# ESG in China: Value Creation or Cost Imposition? An Empirical Study of the A-share Market.

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**Abstract: This research investigates how Environmental, Social, and Governance initiatives affect company performance in China's A-share market. Using a fixed-effects model to analyze panel data from 2009 to 2023, the research examines the connection between ESG performance and financial outcomes.Findings reveal a positive linkage where enhanced ESG implementation correlates with improved operational efficiency and market valuation, particularly in industries with stringent regulatory oversight. However, the financial burden of ESG adoption becomes evident in sectors characterized by high capital intensity and low-profit margins. The study further identifies corporate governance quality and regional institutional development as critical moderators affecting ESG effectiveness. Contrary to conventional assumptions, state-owned enterprises demonstrate weaker ESG-driven value creation compared to private firms. These insights suggest that ESG integration in emerging markets operates through context-dependent mechanisms, requiring coordinated efforts between regulatory frameworks and corporate strategic alignment to optimize sustainable growth outcomes.**

**Keywords: ESG Performance; Financial Performance; Corporate Governance; A-Share Market; Empirical Analysis; China, Sustainability; Industry Differences**

## 1. Introduction

Amidst a global shift toward addressing sustainability challenges, Environmental, Social, and Governance (ESG) criteria have emerged as fundamental benchmarks for assessing organizational performance among stakeholders including investors, corporations, and regulatory bodies. Contemporary business practices reveal that ESG metrics are increasingly being embedded within strategic evaluation systems, with many institutions now prioritizing these factors when analyzing enterprises' capacity for enduring value creation and operational resilience. Recent industry analyses indicate that over 76% of asset managers consider ESG integration crucial for mitigating systemic risks while identifying growth opportunities, as evidenced by findings from the Global Sustainable Investment Alliance's 2022 review.

A recent survey of international financial institutions reveals that approximately nine out of ten worldwide asset management firms acknowledge ESG considerations profoundly influence their investment strategies (Morningstar, 2020)[21]. Concurrently, corporations are increasingly refining their EGS disclosure practices to meet growing market demands for operational transparency and corporate accountability. Data from the Global Reporting Initiative (GRI) indicates a marked improvement in both the volume and sophistication of corporate sustainability reports across industries (GRI, 2021)[15].

Globally, national authorities and oversight bodies are increasingly introducing and reinforced environmental, social, and governance (ESG) compliance frameworks. A notable case is the European Union's 2018 adoption of the Non-Financial Reporting Directive (NFRD), mandating extensive ESG revelation requirements for major corporations. This regulatory shift has heightened focus on sustainable business practices within European markets while motivating businesses to develop comprehensive ESG frameworks. Across the Atlantic, US regulatory entities have similarly intensified scrutiny of corporate sustainability disclosures through updated Securities and Exchange Commission guidelines and state-level climate accountability measures[1].

In 2021, the U.S. Securities and Exchange Commission (SEC) unveiled a comprehensive set of ESG reporting mandates while signaling intentions to intensify regulatory scrutiny over corporate sustainability disclosures (SEC, 2021)

[25]. Meanwhile, China's regulatory authorities have rolled out corresponding frameworks such as the Measures for the Management of Environmental Information Disclosure by Listed Companies, aiming to promote enhanced transparency in environmental reporting among corporations within the world's second-largest economic system[2].

The establishment of these governance frameworks and compliance standards underscores the international community's intensified focus on corporate ESG practices. This regulatory evolution has driven organizations to enhance their approaches to corporate governance, risk mitigation strategies, and workforce well-being initiatives. Such legislative developments not only demonstrate global prioritization of sustainable business conduct but also catalyze structural reforms within corporate operations, particularly in areas concerning ethical oversight, crisis preparedness, and human capital development[6].

Although numerous studies have confirmed that exceptional ESG practices have the potential to boost a company's financial outcomes., the academic community still holds considerably varied views on the correlation between the two. Some scholars maintain that ESG elements promote the growth of financial indicators through mechanisms such as enhancing the brand value of enterprises and the attractiveness to investors. For example, a study conducted by Friede, Busch, and Bassen (2015) reveals that companies with strong environmental practices are more likely to secure financing through green bonds[13]. However, the opposing view emphasizes that this correlation is context-dependent. Empirical data shows that in a specific market environment, ESG investment may encroach on R&D funds or lead to an increase in operating costs, thereby exerting a compression effect on profit margins. For instance, during the transformation of the traditional energy industry, overly rapid ESG reforms may trigger short-term financial pressure.In China, the world's second largest economy, the rapid development of its capital market and the government's increasing emphasis on sustainable investment have made corporate ESG performance an important issue for investors and policy makers. Despite research examining the influence of ESG on corporate financial performance at a global level,, empirical analysis of the A-share market in China is still scarce. Especially in terms of industry differences, policy background and market development stage, there may be significant differences in the ESG strategies and their effects of domestic and foreign enterprises. Thus, investigating the connection between ESG and the financial performance of Chinese companies holds substantial practical significance.

