACT

The impact of Environmental, Social, and Governance (ESG) performance on corporate financial performance has garnered increasing attention in recent years. ESG metrics reflect a company's commitment to sustainable practices, ethical governance, and social responsibility, which are increasingly viewed as drivers of long-term financial success. This study investigates the relationship between ESG performance and financial performance, specifically focusing on the mediating role of financial constraints. Using Return on Assets (ROA) as the dependent variable, this research evaluates whether ESG performance positively influences financial outcomes and how the Size-Age (SA) Index, as a measure of financial constraints, mediates this effect. The study employs a fixed-effects regression model, drawing on data from Chinese publicly listed companies. Results indicate a significant positive relationship between ESG performance and ROA, suggesting that firms with stronger ESG practices experience better financial outcomes. Additionally, the SA Index is found to partially mediate this relationship, demonstrating that ESG performance can reduce financial constraints, thereby further enhancing profitability. This research contributes to the growing body of literature by providing empirical evidence on the dual pathway through which ESG performance influences corporate financial performance.

Keywords: dividend policy, dividend yield, shareholder wealth, return on equity, firm performance

INTRODUCTION

Corporate Environmental, Social, and Governance (ESG) performance has increasingly been recognized as a key factor influencing long-term financial success (Chen et al., 2023). ESG disclosures reflect a company's dedication to sustainable practices, ethical governance, and social responsibility, which ultimately contribute to better financial outcomes. Numerous studies have demonstrated that firms with higher ESG performance tend to achieve superior financial performance, attributed to enhanced risk management, operational efficiencies, and stronger stakeholder relations (Kocmanová & Dočekalová, 2012; Xie et al., 2019). Despite extensive research confirming the positive correlation between ESG performance and corporate financial performance, the mechanisms through which ESG influences financial outcomes require further exploration. Recent discussions in the literature emphasize the need to identify the internal channels—such as financing conditions, cost of capital, and investor perception—through which ESG translates into measurable financial advantages.

This study examines the impact of ESG performance on corporate financial performance, with particular focus on the mediating role of financial constraints, represented by the SA Index. The SA Index (Size–Age Index) is a widely accepted measure of financial constraints, calculated based on a firm's size and age (Carreira & Silva, 2012). Higher SA Index values signify greater financial constraints, reflecting difficulties in securing external financing (Ng et al., 2024). Incorporating the SA Index into the analysis enables a more thorough investigation

of how ESG performance mitigates financial constraints and influences financial outcomes. By integrating this index, the study not only identifies whether ESG affects financial performance, but also how financing frictions may shape the strength of that relationship, offering a clearer analytical framework compared with earlier studies.

The theoretical foundation of this study is based on the assumption that ESG performance directly enhances corporate financial performance while also reducing financial constraints, thereby indirectly improving financial outcomes. Firms that exhibit strong ESG performance are often perceived as lower risk by investors, which improves their access to capital markets and reduces the cost of borrowing. As a result, these firms are better positioned to allocate resources to growth opportunities, further strengthening their financial performance. In addition, ESG-oriented firms may benefit from improved stakeholder trust, stronger regulatory compliance, and greater transparency, all of which help lower information asymmetry and attract long-term investors who value stability and ethical conduct.

Existing literature has consistently highlighted the benefits of ESG performance in enhancing reputation, mitigating risks, and improving operational efficiency. However, fewer studies have analyzed the specific role financial constraints play in this relationship. This study fills this gap by incorporating the SA Index into the analysis, offering a more comprehensive understanding of how ESG influences financial performance both directly and indirectly through the alleviation of financial constraints. This mediating perspective allows the study to situate ESG within firms' broader resource allocation processes, revealing how sustainability efforts may ease financing pressures and thereby reinforce firms' strategic and operational capabilities.

The contribution of this study is as follows: (1) It empirically confirms the direct positive effect of ESG rating performance on corporate financial performance, evidenced by the significant positive relationship between ROA and ESG. This finding reaffirms that ESG represents an intangible strategic asset capable of enhancing profitability. (2) It highlights the mediating role of financial constraints in the ESG–financial performance relationship, using the SA Index to show that ESG indirectly enhances profitability by reducing financial constraints. This demonstrates that ESG not only affects performance through operational improvements but also by easing firms' access to external capital. (3) It ensures the robustness of the findings by incorporating lagged financial performance variables, thereby confirming the stability and validity of the relationship between ESG rating performance and corporate financial outcomes. The use of lagged indicators helps minimize endogeneity concerns and supports the long-term relevance of ESG.

