# Corporate Governance Costs, Social Responsibilities and Capital Market Performance: Evidence from China

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## Abstract

While better ESG is usually interpreted as a high likelihood of generating higher returns, the existing empirical literature suggests that stocks of firms with higher ESG scores may have lower subsequent realized returns than stocks with lower scores. Therefore, this paper examines the relationship between ESG scores, stock market performance, and associated costs, revealing a positive correlation between ESG scores and the stock market performance of Chinese listed companies. This study draws the following conclusions:

1. Regarding the relationship between ESG performance and stock returns of Chinese listed companies, this study concludes that stock returns of companies with low management costs can be significantly improved by increasing ESG scores. On average, a 1-point increase in ESG score is associated with a 2-4 bps increase in stock returns and a 0.1% decrease in volatility. In addition, there is a positive correlation between costs and ESG scores; for every 2 billion yuan of costs a listed company pays, it can increase its ESG score by 1 point.

2. Turning to the relationship between the ESG performance of Chinese listed companies and corporate costs, this study empirically concludes that R&D costs have the greatest impact on a company's ESG score.

To a certain extent, this study is conducive to inspiring Chinese listed companies to assume more social responsibility in their operations, further promoting the understanding and thinking of the business community, scholars, government, and other departments on the issue of how corporate ESG performance affects corporate value, and facilitating the regulators to rationally

guide investors' investment behavior and provide reference value for investors to screen investment targets.

**Keywords:** ESG; equity market performance; costs; decision making; Chinese public firms

## Introduction

Corporation social responsibility (CSR) has become a mainstream of studies of corporate finance in the past decade, in which the effects of firm's non-financial practices are examined. The main aspects of CSR analysis include firm's environmental practices, social practices and governance practices. Therefore, environmental, social and governance (ESG) related studies attract main attentions of executive managers in companies and financial professionals in mutual funds. The existing literature demonstrate that corporate practices on ESG staffs not only promote their reputations, but also significantly improve performance of stocks issued by the company. This paper empirically analyses the relationship between ESG performances of publicly traded companies and their equity market performances (stock return and risk), and show that greater ESG scores, on average, generate higher stock returns and lower risk, which provide empirical evidence for firm's efforts in ESG practices.

On the other side, public firms must keep a high level of ESG performance to satisfy public expectation, which require large cost, and may have conflict with their operating strategies. Therefore, inputs for ESG performance and sufficient operating budget become trade-off in firm's decision-making. This paper empirically analyses the relationship between ESG performances of publicly traded companies and their costs about the ESG input and show that higher costs could improve better ESG performance. On average, public firms could raise ESG score by 1 for cost of every 2 billion yuan. The results provide empirical evidence for firm's heavy costs to keep great ESG scores in China.

Despite the growing emphasis on ESG factors in corporate strategy, several critical area problems persist in understanding their financial implications. First, there is a paradoxical disconnect between the theoretical expectation that higher ESG performance leads to superior stock returns and empirical findings that suggest the opposite, particularly in non-Western contexts. This inconsistency raises questions about the universality of ESG's financial benefits and underscores the need for region-specific analyses. Second, the financial burden associated with maintaining high ESG standards remains under-researched, especially regarding how these costs interact with operational efficiency and profitability. Companies often face a trade-off between allocating resources to ESG initiatives and other strategic investments, yet the optimal balance for maximizing shareholder value is unclear. Third, while ESG encompasses diverse dimensions (environmental, social, governance), the relative impact of different cost types—such as R&D versus administrative expenses—on ESG outcomes is not well-documented. Finally, the unique institutional and regulatory environment in China, characterized by strong governmental influence on corporate practices, may alter the dynamics of ESG performance and its financial repercussions, necessitating localized studies. These gaps highlight the complexity of ESG's role in corporate value creation and the urgency of contextualized research to inform decision-making.

This study addresses critical area problems in ESG research by examining the nuanced relationship between ESG performance, corporate costs, and stock market outcomes in the context of Chinese listed companies. By empirically demonstrating the positive linkage between ESG scores and stock returns—where a 1-point increase in ESG correlates with a 2-4 bps return boost and reduced volatility—the research bridges the gap between conflicting theoretical expectations and empirical evidence. Furthermore, the quantification of cost impacts (2 billion yuan per ESG point) provides actionable insights for firms navigating budget allocations, particularly highlighting R&D costs as the most influential driver of ESG improvement. These findings not only validate the strategic value of ESG investments in emerging markets but also offer a framework for policymakers and investors to foster sustainable corporate practices without compromising financial viability. By clarifying the cost-performance trade-offs and contextualizing ESG dynamics within China's unique regulatory landscape, this study advances the understanding of how non-financial practices translate into market performance, thereby guiding stakeholders toward more informed, sustainable decision-making.