Auer and Schuhmacher (2016) emphasize that while ESG initiatives demonstrate noteworthy effects[3], heightened emphasis on sustainability practices could potentially create financial strain and temporarily diminish profit margins. The operationalization of ESG principles exhibits substantial variation across industrial sectors and economic environments, with the mechanisms through which ESG factors exert their influence can vary substantially. Particularly, the extent to which market valuations accurately incorporate these ESG-related risks and opportunities into corporate valuations remains a critical area for further investigation[7].

This study comprehensively examines the relationship between ESG performance and financial results of A-share listed companies in China using empirical research approaches.The study specifically examines the distinct pathways through which environmental stewardship, social responsibility, corporate governance dimensions influence organizational profitability, while also evaluating how industrial sector characteristics and regional regulatory variations moderate these relationships. Through the application of robust analytical methodologies, this research seeks to offer detailed perspectives on the intricate dynamics between sustainable corporate practices and financial performance indicators within China's rapidly evolving market context.

This research not only bridges the domestic academic gap in examining ESG factors' impact on corporate financial outcomes, but also offers actionable insights for investment decision-makers, corporate managers, and regulatory authorities[10].

## 2. Literature Review

Over the past twenty years, ESG considerations have gained prominence as a critical factor influencing corporate economic outcomes. Scholarly discourse remains divided between two primary perspectives regarding ESG's impact on financial performance. Current

research increasingly demonstrates that enhanced ESG evaluations, particularly in corporate governance practices, exhibit a notable positive association with improved fiscal results. Conversely, alternative academic positions maintain that substantial investments in ESG initiatives may correlate with diminished profitability or show no statistically significant connection to financial outcomes[20].

### 2.1 The View that ESG is Positively Related to Financial Performance

Numerous empirical investigations have demonstrated a significant correlation between elevated ESG ratings and improved corporate financial performance. Particularly regarding governance (G) dimensions, organizations prioritizing improvements in governance frameworks-including enhancing board oversight mechanisms, increasing managerial transparency, and safeguarding shareholder rights-tend to cultivate sustainable organizational value. Such governance enhancements contribute to risk mitigation across operational and reputational domains, thereby creating favorable conditions for financial success. In their seminal analysis of corporate sustainability practices, Khan et al. (2016) established that robust governance systems function as critical drivers of competitive advantage in capital markets[22].

Research indicates that organizations prioritizing ESG considerations, particularly those that integrate ESG concerns central to their operational strategies into managerial processes, demonstrate enhanced economic outcomes. Empirical studies reveal that strengthening corporate governance frameworks substantially boosts financial performance through refined decision-making mechanisms, improved operational transparency, and mitigation of principal-agent conflicts (Eccles et al., 2014) [12].

Eccles and Zhou (2014) emphasized that robust governance frameworks not only strengthen corporate image but also draw increased investor interest while lowering capital expenditures, generating favorable effects on fiscal outcomes. Their research further revealed that environmental stewardship and social responsibility initiatives exhibit a beneficial relationship with financial metrics under specific circumstances, particularly when organizations allocate sustained strategic investments toward ecological preservation and community engagement efforts.Corporate social responsibility initiatives can enhance corporate reputation, strengthen customer retention, and mitigate compliance-related exposures. Such practices ultimately contribute to improved organizational profitability as demonstrated in enterprise financial statements (Friede et al., 2015)[13].

### 2.2 The View that ESG is Negatively Related to Financial Performance

Substantial resource allocation toward environmental initiatives by corporations frequently demands significant financial commitments, which may not yield immediate returns in terms of profitability, thereby placing pressure on fiscal outcomes. Similarly, organizational expenditures related to workforce benefits, compensation structures, and societal obligations within the social responsibility framework could elevate operational expenses, potentially impacting short-term profit margins (Benabou & Tirole, 2010)[5]. Furthermore, such multidimensional investments might temporarily constrain cash flow flexibility while pursuing sustainable development objectives.

Margolis and Walsh's 2003 research highlights how corporate social responsibility initiatives might generate amplified market demands, potentially imposing unsustainable fiscal burdens on organizations[20]. Parallel investigations reveal that environmental and social engagement could expose businesses to "green shuffling" risks-implementing strategies that superficially enhance their CSR image while failing to produce substantive economic benefits, as documented by Lyon and Maxwell (2011) [18].

### 2.3 The Mechanism of Action of Each Dimension of ESG

While scholars hold divergent perspectives, the majority of research underscores that distinct ESG dimensions influence financial outcomes via varied pathways. Consequently, a comprehensive examination of how these multifaceted ESG components shape corporate economic results becomes imperative[24].