LITERATURE REVIEW AND HYPOTHESES

ESG Performance

Environmental, Social, and Governance (ESG) performance has evolved from a voluntary corporate practice into a widely adopted framework for assessing firms' sustainability and ethical conduct (Chouaibi & Affes, 2021). The ESG concept originates from socially responsible investment (SRI) initiatives in the 20th century and has gradually expanded to encompass a broader evaluation of corporate behavior, including environmental stewardship, social responsibility, and governance quality. The environmental dimension evaluates how firms manage natural resources, reduce pollution, control carbon emissions, and mitigate environmental risks (Alsayegh et al., 2020). The social component assesses labor practices, employee relations, human rights, customer welfare, and community engagement. Governance, meanwhile, focuses on board structure, transparency, shareholder protection, and compliance with ethical standards (Kocmanová & Šimberová, 2014). Collectively, these three dimensions aim to capture a firm's overall commitment to long-term sustainability and ethical management.

Measurement of ESG performance varies across rating agencies and academic studies. Internationally recognized ESG rating providers include MSCI ESG Ratings, Refinitiv ESG Scores, and Sustainalytics, while

some countries maintain localized rating systems to reflect domestic regulatory and cultural contexts. Despite differences in metric construction, weighting, and disclosure requirements, ESG ratings consistently aim to quantify non-financial performance that could affect long-term firm value. Studies by Huang (2021) show that ESG ratings are effective indicators of corporate commitment to sustainable practices and serve as credible signals for investors evaluating long-term risks and opportunities. In addition, ESG reporting promotes transparency and accountability, which strengthens stakeholder confidence and can indirectly influence financial decision-making (Kocmanová & Šimberová, 2014). The growing adoption of ESG frameworks demonstrates that firms increasingly recognize sustainability performance as a strategic resource rather than a peripheral activity, suggesting that ESG has become an essential factor in corporate management and research.

ESG Performance and Corporate Financial Performance

A substantial body of research has examined the relationship between ESG performance and corporate financial performance (CFP). Early studies often produced mixed results, with some suggesting that ESG activities may impose additional costs and divert resources from core business operations, potentially reducing profitability (Chen et al., 2023; Friede et al., 2015). However, recent meta-analyses and systematic reviews indicate that the majority of empirical studies report a positive relationship between ESG and CFP (Ahmad et al., 2021; Zhou et al., 2022). Several mechanisms have been proposed to explain this positive impact.

First, high ESG performance enhances corporate reputation, brand value, and stakeholder trust, which may translate into increased customer loyalty, stronger supplier relationships, and improved market competitiveness (Bruna et al., 2022). Second, ESG practices serve as a risk management tool by reducing the likelihood of environmental incidents, regulatory penalties, legal disputes, and governance failures (Dalal & Thaker, 2019). Third, ESG initiatives can increase operational efficiency, particularly through energy savings, resource optimization, and improved production processes. Fourth, firms with strong ESG performance often experience higher employee satisfaction, lower turnover, and improved productivity, which indirectly enhances profitability. Furthermore, ESG practices may facilitate access to financial resources, as investors increasingly value sustainability and may offer lower financing costs to firms perceived as responsible and low-risk. Collectively, these channels suggest that ESG performance contributes to superior financial outcomes not only through operational improvements but also through enhanced stakeholder relations and resource accessibility.

Financial Constraints and Their Role in Firm Performance

Financial constraints refer to limitations that firms face in obtaining sufficient external financing for investment and operational activities (Santos & Cincera, 2022). These constraints often result from information asymmetry between firms and investors, lack of collateral, small firm size, or limited operating history (Akbar et al., 2021). Financially constrained firms may underinvest in profitable opportunities, delay expansion projects, or reduce spending on innovation, ultimately affecting long-term growth and profitability. Scholars have developed multiple indices to quantify financial constraints, including the Kaplan-Zingales (KZ) Index, Whited-Wu (WW) Index, and the Size-Age (SA) Index (Zhang et al., 2023). Among these, the SA Index is considered more robust and exogenous because it relies on observable firm characteristics (size and age) rather than potentially endogenous financial ratios, making it particularly suitable for empirical analyses of the effects of financial constraints.

