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Study on the Impact of ESG Performance on Corporate Profitability

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Abstract

This study utilizes pre-processed data of all A-share listed companies from 2014 to 2024 as the sample. By constructing regression models and mediation effect models, it investigates the transmission mechanism among ESG performance, corporate risk level, and profitability. The findings indicate that better ESG performance is associated with higher corporate profitability. Moreover, superior ESG performance is linked to lower corporate risk levels, which in turn enhances profitability. The contributions of this research lie in its innovative perspective and practical implications: it addresses existing research gaps by exploring the "pathway" between ESG performance and profitability from the perspective of corporate risk level, thereby enriching the literature on the economic consequences of ESG performance. The conclusions also provide valuable references and insights for economic practices by corporations, governments, regulatory authorities, and other stakeholders.

Keywords

ESG performance, corporate profitability, corporate risk level, empirical study

1. Introduction

With the introduction of China's dual-carbon goals, increasing attention has been paid to the sustainability of environmental protection and social development. ESG (Environmental, Social, and Governance) performance has become a key concern for enterprises. Environmental, social, and governance factors not only affect corporate reputation but also influence the level of sustainable development. In the stage of pursuing high-quality development, clarifying the relationship between ESG performance and corporate profitability is of great necessity. Existing studies have paid insufficient attention to the economic consequences of ESG performance and the underlying transmission mechanisms. Therefore, this paper focuses on the corporate governance dimension to examine the influence mechanism between ESG performance and profitability, aiming to fill the identified research gap. Corporate risk level directly affects profitability, and prior research has also established an association between ESG performance and corporate risk level. Accordingly, this study selects corporate risk level as the mediating variable to explore the transmission mechanism among the three variables.

The sample consists of pre-processed data from all A-share listed companies over the period 2014–2024. Baseline regression models and mediation effect models are constructed. Descriptive statistics and correlation

tests are first performed to examine the relationships among variables, followed by regression analysis for hypothesis testing. Finally, robustness checks are conducted by replacing the dependent variable and incorporating DuPont analysis.

The contributions of this study are twofold. First, it explores the "pathway" linking ESG performance to profitability from the perspective of corporate risk level, thereby enriching the research on the economic consequences of ESG performance. Second, the findings offer practical references and implications for multiple stakeholders, including corporations, governments, and regulatory bodies.

2. Literature Review and Hypothesis Development

With the rise of concepts such as green finance and sustainable development, greater emphasis has been placed on sustainability. ESG has emerged as a crucial framework for evaluating enterprises' sustainable development capabilities and fulfillment of social responsibilities, attracting extensive attention from both academia and industry. This has spurred a growing body of research on corporate ESG performance and its consequences.

However, existing studies present divergent findings regarding the impact of ESG performance on firm performance. On one hand, numerous studies support a positive effect. For instance, Lai Cai Lin and Miao Yi Cong argue that higher ESG ratings positively promote corporate performance [1]. Liu Yiqi and co-authors further introduce mediating variables, suggesting that strong ESG performance can improve financial performance by reducing the cost of debt financing [2]. On the other hand, some scholars identify a negative or nonlinear relationship. For example, Wang Shuangjin et al. find that the fulfillment of ESG responsibilities by industrial enterprises exhibits a U-shaped nonlinear effect on financial performance [3].

These inconsistencies suggest that the relationship between ESG performance and firm performance is complex and influenced by multiple factors. As corporate profitability serves as a core indicator of firm performance, it partially reflects overall performance levels. Therefore, this study examines the impact of ESG performance on corporate profitability and proposes the following hypothesis:

H1: Better ESG performance is associated with higher corporate profitability.

Existing research indicates that ESG performance exerts differential effects on systematic risk and idiosyncratic risk [4], implying a relationship between ESG performance and corporate risk level. Accordingly, this study adopts corporate risk level as the mediating variable to investigate the underlying mechanism and proposes the following hypothesis:

H2: Better ESG performance is associated with lower corporate risk levels, which in turn enhances corporate profitability.

3. Research Design

3.1 Sample Selection and Data Sources

To investigate the impact of ESG performance on corporate profitability, this study selects data from all A-share listed companies over the period 2014–2024 as the initial sample. To ensure scientific rigor and data accuracy, the following treatments were applied:

(1) Exclusion of samples from financial and insurance companies.

(2) Exclusion of samples with ST or *ST designations.

(3) Exclusion of samples with missing data.

(4) Winsorization of all continuous variables at the 1% level on both tails.

After these procedures, a final sample of 15,333 valid observations was obtained. All data used in this study were sourced from the CSMAR and Wind databases. Model estimation and data processing were performed using Stata 18.0.