Environmental dimension (E): While substantial upfront investments are often demanded for corporate environmental initiatives like pollution reduction and energy efficiency enhancement, such expenditures can yield long-term financial

benefits. Over time, these strategies may enable firms to mitigate compliance risks, enhance resource utilization efficiency, and curb energy expenditures, ultimately leading to operational cost reductions (Porter & van der Linde, 1995)[23]. Empirical evidence from Wang and Li (2020) demonstrates that adopting green technological solutions resulted in measurable improvements across multiple operational parameters, including regulatory compliance and energy consumption patterns[27].

Social dimension (S): This dimension mainly centers on a firm's responsibility to its employees, customers, suppliers and communities. Research shows that the input of social dimension improves the working environment of enterprises by enhancing employee satisfaction and loyalty, thus enhancing the productivity and innovation ability of enterprises (Awaysheh et al., 2018)[4]. In addition, corporate investment in social responsibility can also improve brand image and customer loyalty, and ultimately improve revenue level (Bhattacharya et al., 2009)[28].

Governance dimension (G): The effect of governance dimension on financial performance is particularly significant, particularly by mitigating agency issues and enhancing corporate transparency, thereby lowering the cost of capital and enterprise risks (Gompers et al., 2003)[16]. Good corporate governance can enhance the trust of investors, thereby improving the stock price and the ability to obtain capital.

### 2.4 Gaps in Existing Research and Innovations of this Study

While extensive research has investigated the relationship between ESG factors and corporate financial performance, the predominant focus has been on evaluating how ESG initiatives affect shareholder value creation, with comparatively limited investigation into the distinct pathways through which individual ESG pillars-environmental, social, and governance components-influence organizational economic results. Current academic examinations frequently treat ESG frameworks as unified constructs, often overlooking critical analyses of how each discrete dimension independently shapes financial performance metrics. Furthermore, while certain studies have begun to address these gaps,investigations have revealed that the complex interplay between environmental, social, and governance (ESG) dimensions and corporate financial performance remains partially understood, with insufficient clarity regarding their operational linkages. A notable research gap persists in examining how financial markets systematically evaluate and incorporate corporate achievements across these three critical sustainability dimensions into valuation mechanisms.

Consequently, this research seeks to address these research deficiencies by investigating the unique influences of environmental, social, and governance factors on corporate financial performance within the context of China's market.Utilizing empirical evidence from Chinese enterprises, the study comparatively examines each ESG component's influence while elucidating their differential transmission pathways-including but not limited to brand equity enhancement, operational efficiency optimization, and strategic risk mitigation-that ultimately shape organizational profitability[26].

## 3. Research Methodology and Data

This research seeks to examine the sustained influence of environmental, social, and governance (ESG) performance on the financial outcomes of A-share listed firms in China.As ESG factors have become increasingly important in global investment and corporate management, it has become particularly critical to examine their specific impact on corporate financial performance. Through multiple empirical methods like regression analysis, robustness test, mechanism analysis and moderating effect,this research comprehensively examines the influence of various ESG performance dimensions on the financial outcomes of businesses.

### 3.1 Research Methodology

To precisely uncover the influence of ESG performance on corporate financial outcomes, this study employs the following primary research methodologies:

Regression Analysis

This study used panel data regression model to explore the relationship between ESG score and financial performance (such as ROA and ROE) through regression analysis. Specifically, we use the bidirectional fixed effects model, This model is capable of effectively managing individual heterogeneity and time-related effects, removing the impact of external influences on the outcomes, and thereby precisely determining the

influence of ESG on financial performance.

Lagged Effect Analysis

In order to explore the long-term Influence of ESG performance, this study introduces a lagged variable (ESG1) to examine its continuous effect by analyzing the impact of ESG performance on future financial performance.

Robustness Checks

Verification procedures were implemented by omitting pandemic-affected 2020 records and performing alternative model configurations for sensitivity testing. These methodological safeguards were adopted to validate result consistency across varying analytical frameworks.

Mechanism Analysis

This research further introduction of financial Leverage (Leverage) * * * * as a intervening variable, this paper discusses how to Leverage through influence company ESG will affect its financial performance, reveal the ESG performance impact on the capital structure of the mechanism.

Moderating Effects Analysis

The research also investigates how firm-specific attributes moderate the connection between ESG and financial performance. By introducing interaction terms, we test the role of variables such as cash flow (CF), ** proportion of Fixed assets (Fixed) and state-owned enterprise attributes (SOE) ** in the ESG effect, providing empirical evidence for policy makers and corporate strategies.

### 3.2 Data Collection and Sample Selection

The data of this study mainly come from Wind database and CSMAR database. Specifically, ESG data are provided by the China Securities ESG Evaluation System, covering the ESG scores of A-share listed companies from 2009 to 2023; While financial data from CSMAR database, mainly including the ROA and ROE and financial index of enterprises. The research samples mainly include A-share listed companies, excluding financial industry companies, ST and *ST companies, and excluding abnormal samples with asset-liability ratio greater than 100%. Finally, 43,287 valid observations are obtained for subsequent analysis, as shown in Table 1.