Existing studies indicate that financial constraints play a critical mediating role in determining firm performance. Firms with fewer constraints have greater flexibility in capital allocation, enabling timely investment in profitable projects and enhancing operational efficiency (Yao & Yang, 2022). Conversely, highly constrained firms face restricted growth opportunities and may adopt suboptimal strategies to conserve cash. Recent research suggests that ESG performance can alleviate financial constraints by improving investor perceptions, enhancing credibility, and signaling lower risk (Zhang, 2022). Firms with strong ESG performance are often viewed as

more transparent and socially responsible, which can increase access to long-term financing, reduce borrowing costs, and attract patient capital. This interplay suggests that financial constraints may serve as an important transmission mechanism linking ESG performance to corporate financial outcomes, highlighting the need for research that explicitly models both direct and indirect effects.

Research Gaps

Although numerous studies have examined ESG performance and its relationship with corporate financial performance, several gaps remain. First, most prior research focuses on the direct effect of ESG on financial outcomes, while the indirect mechanisms, particularly the role of financial constraints, are underexplored. Theoretical models suggest that ESG may reduce financing frictions, thereby enabling firms to invest more efficiently and enhance profitability, yet empirical evidence remains limited. Second, many studies rely on financial-variables-based indices, such as KZ or WW, to measure constraints, which may introduce endogeneity issues and limit the robustness of conclusions. Few studies have employed the SA Index, which provides a more exogenous measure of financial constraints, allowing for clearer identification of ESG's indirect effects. Third, existing literature is heavily concentrated on developed markets, while emerging markets—where capital markets are less mature and institutional environments differ—have been largely neglected. Differences in regulatory enforcement, investor behavior, and corporate governance practices may alter the ESG–performance relationship and the extent to which ESG mitigates financial constraints. Finally, there is a lack of integrated frameworks that simultaneously examine ESG, financial performance, and financial constraints. As a result, prior studies do not fully explain whether ESG contributes to profitability solely through operational improvements or also via easing access to financing. These gaps indicate the need for empirical research that investigates both direct and indirect effects of ESG using robust measures of financial constraints, thereby providing a more comprehensive understanding of the ESG–financial performance nexus.

Hypotheses Development

A review of prior literature indicates that the relationship between Environmental, Social, and Governance (ESG) rating performance and corporate financial outcomes has produced mixed findings, reflecting the complexity of the mechanisms through which ESG affects firm performance. On one hand, several studies suggest that higher ESG ratings directly enhance corporate financial performance. Firms that implement robust ESG practices often achieve better risk management, higher operational efficiency, and stronger stakeholder trust, all of which contribute to improved profitability and firm value (Velte, 2017; Friede, Busch, & Bassen, 2015). For instance, companies with strong environmental management can reduce energy and resource costs, mitigate potential regulatory penalties, and lower the probability of environmental accidents. Similarly, firms with high social and governance standards can reduce reputational risks, improve employee satisfaction, and foster better relationships with investors, customers, and suppliers. These factors collectively support the notion that ESG performance can directly generate financial benefits by optimizing internal operations and enhancing external stakeholder relationships.

On the other hand, ESG may also exert an indirect effect on financial performance through its influence on financial constraints. Financially constrained firms often face limited access to external financing, higher borrowing costs, and restricted investment capacity, which can hinder growth and profitability. Prior studies suggest that strong ESG performance can alleviate these constraints by signaling lower risk and higher reliability to capital providers (Ansong, 2017; Hadlock & Pierce, 2010). Firms with high ESG ratings are often perceived as more transparent, socially responsible, and ethically managed, characteristics that reduce information asymmetry between firms and investors. As a result, these firms can secure financing at more favorable terms, obtain larger credit lines, and attract long-term capital, all of which facilitate investments in profitable projects and contribute to improved financial outcomes. This financing channel provides an important indirect pathway linking ESG practices to corporate financial performance.

Additionally, theoretical frameworks support both the direct and indirect effects of ESG on firm performance. Stakeholder theory emphasizes that firms addressing the interests of multiple stakeholders, including investors, employees, regulators, and the broader community, are more likely to achieve sustainable success. Resource-based theory suggests that ESG-related capabilities, such as environmental innovation, strong governance structures, and robust social practices, constitute strategic resources that are valuable, rare, and difficult to imitate. These resources provide competitive advantages that can enhance profitability. Finally, information asymmetry theory explains that firms with strong ESG disclosure reduce uncertainty for investors, leading to lower capital costs and improved access to external financing. Taken together, these perspectives justify the investigation of both direct and indirect effects of ESG on financial performance. Based on the preceding discussion, the study proposes the following hypotheses (Figure 1):

H1: Corporate ESG rating performance has a positive effect on financial performance.