3.2 Variable Selection

3.2.1 Dependent Variable

Corporate profitability serves as the dependent variable in this study. Profitability is a core financial indicator of a firm, influenced by factors such as production costs, operational efficiency, and revenue structure, and it reflects the overall operating condition of the enterprise to a certain extent. Profitability can be measured using multiple indicators; this study adopts return on assets (ROA) as the proxy for corporate profitability.

3.2.2 Independent Variable

Corporate ESG performance is the independent variable. ESG represents a comprehensive evaluation framework encompassing environmental, social, and governance dimensions. It reflects a firm's development status and sustainability capability from a non-traditional financial perspective and indirectly influences various financial indicators. In current business practice, several third-party agencies assess corporate ESG performance through multiple indicators, typically presented in the form of ESG ratings. Given that the sample consists of A-share listed companies, this study employs the Hua Zheng ESG rating system, which is recognized for its scientific and comprehensive coverage. Following the approach of Wang Bo and Yang Maojia [5], the nine rating categories (C-AAA) are assigned numerical values from 1 to 9, with higher scores indicating better ESG performance.

3.2.3 Mediating Variable

Corporate risk level is selected as the mediating variable. In business operations, firms face various risks, including policy risk, financial risk, and operational risk, all of which directly affect operating performance. Therefore, this study employs the Z-score model to calculate the following indicators: X1 (working capital / total assets), X2 (retained earnings / total assets), X3 (EBIT / total assets), X4 (market value of equity / total liabilities), and X5 (total revenue / total assets). The resulting Z-score is then used to quantify corporate operational risk; a higher Z-score indicates a lower level of risk.

3.2.4 Control Variables

To enhance the robustness and validity of the results, the following control variables are included, drawing on prior literature: firm size (Size), firm age (Age), asset turnover ratio (ATR), ownership concentration (Top5), board size (Board), cash flow ratio (Cash), fixed asset ratio (Fix), and growth rate (Growth).

Table 1: Variable Definitions

Variable Category	Variable Name	Symbol	Variable Description
Dependent Variable	Corporate Profitability	ROA	Return on assets = Net profit / Average total assets × 100%
Independent Variable	ESG Performance	ESG	Hua Zheng ESG rating score (1–9)
Mediating Variable	Corporate Risk Level	Z	Z=1.2X1+1.4X2+3.3X3+0.6X4+X5
Control Variables	Firm Size	Size	Natural logarithm of total assets
	Firm Age	Age	Natural logarithm of years since establishment
	Asset Turnover	ATR	Total asset turnover = Operating revenue / Average total assets × 100%
	Ownership Concentration	Top5	Shareholding proportion of the top five shareholders
	Board Size	Board	Number of board members
	Cash Flow Ratio	Cash	Cash flow ratio = Net cash flow from operating activities / Total assets × 100%
	Fixed Asset Ratio	Fix	Fixed assets / Total assets × 100%
	Growth	Growth	Operating revenue growth rate = (Current revenue – Prior revenue) / Prior revenue × 100%

3.3 Model Specification

3.3.1 Baseline Regression Model

To test Hypothesis 1, the following baseline regression model is constructed:

$$\mathrm{ROA}_{i,t}=\alpha_0+\alpha_1 ESG_{i,t-1}+\sum Controls_{i,t}+Industry+Year+\varepsilon_{i,t} \quad (1)$$

where α_0 is the constant intercept, $ROA_{i,t}$ is the dependent variable, denoting the profitability of firm i in year t, $ESG_{i,t-1}$ is the independent variable, representing the ESG performance of firm i in year t, α_1 is coefficient of the explanatory variable, $\sum Controls_{i,t}$ is the set of control variables, Industry and Year represent industry and year fixed effects, respectively, and $\varepsilon_{i,t}$ is the random error term.

3.3.2 Mediation Effect Model

To explore the underlying mechanism through which ESG performance affects corporate profitability and to verify Hypothesis 2, this study introduces corporate risk level as a mediating variable. Following the methodology of Wu Yongxia and Shan Fei [6], the following model based on Model (1) is constructed:

$$\mathrm{Mi}_{i,t}=\beta_0+\beta_1 ESG_{i,t-1}+\sum Controls_{i,t}+Industry+Year+\theta_{i,t} \quad (2)$$

$$\mathrm{ROA}_{i,t}=\gamma_0+\gamma_1 ESG_{i,t-1}+\gamma_2 \mathrm{Mi}_{i,t}+\sum Controls_{i,t}+Industry+Year+\varepsilon\theta_{i,t} \quad (3)$$

where $Mi_{i,t}$ is the mediating variable, representing the risk level of firm i in year t. Provided that coefficients α_1 and β_1 are statistically significant, the significance of both γ_1 and γ_2 indicates the existence of a partial mediation effect. Conversely, if γ_1 is non-significant while γ_2 remains significant, it suggests a full mediation effect.