**Table 1. Variable Definitions**

| Variable | Description | Type |
|---|---|---|
| ROA | Return on Assets (measure of financial performance) | Dependent Variable |
| ESG | Environmental, Social, and Governance score | Main Independent Variable |
| ESG1 | Lagged ESG score (one period) | |
| SOE | State-Owned Enterprise (1 = Yes) | Control Variable |
| Pollut | Polluting Enterprise (1 = Yes) | |
| Size | Firm size (log of total assets) | |
| Age | Firm age (log-transformed) | |
| CF | Cash to total assets ratio | |
| Fixed | Fixed assets ratio | |
| Top | Shareholding ratio of largest shareholder | |
| Indep | Board independence ratio | |
| Lev | Leverage (debt-to-assets ratio) | Mediating Variable |

## 4. Empirical Analysis

Before the formal regression analysis, this paper first shows the descriptive statistical results of the main variables, as shown in Table 2. Taking ROA (return on Assets) as an example, the mean value is 0.0348, the standard deviation is 0.171, the minimum value is -5.259, and the maximum value is as high as 22.01, indicating that there are large differences in the profitability of the sample enterprises. The mean value of ESG performance is 4.134, and the standard deviation is 0.939, indicating that the ESG scores of the enterprises in the sample are widely distributed and have strong discrimination.

In terms of control variables, the mean value of SOE is 0.347, indicating that about 34.7% of the samples are state-owned enterprises; The mean value of Pollut is 0.227, indicating that about 22.7% of the enterprises belong to high-pollution industries. The average value of Size is 12.95, and the distribution of enterprise size after logarithmic processing is concentrated. The average value of Age is 2.217, indicating that most enterprises are in the relatively young stage. Other variables such as CF (cash to assets ratio), Fixed (fixed assets ratio), Top (shareholding ratio of the largest shareholder) and Indep (board

independence) all show reasonable sample distribution.

**Table 2. Descriptive Statistic**

| Variable | Mean | Sd | Min | Max | N |
|---|---|---|---|---|---|
| roa | 0.0348 | 0.171 | -5.259 | 22.01 | 43287 |
| esg | 4.134 | 0.939 | 1 | 8 | 43287 |
| soe | 0.347 | 0.476 | 0 | 1 | 43287 |
| pollut | 0.227 | 0.419 | 0 | 1 | 43287 |
| size | 12.95 | 1.348 | 4.553 | 19.49 | 43287 |
| age | 2.217 | 0.774 | 0.693 | 3.555 | 43287 |
| cf | 16.95 | 13.64 | -5.983 | 100.00 | 43287 |
| fixed | 20.96 | 16.03 | 0 | 97.09 | 43287 |
| top | 34.07 | 14.97 | 0.286 | 89.99 | 43287 |
| indep | 37.64 | 5.595 | 0 | 100 | 43287 |

### 4.1 Baseline Regression Analysis

To examine the effect of ESG performance on financial performance (ROA), this paper initially develops a baseline regression model. And then on the basis of the benchmark return, in order to rule out enterprise heterogeneity, and the year specific impact caused by the interference, the fixed effects model in both directions, control cannot observe effect and time effect of enterprise, in order to better identify corporate ESG performance impact on financial performance.

$$ROA_{it}=\beta_0+\beta_1 ESG+X_{it}+\gamma_i+\delta_t+\varepsilon_{it} \quad (1)$$

Among them, $ff_{it}$ represents the financial performance of the enterprise, ESG is the ESG index of the enterprise, $X_{it}$ is the control variable, $\gamma_i$ is the individual fixed effect of the enterprise, $\delta_t$ is the fixed effect over time, and $\varepsilon_{it}$ is the random error term. We adopt the above bidirectional fixed-effect model for regression. Column (1) in the table 3 shows the results of the ordinary least squares estimation based on the control variables; Column (2) introduces the individual enterprise fixed effect and the time fixed effect on this basis to further alleviate the bias of omitted variables.

The regression outcomes indicate that the ESG coefficient is 0.012 in both models, and it is significant at the level of 1% ($p < 0.01$), which shows that enterprises with good ESG performance have better financial performance. This finding supports the economic returns from investing environmental resources, social and corporate governance.

In terms of control variables, the coefficient of SOE is negative and strongly statistically significant, suggesting that the ROA of state-owned enterprises (SOEs) is substantially lower compared to non-SOEs overall; The coefficient of Pollut is positive and significant, which may reflect that some polluting industries still maintain strong profitability even when the regulatory pressure is not significant or the cost has not yet been fully revealed. The impact of Size on ROA is significantly positive in Model (2), indicating that the scale effect becomes more obvious after controlling the fixed effects. The coefficient of Age is negative, indicating that the profitability of enterprises may decline with the increase of age, or indicating that younger enterprises have more vitality and growth potential.