H2: Corporate ESG rating performance has a positive effect on financial performance by alleviating its financing constraints.

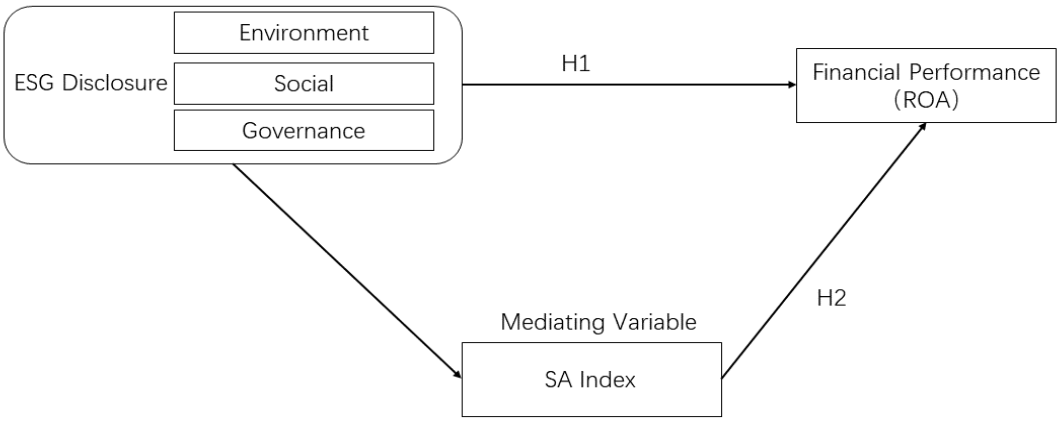

Figure 1: Research Hypothesis

METHODOLOGY

Model Design

Based on the data and modeling objectives of this study, a fixed effects model was selected for empirical analysis, and Model (1) was constructed to examine the impact of ESG rating performance on corporate financial performance, aiming to test H1. Specifically, ESG Score represents the ESG rating performance of the firm, and the model is designed to analyze its direct influence on corporate financial performance. The structure of the model is as follows:

$$ROA_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \sum \gamma_i Control_k + \delta Ind_i + \varepsilon_{i,t} \quad (1)$$

where i represents individual firms and t represents time periods (years). Ind captures the differences between individual industry, with different values for each entity, representing the fixed effects across firms. $\varepsilon_{i,t}$ denotes the error term, which varies across firms and time, accounting for unobserved factors. The control variables in the model include the Market Value, Firm Size, Interest Expense, Fixed Asset Ratio, Leverage, Earnings Per Share (EPS), and Net Cash Flow to Total Assets (NCF).

Furthermore, to capture the indirect effect of ESG Score on financial performance through financing constraints, the SA Index is introduced as a mediator. The SA Index measures the degree of a firm's financial constraints,

where higher values indicate less constrained firms. We hypothesize that firms with better ESG performance face fewer financial constraints, which in turn positively affects their financial performance. The ESG performance's effect on the SA Index model is as follows:

$$SA_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \sum \gamma_i Control_k + \delta Ind_i + \varepsilon_{i,t} \quad (2)$$

Then, we test the hypothesis that financing constraints of listed companies play an important mediating role in the relationship between corporate social responsibility performance (ESG) and financial performance. To examine this, we include both financing constraints (measured by the SA Index) and the firm's ESG rating performance in the regression model, constructing Model (3) to test the mediating effect. The specific model is as follows:

$$ROA_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \alpha_2 SA_{i,t} + \sum \gamma_i Control_k + \delta Ind_i + \varepsilon_{i,t} \quad (3)$$

Variables

The core explanatory variable of this study is the ESG score, representing a firm's environmental, social, and governance performance. ESG has become an increasingly important metric as investors, regulators, and stakeholders place greater emphasis on sustainability, ethical practices, and transparent corporate governance. The selection of ESG score as the main explanatory variable enables the study to investigate how corporate commitment to environmental protection, social responsibility, and strong governance influences financial performance. Firms with high ESG scores are generally perceived as lower-risk investments, which can improve access to capital, reduce cost of financing, and enhance reputation among stakeholders (Friede, Busch, & Bassen, 2015; Velte, 2017). In addition, ESG performance reflects the firm's long-term strategic orientation, capability to manage non-financial risks, and ability to sustain operations in a competitive environment. The ESG score thus serves as a comprehensive indicator of a firm's sustainability practices and overall governance quality.