4. Empirical Analysis

4.1 Descriptive Statistics

As shown in Table 2, the dependent variable ROA ranges from -0.025 to 1.285, with a mean of 0.058 and a median of 0.579, indicating substantial variation in profitability across firms. The ESG score has a mean of 4.376, a median of 4.367, and a standard deviation of 1.919, suggesting that most firms exhibit relatively concentrated ESG performance levels, though the full range (1.000 to 9.000) reflects notable differences in ESG emphasis across companies. The mean and median of the Z-score are both 1.493, indicating that the distribution of corporate risk levels is uniform and symmetrical. However, the minimum value of -19.970 and the maximum value of 11.769 suggest the presence of extreme cases and significant heterogeneity in risk levels across the sampled firms.

Table 2: Descriptive Statistics Results

Variable	Observations	Mean	Median	Std. Dev.	Min	Max
ROA	15333	0.058	0.579	0.052	-0.025	1.285
ESG	15333	4.376	4.367	1.919	1.000	9.000
Z	15333	1.493	1.493	0.731	-19.970	11.769
Size	15333	22.257	22.257	1.221	18.114	28.366
Age	15333	3.233	3.233	0.233	2.079	4.248
ATR	15333	0.656	0.656	0.524	0.006	11.975
Top5	15333	52.620	52.620	15.730	1.420	166.60
Board	15333	8.341	8.341	1.570	4.000	17.000
Cash	15333	0.057	0.057	0.067	-0.397	0.839
Fix	15333	0.193	0.193	0.143	0.000	0.954
Growth	15333	0.219	0.219	1.578	-0.929	87.484

4.2 Correlation Analysis

The correlation analysis reveals that the correlation coefficient between ESG performance and corporate profitability is 0.168, significant at the 1% level, indicating a significant positive correlation between the two. Similarly, the correlation coefficient between ESG performance and the Z-score is 0.129 (significant at 1%), suggesting that better ESG performance is associated with a higher Z-score, which implies lower corporate risk. Furthermore, the correlation between the Z-score and profitability is 0.476 (significant at 1%), demonstrating that lower risk levels correspond to higher profitability. Additionally, control variables—including firm size, firm age, operating efficiency, ownership concentration, growth, cash flow ratio, and fixed

asset ratio—all exert significant impacts on both profitability and ESG performance. In summary, there are significant correlations among the explanatory variable (ESG performance), the dependent variable (profitability), and the mediating variable (corporate risk), and all selected control variables significantly influence the dependent variable.

4.3 Baseline Regression Analysis

Table 3 presents the estimation results of the benchmark regression, with all six models employing fixed effects. As shown in column (1), when only the explanatory and dependent variables are included—without control variables or fixed effects for year and industry—the regression coefficient is 0.004, significant at the 1% level. This is consistent with the results in column (2), where fixed effects are incorporated, suggesting a significant positive relationship between ESG performance and corporate profitability that remains robust against unobservable factors at the industry and temporal levels. Furthermore, columns (3) through (5) show the results of gradually adding control variables while maintaining year and industry fixed effects. The regression coefficient of ESG performance on ROA slightly decreases from 0.005 to 0.003, while remaining significant at the 1% level. This indicates that after controlling for various interfering factors, the positive relationship between ESG performance and profitability still holds and is more reliable than the results without control variables. These findings provide empirical support for Hypothesis 1 (H1).

Table 3: Baseline Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROA	ROA	ROA	ROA	ROE
ESG	0.004***	0.004***	0.005***	0.005***	0.003***	0.003***
	(10.0947)	(9.9972)	(11.2874)	(10.5861)	(8.2563)	(6.5553)
Size			-0.003***	-0.003***	-0.003***	0.007***
			(-3.7281)	(-3.9384)	(-4.8444)	(8.2550)
Age			-0.011***	-0.008**	-0.008***	-0.013***
			(-3.4992)	(-2.4032)	(-3.1239)	(-3.3574)
ATR				0.014***	0.008***	0.025***
				(3.9094)	(3.9581)	(5.6113)
Top5				0.000***	0.000***	0.000***
				(8.0017)	(7.3804)	(6.7285)
Board				-0.000	0.000	-0.001
				(-0.0768)	(0.0746)	(-1.2584)
Cash					0.3730***	0.4920***
					(17.1897)	(17.5637)
Fix					-0.080***	-0.094***
					(-14.1749)	(-11.4243)
Growth					0.003***	0.005***
					(2.6301)	(3.4701)
Constant	0.038***	0.034***	0.124***	0.146***	0.099***	-0.081***
	(20.6980)	(4.3520)	(6.6582)	(8.4403)	(6.3505)	(-3.2563)
Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	Yes	Yes	Yes	Yes	Yes
Observations	15333	15333	15333	15333	15333	15333
r2_a	0.028	0.092	0.097	0.123	0.345	0.299