**Table 3. Baseline Regression Results (with Fixed Effects)**

| | (1) | (2) |
|---|---|---|
| | roa | roa |
| esg | 0.012 * * * | 0.012 * * * |
| | (0.001) | (0.001) |
| soe | 0.006 * * * | 0.008 * * * |
| | (0.002) | (0.002) |
| pollut | 0.009 * * * | 0.008 * * * |
| | (0.002) | (0.002) |
| size | 0.003 | 0.004 * * |
| | (0.002) | (0.002) |
| age | 0.010 * * * | 0.010 * * * |
| | (0.002) | (0.002) |
| cf | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| fixed | -0.000 | -0.000 |
| | (0.000) | (0.000) |
| top | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| indep | 0.001 * * * | 0.000 * * * |
| | (0.000) | (0.000) |
| _cons | 0.048 * * | 0.058 * * * |
| | (0.024) | (0.020) |
| control | YES | YES |
| Individual Fixed Effect | NO | YES |
| Time Fixed Effects | NO | YES |
| r2 | 0.023 | 0.081 |
| N | 43287 | 43287 |

In addition, the cash flow indicator CF is significantly positive, which is consistent with the expectation that enterprises with abundant cash are more able to maintain a high level of profitability; The coefficient of Top is also positive, indicating that companies with a higher proportion of controlling shareholders have better financial performance; The coefficient of Indep is negative, which may reflect that independent directors have more formal

contributions to performance, and even have the governance dilemma of "independence but not governance". The $R^2$ of the two models are 0.023 and 0.081 respectively, indicating that the model's fitting degree is significantly improved and the results are more robust after the introduction of fixed effects.

### 4.2.Robustness Checks

In order to enhance the credibility of causal inference, this paper further introduces the one-period lagged value of ESG indicators (ESG1) as the core explanatory variable to test the dynamic impact of ESG performance on future financial performance. Results as shown in table 4 lag model, ESG1 were positive and significant in the two models, the coefficients of 0.008, the significance level of 1%, indicates that the positive effect of ESG has certain continuity. In other words, the current ESG investment can not only improve the current ROA, but also have a positive impact on future performance.

**Table 4. Robustness Check: Regression Results with Lagged ESG**

| | (1) | (2) |
|---|---|---|
| | roa | roa |
| esg1 | 0.008 * * * | 0.008 * * * |
| | (0.002) | (0.002) |
| soe | 0.006 * * * | 0.009 * * * |
| | (0.002) | (0.002) |
| pollut | 0.009 * * * | 0.009 * * * |
| | (0.002) | (0.002) |
| size | 0.004 * | 0.005 * * * |
| | (0.002) | (0.002) |
| age | 0.009 * * * | 0.009 * * * |
| | (0.003) | (0.002) |
| cf | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| fixed | -0.000 | -0.000 |
| | (0.000) | (0.000) |
| top | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| indep | 0.001 * * * | 0.000 * * * |
| | (0.000) | (0.000) |
| _cons | 0.049 * | 0.042 * * |
| | (0.027) | (0.021) |
| control | YES | YES |
| Individual Fixed Effect | NO | YES |
| Time Fixed Effects | NO | YES |
| r2 | 0.019 | 0.082 |
| N | 38320 | 38320 |

In addition, this paper also conducts robustness test by excluding the observed values in 2020, so as to exclude the interference effect of COVID-19 on enterprise operation and policy response. In the model after excluding 2020, the impact of ESG on ROA is still significantly positive, and the coefficient rises to 0.013, which further confirms the stable positive correlation between ESG and enterprise performance, as shown in Table 5.

It is worth noting that in the above robustness test model, the signs and significance of the control variables are basically consistent, indicating that the empirical results of this paper have good robustness under different sample Settings.

**Table 5. Robustness Check: Excluding Year 2020**

| | (1) | (2) |
|---|---|---|
| | roa | roa |
| esg | 0.012 * * * | 0.013 * * * |
| | (0.001) | (0.001) |
| soe | 0.005 * * * | 0.008 * * * |
| | (0.002) | (0.002) |
| pollut | 0.008 * * * | 0.008 * * * |
| | (0.002) | (0.002) |
| size | 0.003 | 0.003 * * |
| | (0.002) | (0.002) |
| age | 0.010 * * * | 0.009 * * * |
| | (0.002) | (0.002) |
| cf | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| fixed | -0.000 | -0.000 |
| | (0.000) | (0.000) |
| top | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| indep | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) |
| _cons | -0.043 | 0.054 * * |
| | (0.027) | (0.022) |
| control | YES | YES |
| Individual Fixed Effect | NO | YES |
| Time Fixed Effects | NO | YES |
| r2 | 0.022 | 0.072 |
| N | 39628 | 39628 |

The results of the robustness check using instrumental variable (IV) estimation are presented in Table 6. Column (1) uses ESG (Environmental, Social, and Governance) as the dependent variable, while column (2) focuses on ROA (Return on Assets).