The dependent variable in this study is return on assets (ROA), a widely used measure of corporate profitability relative to total assets. ROA indicates the efficiency with which a firm utilizes its assets to generate profits, making it a crucial indicator of financial performance (Goyal, Rahman, & Kazmi, 2013). Firms with higher ROA values demonstrate better resource allocation, stronger operational management, and greater ability to convert assets into profit. By using ROA as the dependent variable, the study directly assesses the financial impact of ESG practices, providing insights into the relationship between corporate sustainability and economic outcomes. ROA is particularly suitable because it captures both operational efficiency and the overall effectiveness of management decisions.

The study includes the SA Index as the mediator variable, representing financial constraints. The SA Index is calculated based on firm size and firm age, with higher values indicating fewer financial constraints (Hadlock & Pierce, 2010). Firms with lower financial constraints can access external capital more easily, invest in profitable opportunities, and enhance long-term financial performance (Almeida, Campello, & Weisbach, 2004). By including the SA Index, the study examines whether ESG performance improves financial outcomes partly by alleviating financing constraints. This allows for testing both the direct and indirect effects of ESG on firm profitability.

To isolate the effect of ESG score and minimize potential confounding influences, several control variables are included. These include market value (MV), firm size (Size), interest expense (IE), fixed asset ratio (FAR), leverage (Lev), earnings per share (EPS), and operating cash flow to total assets (CF). These variables account for differences in firm scale, capital structure, profitability, and liquidity, ensuring that the estimated relationship between ESG and financial performance is not biased by other financial or operational factors. All variables are summarized in Table 1.

Table 1 Variables and descriptions

Variable type	Variable	Description
Independent variables	ESG	Environment, social and governance- disclosure score
Dependent variable	ROA	Return on assets, the natural log of a firm's net income to its total assets at the end of year, ROA = Net income/total assets；
Mediating variables	SA Index	The SA Index measures a firm's financing constraints, with higher values indicating less financial flexibility.
Control variables	Leverage	Natural logarithm of a firm's debt to total assets at the end of year
	Fixed Assets Ratio	(Total Fixed Assets / Total Assets) × 100%
	Net Cash Flows from Operating Activities (NCF)	Net Cash Flows from Operating Activities/ Total assets
	Earnings Per Share (EPS)	Portion of a company's profit allocated to each outstanding share of common stock
	Interest Expense (IE)	Interest Expense refers to the cost incurred by the company for borrowed funds.
	Market Value (MV)	Market Value represents the total market capitalization of the firm.
	Firm size (Size)	Natural logarithm of a firm's total assets at the end of year

Data Sources

In this study, the indicator system is established by categorizing variables into four distinct groups: core explanatory variable, dependent variable, mediator variable, and control variables. Each category is selected carefully to reflect the objectives of the study and supported by relevant literature to ensure a comprehensive analysis of the impact of ESG Score on financial performance through financing constraints. All data were collected from the CSMAR (China Stock Market & Accounting Research) database. The CSMAR database is a widely recognized and authoritative source for financial and economic research, providing comprehensive coverage of financial data, corporate governance information, stock prices, and transaction details for Chinese listed companies.

RESULTS AND DISCUSSION

Baseline Regression Analysis

The results of the industry fixed effects model indicate that ESG performance has a significant and positive impact on a firm's financial performance, measured by Return on Assets (ROA) in Table 2. Specifically, the coefficient for ESG score is 0.0136, with a P-value of 0.0035, suggesting that an increase in ESG score is associated with a higher ROA. This statistically significant result provides strong empirical evidence supporting Hypothesis 1 (H1), which posits that improved ESG rating performance enhances corporate financial performance. The positive association is consistent with existing literature suggesting that firms with stronger ESG profiles benefit from improved stakeholder trust, reduced non-financial risks, and enhanced operational efficiency. These advantages can translate into better resource allocation, stronger market competitiveness, and ultimately improved profitability.