*Note: 1. t-statistics are reported in parentheses. 2. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

4.4 Mediation Effect Test

Table 4 presents the results of the mediation effect test, with control variables included in Models (1) through (3). Model (1) shows that the coefficient for ESG performance is 0.003 (significant at the 1% level), confirming a positive correlation between ESG performance and corporate profitability. This further validates Hypothesis 1 and confirms that coefficient α_1 in the regression model is significant.

Model (2) reveals that the coefficient for ESG is 0.051, significant at the 1% level, indicating a significant positive correlation between ESG performance and the Z-score. This implies a significant negative correlation

between ESG performance and corporate risk; specifically, higher ESG performance corresponds to lower risk levels. This also confirms the statistical significance of β_1 in the mediation model.

In Model (3), the Z-score is incorporated as a mediator alongside the control variables. The coefficient for ESG performance remains significant at the 1% level but decreases to 0.001 compared to its value in Model (1). Concurrently, the coefficient for the Z-score is 0.042, significant at the 1% level, indicating a positive correlation between the Z-score and profitability—meaning that lower corporate risk levels lead to higher profitability. Since both γ_1 and γ_2 in the mediation model are statistically significant, it can be concluded that corporate risk (Z-score) plays a partial mediating role between ESG performance and profitability. Specifically, superior ESG performance reduces risk, which in turn enhances profitability, thereby validating Hypothesis 2.

Table 4: Mediation Effect Test Results

	(1)	(2)	(3)
	ROA	Z	ROA
ESG	0.003***	0.051***	0.001**
	(9.41)	(11.26)	(2.30)
Z			0.042***
			(5.80)
Constant	0.127***	3.474***	-0.017
	(10.70)	(19.73)	(-0.57)
Control Variables	Yes	Yes	Yes
Observations	15333	15333	15333
r2_a	0.307	0.565	0.459

*Notes:1. t-statistics are reported in parentheses. 2. * p < 0.1, ** p < 0.05, *** p < 0.01. 3. Control variables include Size, Age, ATR, Top5, Board, Cash, Fix, and Growth.*

4.5 Robustness Check

To ensure the reliability of the conclusions, a robustness check was conducted by replacing the dependent variable ROA with Return on Equity (ROE). The results are presented in column (6) of Table 3. A comparison of the results reveals that under the conditions of fixed industry and year effects, and with consistent and comprehensive control variables, the regression coefficient for ESG performance on ROE is 0.003, significant at the 1% level. This is consistent with the findings when ROA was used as the dependent variable, indicating that the choice of proxy for profitability does not alter the relationship between ESG performance and corporate profitability. Thus, a significant positive correlation between the two remains evident.

Additionally, this study controls for operating efficiency, proxied by Total Asset Turnover. When ROE is used as the dependent variable, DuPont analysis suggests that a firm's profitability and risk level are the primary determinants of ROE. Combined with the empirical findings of this study—that ESG performance enhances profitability by mitigating corporate risk—the results align with the profit-driven pathways revealed by DuPont analysis. This consistency further validates the authenticity and robustness of Hypothesis 2.

5. Conclusions and Policy Recommendations

Based on the empirical analysis, the following conclusions are drawn: 1. Better ESG performance is significantly associated with higher corporate profitability, indicating a positive promotional effect of ESG on profitability. 2. Corporate risk level plays a mediating role in the relationship between ESG performance and profitability: superior ESG performance reduces risk levels, which in turn enhances profitability.

The following policy recommendations are proposed: Enterprises should place greater emphasis on improving ESG performance, actively adopt environmentally friendly practices, fulfill social responsibilities, and strengthen corporate governance to achieve long-term sustainable development. Government agencies and regulators should enhance oversight of ESG disclosure, continuously improve relevant regulations and standards, and promote the standardization and normalization of ESG rating systems, thereby creating a favorable external environment for corporate development. For financial institutions and other investors, greater attention should be paid to corporate ESG disclosure and performance. By evaluating ESG factors to assess operating risks, investors can engage in more rational and scientifically grounded investment decisions.

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Conflicts of Interest

The authors declare no conflict of interest.

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