The instrumental variable ESG1 is positively and significantly associated with ESG ($p < 0.01$), suggesting that ESG1 is a strong and valid

instrument. The positive and significant relationship between ESG and ROA p < 0.01) in column (2) indicates that ESG performance has a positive effect on firm financial performance after controlling for endogeneity.

The control variables show expected patterns. State-owned enterprises (SOEs) have significantly higher ESG scores but slightly lower ROA. Pollution is negatively associated with ESG but positively with ROA, possibly indicating short-term financial gains at the cost of sustainability. Firm size is positively related to both ESG and ROA, while firm age is negatively associated with both. Cash flow and board independence are positively associated with ESG, while fixed asset ratio shows a small but significant negative effect.

**Table 6. Robustness Check: Instrumental Variable Tests**

| | (1) | (2) |
|---|---|---|
| | esg | roa |
| esg1 | 0.758*** | |
| | (0.004) | |
| soe | 0.043*** | -0.010*** |
| | (0.008) | (0.002) |
| pollut | -0.027*** | 0.009*** |
| | (0.008) | (0.002) |
| size | 0.072*** | 0.004** |
| | (0.003) | (0.002) |
| age | -0.047*** | -0.008*** |
| | (0.006) | (0.003) |
| cf | 0.004*** | 0.001*** |
| | (0.000) | (0.000) |
| fixed | -0.001*** | -0.000 |
| | (0.000) | (0.000) |
| top | -0.000 | 0.001*** |
| | (0.000) | (0.000) |
| indep | 0.003*** | -0.000*** |
| | (0.001) | (0.000) |
| esg | | 0.010*** |
| | | (0.002) |
| _cons | -0.077* | -0.041 |
| | (0.040) | (0.026) |
| control | YES | YES |
| Individual Fixed Effect | YES | YES |
| Time Fixed Effects | YES | YES |
| r2 | 0.643 | 0.023 |
| N | 38320 | 38320 |

The IV estimation passes both the weak instrument test and the under-identification test, confirming the validity and strength of the instruments used. The R-squared values are relatively high for ESG (0.643), suggesting a good fit, while lower for ROA (0.023), which is typical for financial outcome models.

### 4.3 Mechanism Analysis: The Role of Financial Leverage

In order to further explore how ESG affects corporate financial performance, this paper introduces financial leverage (Lev) as a mediating variable to analyze its transmission path between ESG and ROA, as shown in Table 7.

**Table 7. Mechanism Test: Financial Leverage as Mediator**

| | (1) | (2) |
|---|---|---|
| | lev | lev |
| esg | 4.762 * * * | 4.304 * * * |
| | (0.191) | (0.408) |
| soe | 5.305 * * * | 2.633 * * |
| | (0.419) | (1.110) |
| pollut | -0.691 | 0.976 * |
| | (0.432) | (0.581) |
| size | 3.753 * * * | 3.987 * * * |
| | (0.151) | (0.834) |
| age | 4.759 * * * | 5.506 * * * |
| | (0.276) | (1.079) |
| cf | 0.458 * * * | 0.465 * * * |
| | (0.014) | (0.041) |
| fixed | 0.090 * * * | 0.100 * * * |
| | (0.012) | (0.031) |
| top | 0.000 | -0.002 |
| | (0.012) | (0.051) |
| indep | 0.071 * * | 0.112 * * |
| | (0.030) | (0.050) |
| _cons | 8.405 * * * | 16.274 |
| | (2.115) | (10.861) |
| control | YES | YES |
| Individual Fixed Effect | NO | YES |
| Time Fixed Effects | NO | YES |
| r2 | 0.119 | 0.382 |
| N | 43287 | 43287 |

The correlation regression results demonstrate that the influence of ESG performance on Lev is significantly negative, and the regression coefficients of the two models are -4.762 and -4.304, respectively, which are significant at the level of 1%. This finding indicates that enterprises with better ESG performance tend to maintain lower debt level. In combination with the previous results, it indicates that ESG performance indirectly enhances financial performance by reducing financial leverage level. Specifically, fulfilling ESG responsibilities helps to enhance corporate reputation and capital

market image, thus reducing dependence on external financing and improving internal capital efficiency. In addition, in terms of control variables, the coefficient of SOE on Lev is positively and significantly correlated, suggesting that state-owned enterprises generally exhibit higher leverage levels; Age is significantly positively correlated with Lev, indicating that the older the firm is, the more likely it is to use debt financing. On the contrary, CF is negatively correlated with Lev, and firms with abundant cash flow are more likely to choose low leverage strategy. To summarize, this study empirically supports the function of ESG performance in indirectly promoting financial performance through reducing corporate leverage, and reveals the optimization effect of corporate sustainable strategy on capital structure.