Beyond the main explanatory variable, the model reveals meaningful insights regarding the influence of firm-level financial characteristics on ROA. Notably, operating cash flow (NCF) emerges as a highly significant

predictor of ROA, with a coefficient of 2.1512 and a P-value of 0.0000. This remarkably strong positive effect underscores the central role of internal liquidity in shaping corporate profitability. Firms with robust operating cash flows possess greater flexibility in financing day-to-day operations, investing in productive assets, and responding to market uncertainties. The significance of NCF also highlights that, regardless of a firm's ESG engagement, efficient internal cash generation remains a foundational determinant of financial performance. Companies that maintain strong cash flow positions are better equipped to pursue growth opportunities, manage working capital more effectively, and withstand periods of financial pressure.

Table 2 Baseline regression results

Variables	**ROA (1)**		
	Coefficient	Std. Err	P-value
const	-2.3311	1.0352	0.0245
ESG	0.0136	0.0046	0.0035
Market Value	-0.0710	0.0493	0.1502
Firm Size	0.2174	0.1228	0.0769
Interest Expense	-0.1180	0.0301	0.0001
Fixed Asset Ratio	-0.0961	0.0104	0.0000
Leverage	0.0588	0.0774	0.4476
EPS	0.6604	1.1155	0.5539
NCF	2.1512	0.2280	0.0000
Observation	1816		
R-squared	0.6752		

Interest expense exhibits a negative and highly significant relationship with ROA, with a coefficient of –0.1180 and a P-value of 0.0001. This finding suggests that higher debt-related costs can substantially weaken corporate profitability. As interest obligations increase, firms face greater financial burdens, reducing net income and limiting the resources available for innovation, sustainability initiatives, or capital investment. The magnitude and significance of this coefficient emphasize the importance of maintaining an optimal capital structure and managing borrowing costs carefully. Excessive reliance on debt financing may increase financial risk and lead to constrained investment capacity, ultimately diminishing firm performance. Other control variables also show noteworthy effects. The fixed asset ratio (FAR) demonstrates a significant negative impact on ROA, with a coefficient of –0.0961 (P-value = 0.0000). This indicates that firms with a higher proportion of fixed assets may suffer from lower operational efficiency or slower asset turnover, both of which reduce profitability.

In asset-intensive industries, maintaining large fixed asset bases may lead to high depreciation expenses or underutilized capacity, thereby constraining financial returns. Similarly, the coefficient for total assets is negative and significant (–2.182e-12, P-value = 0.0000), suggesting that larger firms do not necessarily achieve higher ROA, possibly due to diseconomies of scale, more complex management structures, or slower organizational responsiveness. In contrast, leverage (Lev) and earnings per share (EPS) do not show statistically significant associations with ROA. Their lack of significance indicates that, within the model's specification, variations in these factors do not meaningfully explain differences in financial performance. This outcome may reflect industry-level differences, market conditions, or the possibility that the effects of leverage and EPS are mediated through other financial variables already captured in the model.

Overall, the empirical results emphasize the value of ESG performance in improving financial outcomes while highlighting the central roles of liquidity and debt management. Firms seeking to enhance profitability should not only strengthen their ESG initiatives but also prioritize efficient cash flow management and avoid excessive reliance on fixed asset investments or high-interest borrowing.

Mediation Regression Analysis

In the model (2), ESG performance is shown to significantly reduce the firm's SA Index (coefficient = -0.0018, P-value = 0.0000), confirming that firms with higher ESG scores face fewer financing constraints. This supports Hypothesis 2 (H2), which posits that corporate ESG rating performance alleviates financing constraints. The reduction in financing constraints can be attributed to the positive market perception of firms with strong ESG practices. Such firms are often viewed as lower-risk, benefiting from improved access to capital and more favorable borrowing conditions. Control variables such as Market Value and Firm Size also play significant roles in reducing financing constraints, indicating that larger firms and those with higher market valuations generally experience less difficulty in securing external financing. On the other hand, Net Cash Flow has a negative and significant effect on the SA Index, indicating that companies with greater operational liquidity are less financially constrained, which complements the role of ESG in mitigating financial barriers.

In the model (3), where ROA is the dependent variable, the SA Index exhibits a strong negative relationship with ROA (coefficient = -1.7363, P-value = 0.0000), confirming that firms facing fewer financial constraints achieve better financial performance. This finding aligns with Hypothesis 2 (H2), suggesting that ESG improves financial performance by reducing financing constraints, as firms with lower SA Index values are better positioned to invest in growth opportunities and generate higher returns. Additionally, ESG performance continues to have a direct and positive effect on ROA (coefficient = 0.0105, P-value = 0.0109), confirming Hypothesis 1 (H1). This demonstrates that firms with higher ESG scores not only experience financial benefits through improved operational efficiency and stakeholder relations but also by easing their access to financial resources.

Overall, the results strongly support both Hypothesis 1 (H1) and Hypothesis 2 (H2). ESG performance has a dual impact on financial outcomes: directly improving profitability and indirectly enhancing financial performance by reducing financing constraints. This indicates that ESG initiatives are not only beneficial from a sustainability and governance perspective but also create tangible financial advantages for firms, both by boosting their financial flexibility and increasing overall profitability.

Table 3 Mediation regression results

Variables	SA Index (2)			ROA (3)		
	Coefficient	Std. Err	P-value	Coefficient	Std. Err	P-value
SA Index	-	-	-	-1.7363	0.2665	0.0000
const	-1.6804	0.0943	0.0000	-5.2488	1.0854	0.0000
ESG	-0.0018	0.0004	0.0000	0.0105	0.0041	0.0109
Market Value	0.0368	0.0076	0.0000	-0.0070	0.0354	0.8420
Firm Size	2.7905	0.0108	0.0000	5.0627	0.7458	0.0000
Interest Expense	0.0724	0.0069	0.0000	0.0077	0.0387	0.8424
Fixed Asset Ratio	0.0040	0.0008	0.0000	-0.0891	0.0099	0.0000
Leverage	-0.0023	0.0027	0.3879	0.0548	0.0545	0.3151
NCF	-0.0244	0.0099	0.0135	2.1088	0.0362	0.0000
EPS	-0.1836	0.0960	0.0559	0.3417	1.0020	0.7331
Observation	1816			1816		
R-squared	0.4190			0.6828		

Robustness Analysis

To address concerns of reverse causality between ESG rating performance and financial performance, a robustness check was performed by introducing a lagged dependent variable (ROA_lag). This approach controls for potential endogeneity, ensuring that past financial performance does not influence current ESG ratings. By

including ROA_lag, the model captures financial performance from the previous period, providing a more accurate assessment of the causal relationship between ESG and financial performance.

Initial regression results indicated a positive relationship between ESG performance and ROA. However, firms with strong financial performance may have more resources to invest in ESG initiatives, potentially improving their ESG scores. Incorporating ROA_lag ensures that the effect of ESG on financial performance is not simply a result of prior success, mitigating the risk of reverse causality. The robustness check confirms that ESG performance continues to have a significant positive effect on financial performance, supporting the initial findings and providing stronger evidence for the causal link between ESG ratings and corporate financial outcomes.

Table 4 Robustness analysis with lagged variables

Variables	**ROA_lag (4)**		
	Coefficient	Std. Err	P-value
const	-2.9484	1.7715	0.0962
ESG	0.0184	0.0078	0.0182
Market Value	-0.0906	2.2376	0.0304
Firm Size	2.2860	0.1228	0.3071
Interest Expense	-0.0631	0.0638	0.3230
Fixed Asset Ratio	-0.0872	0.0184	0.0000
Leverage	0.1599	0.0579	0.0058
NCF	1.6634	0.1828	0.0000
EPS	0.2640	1.2423	0.8317
SA Index	-0.7816	0.7795	0.3162
Observation	1723		
R-squared	0.2765		

In the robustness check, by introducing the lagged ROA (ROA_Lag) into the regression analysis, we further verify the impact of ESG rating performance on corporate financial performance. The results show that the regression coefficients remain stable, and most of the key variables remain significant, confirming the robustness of the findings. The regression coefficient for ESG is 0.0184, and it remains significant at the 0.01 level (P-value = 0.0182). This indicates that even after including lagged ROA, the positive effect of ESG rating on corporate financial performance (ROA) persists. Firms with higher ESG ratings continue to exhibit better financial performance, which is consistent with the findings from the previous analysis and further supports Hypothesis 1.