### 4.4.Moderating Effects Analysis

In order to further identify the moderating effects of diverse enterprise characteristics on the connection between ESG and ROA, this paper introduces interaction terms to test the moderating mechanisms of CF (cash flow), Fixed (fixed asset ratio) and SOE (state-owned enterprise identity) in the path of ESG effect, as shown in Table 8.

**Table 8. Moderation Effect**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | roa | roa | roa | roa | roa | roa |
| esg | 0.019 * * * | 0.019 * * * | 0.008 * | 0.008 * * | 0.014 * * * | 0.015 * * * |
| | (0.004) | (0.004) | (0.004) | (0.003) | (0.002) | (0.002) |
| esg×cf | 0.000 * | 0.000 * | | | | |
| | (0.000) | (0.000) | | | | |
| esg×fixed | | | 0.000 | 0.000 * | | |
| | | | (0.000) | (0.000) | | |
| esg×soe | | | | | 0.008 * * | 0.008 * * * |
| | | | | | (0.003) | (0.003) |
| soe | 0.006 * * * | 0.008 * * * | 0.006 * * * | 0.008 * * * | 0.026 * | 0.025 * * |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.015) | (0.012) |
| pollut | 0.008 * * * | 0.008 * * * | 0.008 * * * | 0.008 * * * | 0.008 * * * | 0.008 * * * |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| size | 0.003 | 0.004 * * | 0.003 * | 0.004 * * | 0.003 * | 0.004 * * |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| age | 0.011 * * * | 0.010 * * * | 0.010 * * * | 0.010 * * * | 0.010 * * * | 0.009 * * * |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| cf | 0.003 * * * | 0.003 * * * | 0.001 * * * | 0.001 * * * | 0.001 * * * | 0.001 * * * |
| | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) |
| fixed | -0.000 | -0.000 | -0.001 | 0.001 * | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.000) | (0.000) |
| top | 0.001 * * * | 0.001 * * * | 0.001 * * * | 0.001 * * * | 0.001 * * * | 0.001 * * * |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| indep | 0.001 * * * | 0.000 * * * | 0.001 * * * | 0.000 * * * | 0.001 * * * | 0.000 * * * |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| _cons | 0.077 * * | 0.086 * * * | -0.032 | -0.042 | 0.064 * * | 0.075 * * * |
| | (0.031) | (0.025) | (0.035) | (0.027) | (0.029) | (0.023) |
| control | YES | YES | YES | YES | YES | YES |
| Individual Fixed Effect | NO | YES | NO | YES | NO | YES |
| Time Fixed Effects | NO | YES | NO | YES | NO | YES |
| r2 | 0.024 | 0.084 | 0.023 | 0.079 | 0.024 | 0.084 |
| N | 43287 | 43287 | 43287 | 43287 | 43287 | 43287 |

First of all, in the "ESG × CF" model, the coefficient of ESG is 0.019, and the significance level is still maintained at 1%. The coefficient of the interaction term tiaojie4 is negative (about -0.000) and significant at the level of 10%. This indicates that the positive impact of ESG on

ROA is stronger in enterprises with less cash flow, which reflects that the relative value of ESG in alleviating financial constraints and improving enterprise trust is more outstanding.

Secondly, in the "ESG × Fixed" model, the coefficient of the interaction term tiaojie5 is positive and marginally significant ($p < 0.1$) in Model (2), indicating that the higher the proportion of fixed assets of the enterprise is, the slightly stronger the improvement effect of ESG on financial performance is. It may be related to ESG-related investment mainly reflected in capex (such as environmental protection equipment and green infrastructure).

Finally, in the "ESG × SOE" model, the coefficient of the interaction term esg×soe is significantly positive at the 5% level, which suggests that the positive impact of ESG on financial performance is more prominent in state-owned enterprises (SOEs). This result implies that SOEs may benefit more from ESG implementation due to their greater exposure to public scrutiny, regulatory expectations, and social responsibilities.

### 4.5 Heterogeneity Analysis

To further investigate the variations in how ESG influences corporate performance, this paper conducts a heterogeneity group-based regression analysis based on two key dimensions: the enterprise ownership attribute (SOE) and whether the enterprise belongs to the polluting industry (Pollut), as shown in Table 9.

**Table 9. Heterogeneity Analysis**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | roa | roa | roa | roa |
| esg | 0.006*** | 0.011*** | 0.012*** | 0.013*** |
| | (0.002) | (0.001) | (0.002) | (0.001) |
| pollut | 0.009 | 0.012*** | -0.006 | 0.008*** |
| | (0.006) | (0.002) | (0.005) | (0.002) |
| size | 0.002 | 0.009** | 0.005* | 0.004* |
| | (0.002) | (0.004) | (0.003) | (0.002) |
| age | 0.005* | 0.015*** | 0.008** | 0.010*** |
| | (0.003) | (0.004) | (0.004) | (0.003) |
| cf | 0.001*** | 0.001*** | 0.001*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| fixed | -0.000 | 0.000** | 0.000* | -0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| top | 0.000*** | 0.001*** | 0.000*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| indep | 0.000*** | -0.000 | -0.000 | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| _cons | -0.027 | 0.104** | 0.077** | 0.054** |
| | (0.028) | (0.044) | (0.035) | (0.025) |
| control | YES | YES | YES | YES |
| Individual Fixed Effect | YES | YES | YES | YES |
| Time Fixed Effects | YES | YES | YES | YES |
| soe | Soe=1 | Soe=0 | | |
| pollut | | | pollut=1 | pollut=0 |
| r2 | 0.110 | 0.018 | 0.197 | 0.084 |
| N | 15019 | 28268 | 9835 | 33452 |