Among the control variables, several remain consistent with the previous results. Market Value shows a negative and significant relationship with financial performance (coefficient = -0.0906, P-value = 0.0304), indicating that larger firms may face diminishing returns on their financial performance. Similarly, Fixed Asset Ratio demonstrates a significant negative relationship with ROA_lag (coefficient = -0.0872, P-value = 0.0000), suggesting that companies with a higher proportion of fixed assets may experience lower liquidity, thereby negatively impacting their financial performance. Leverage (coefficient = 0.1599, P-value = 0.0058) exhibits a positive and significant relationship with ROA in the lagged model, which contrasts with the previous negative relationship. This implies that, after accounting for lagged financial performance, the level of debt may positively influence current financial performance.

CONCLUSION

This study investigated the relationship between corporate ESG performance and financial outcomes, with a particular focus on the mediating role of financial constraints measured by the SA Index. By employing a fixed-

effects regression model and utilizing panel data from Chinese publicly listed firms, the research provides a comprehensive examination of how sustainability practices translate into financial benefits. The empirical findings consistently demonstrate that higher ESG ratings are significantly associated with improved financial performance, as reflected in Return on Assets (ROA). This positive association confirms that firms' engagement in environmental protection, social responsibility, and sound governance structures contributes not only to ethical and societal value but also to tangible economic returns.

Beyond the direct effect, this study further explored the mechanism through which ESG performance enhances financial outcomes, emphasizing the role of financial constraints as a mediating factor. The analysis reveals that firms with stronger ESG performance face lower levels of financial constraints, as captured by the SA Index. Such firms tend to enjoy improved creditworthiness, greater investor confidence, and reduced information asymmetry, all of which facilitate easier access to external financing. This reduction in financial constraints subsequently strengthens firms' operating capacity and investment efficiency, ultimately boosting their profitability. These results highlight an important indirect pathway: ESG engagement enhances financial performance not only through operational improvements but also by alleviating financing barriers that often limit corporate growth.

The findings of this study contribute to the expanding body of literature on ESG and corporate finance in several meaningful ways. First, the study offers empirical evidence from the Chinese capital market, enriching the understanding of ESG's economic value in an emerging economy context where institutional environments, regulatory frameworks, and investor behaviors differ from those in more mature markets. Second, by incorporating financial constraints as a mediating variable, the research provides a more nuanced explanation of how ESG performance translates into financial gains. This contributes to theoretical development by bridging sustainability research with corporate finance literature, emphasizing that ESG initiatives carry significant strategic implications beyond corporate image-building.

From a practical perspective, the results hold important implications for corporate managers, investors, and policymakers. For managers, the findings underscore the strategic importance of integrating ESG considerations into business decision-making and long-term planning. Investing in ESG-related initiatives can create dual benefits: enhancing firm value directly through improved operational outcomes and indirectly by easing financing pressure. For investors, the demonstrated link between ESG performance and financial returns provides a strong foundation for incorporating ESG criteria into investment decisions, particularly in markets where information asymmetry remains a challenge. For policymakers and regulators, the study's results reinforce the importance of promoting ESG disclosure standards and supporting sustainability-oriented policy measures, which can collectively improve capital allocation efficiency and encourage responsible corporate behavior.

Despite its contributions, this study has several limitations that provide avenues for future research. First, ESG data availability and measurement remain challenges. The study relies on existing ESG rating systems, which may differ in scoring criteria, weighting mechanisms, and coverage across industries. Future research could incorporate alternative ESG metrics, manually coded indicators, or textual analysis to obtain more granular and robust ESG evaluations. Second, the mediating analysis focuses solely on financial constraints measured by the SA Index. While the index is widely used, it may not fully capture all dimensions of financing limitations. Subsequent studies may consider additional mediators such as information transparency, innovation capacity, or risk-taking behavior to reveal more complex transmission mechanisms. Third, the data sample is limited to Chinese listed firms, which operate under specific regulatory environments and institutional structures. The generalizability of findings may thus be constrained. Future research could conduct cross-country comparisons or industry-specific analyses to identify how institutional differences shape the ESG–financial performance relationship. Fourth, although this study uses fixed-effects models to mitigate endogeneity concerns, causal inference remains a challenge. Future work may adopt quasi-natural experiments, instrumental variable approaches, or machine learning–based causal methods to strengthen causal identification. Finally, and

importantly, future studies could examine the E, S, and G components separately to determine which dimension primarily drives the observed effects. Such an approach would allow researchers and practitioners to identify the most influential aspects of ESG performance and tailor corporate strategies or investment decisions accordingly.

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