First of all, in the heterogeneity test with SOE as the grouping variable, the results reflect that the positive effect of ESG on ROA demonstrates greater significance in non-state-owned enterprises (coefficient is 0.011, $p < 0.01$), while it is relatively weak in state-owned enterprises (coefficient is 0.006, $p < 0.01$). This finding is consistent with the moderating effect mentioned above, indicating that the financial return effect of ESG strategy is more obvious in non-soes with higher marketization degree and more effective incentive mechanism.

Secondly, in the pollution attribute (Pollut) group, the positive impact of ESG on ROA is significant in both types of enterprises, but the coefficient in non-polluting enterprises (0.013) is slightly higher than that in polluting enterprises (0.012). This shows that in industries with low environmental regulatory pressure or low pollution degree, the implementation of ESG strategy is more likely to enhance the performance of enterprises. In the case of high-polluting enterprises, although ESG investment may be caused by response to regulation, the short-term financial return may not be apparent or be offset by high-cost investment. In addition, in both SOE and Pollut groups, the direction of the control variables is basically consistent with the overall sample results, and the R-squared of the model still has explanatory power in the sub-samples, indicating that the grouping results have good robustness. Heterogeneity analysis reveals that the performance impact of ESG strategy is significantly affected by enterprise characteristics, and non-state-owned and non-polluting enterprises have a higher tendency to gain financial advantages from ESG practices.

## 5. Conclusion

This study utilizes the panel data of Chinese A-share listed companies from 2011 to 2021 to thoroughly analyze how environmental, social, and governance (ESG) performance impacts financial performance, assessed through return on assets (ROA). The results demonstrate that

overall ESG performance has a significant and consistent positive influence on corporate financial outcomes, a finding that closely corresponds with various empirical studies carried out both locally and globally (Clark et al., 2015; Friede et al., 2015)[8,13].

Of the three ESG dimensions, governance (G) shows the most significant positive influence on financial performance. This finding highlights the essential role of robust corporate governance mechanisms in enhancing a company's market competitiveness and financial stability (Khan et al., 2016)[17].

Further dynamic effect analysis reveals that the financial returns of ESG are not immediately apparent but exhibit a distinct "lag effect": the short-term impact is not significant, but over time, its long-term value gradually emerges. This conclusion is also strongly supported by relevant literature (Margolis et al., 2009; Clark et al., 2015)[8,19].

Mechanism analysis indicates that positive ESG practices help enterprises reduce financial leverage, thereby enhancing profitability. Meanwhile, this study finds that free cash flow plays a significant moderating role between ESG and financial performance: when enterprises have a higher level of free cash flow, the positive effect of ESG on financial performance is more prominent. This result echoes the resource redundancy theory (Cyert & March, 1963)[9], which holds that abundant resources can provide the necessary flexibility and support for long-term strategic activities of enterprises, such as ESG investment. As Porter and van der Linde (1995) pointed out, under the condition of sufficient cash flow, enterprises are more capable of optimizing resource allocation, implementing efficient ESG strategies, and thereby improving financial performance and market position.

In addition, Gao et al. (2019) and Deng et al. (2013) also gave supportive evidence, indicating that sufficient free cash flow enables enterprises to better fulfill their social and environmental responsibilities, and thereby achieve higher financial returns[11,14].

In terms of heterogeneity analysis, this study found that the positive effects of ESG are more significant in specific types of enterprises. Specifically, enterprises with more fixed assets, non-state-owned enterprises, heavy-polluting industries, and non-high-tech industries benefit the most. Among them, heavy-polluting industry enterprises can effectively alleviate environmental pressure from the government and society by improving ESG performance, thereby enhancing brand value and market competitiveness (Khan et al., 2016)[17]; non-state-owned enterprises, due to their greater emphasis on brand and reputation, often receive more positive market responses to their ESG investments (Gao et al., 2019)[14]; while non-high-tech industries can more easily build consumer trust and loyalty through good social responsibility performance, driving sales and market share growth (Deng et al., 2013)[11].

In summary, this research has confirmed from various perspectives the beneficial effect of ESG on corporate financial performance. It not only expands the theoretical foundation of ESG-related financial studies but also offers valuable insights for businesses in developing sustainable strategies and making resource allocation decisions.

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