This paper examines the relationship between ESG scores, equity market performances, and related costs for Chinese public companies. The main contributions are twofold. First, although ESG graduate becomes critical factors in equity pricing, the research about ESG in China remains at an early stage. Through the empirical evidence using Chinese data, the paper shows that firm's ESG scores could significantly affect firm's stock return and risk.

Second, we show the enhancement of ESG scores requires a great amount of input, which may affect firm's daily operating. Therefore, firms should not unlimitedly increase their costs in ESG practices. The findings in this paper shed light on optimizing firms' decision-making process for determining their ESG input level by examining the potential limitations of implementing ESG practices without meticulous cognition.

## Research Objectives

1. The relationship between ESG scores and stock return yields of Chinese listed companies. The central objective of this study is to analyze the relationship between ESG scores, stock market performance, and associated costs of Chinese listed companies. This study argues that higher ESG scores are closely related to their stock market performance so that a company's stock generates higher returns and lower risk by establishing a good image of its ESG performance, which in turn improves its corporate reputation.

2. The relationship between higher accounting costs and ESG scores of listed companies in China. This is the second objective of this paper's study. There may be a relationship between higher accounting costs and higher ESG scores, the main reason for this may be that higher accounting costs usually mean that a company invests more in financial reporting and compliance, reflecting a sound corporate governance structure. This is coupled with the fact that some companies emphasize corporate sustainability and are therefore forward-looking and sustainable in their accounting cost strategies.

## Literature Review

The first strand of literature discusses ESG and ESG scores. The ESG scores, developed by several rating agencies, provide quantitative indicators for firms' ESG performances. Moreover, ESG scores are developed by several rating agencies to evaluate the firms' ESG performances in recent years, and numerous studies find the ESG scores could quantitatively describe the company's ESG performance, and thus essentially affect its stock price Pedersen, Fitzgibbons and Pomorski (2021) showed that firm's ESG score revealed important information about its fundamentals and thus determines investor's preferences. As a result, ESG scores significantly affects the required return of stocks. Lööf, Sahamkhadam and Stephan (2022) proposed for companies with higher ESG scores, their exposure to downside risk were lower, and their upside return potential were also lower.

Although the ESG development has a late start in China, Chinese government has announced a series of regulations and incentive programs over the past decade to increase ESG awareness among businesses and investors. These announcements date back to the January 2001 publication of the Notice of the China Banking Regulatory Commission on Issuing Green Credit Guidelines. These policies had a significant impact on Chinese corporations and the country's overall economy, in addition to the country's social conditions. Yang et al. (2021) suggested that environmental and social issues should be given high priority, which included 34 items in 12 categories for the environment and 48 items in 30 categories for society. Although the development of the ESG rating system for Chinese companies started late, it has progressed rapidly in recent years. Ma, Wang and Qin (2016) proposed the General Plan for the Reform of Ecological Civilization System released in September 2015, which required the domestic financial market to establish a mandatory environmental information disclosure mechanism for listed companies. From 2021, the Chinese regulatory authorities issued a series of policies involving the ESG system. In June 2021, the CSRC published new guidelines on the format and content of annual and semi-annual reports of listed companies, in which a separate section on "environmental and social responsibility" becomes a required chapter. In October 2021, the China Insurance Asset Management Association established a professional committee on responsible investment about ESG, aiming to coordinate and promote the construction of a comprehensive governance system for ESG investment. Ho (2018) examined the role of creditor regulation in corporate ESG performance using data from 21 Chinese Green Finance Initiative franchise banks. Qiu and Yin (2019) examined the relationship between corporate ESG performance and financing cost and found that the quality of information disclosure was an important factor in determining this relationship. Jin (2021) explores whether companies with better performance in non-financial performance could achieve higher investment returns based on the data of A-share companies in China and showed that insurance funds with long-term value investment preference would prefer companies with high ESG performance. Lin et al. (2021) analyze the effects of property rights on innovation and the mediating role played by ESG performance using data of 2,629 Chinese listed companies between 2007 and 2015.

The second strand of literature links ESG and equity market performance. Because ESG performance becomes a critical factor in determining corporate values, numerous studies examine the relationship between firms' ESG performances and their financial performances. On one side, greater ESG performances generate higher stock returns. Broadstock et al. (2020) show that high-ESG portfolios generally outperform low-ESG portfolios, especially during financial crisis. Bolton and Kacperczyk (2021) suggest that the stocks were required higher returns for the companies with higher total carbon dioxide emissions, and the results are robust by controlling for size, book-to-market, and other return predictors. Avramov et al. (2021) show that the market premium increases and demand for stocks declines under ESG uncertainty. Zhang, Zhao and Qu (2021) explore the impact of ESG policies on policy-driven markets and find that the Guideline for

Establishing a Green Financial System, issued in 2016, catalyzed a significant, positive relationship between ESG performance and stock abnormal return, and good ESG profiles predict higher future excess returns.

The other direction is that greater ESG performances reduce the risk exposure in equity markets. DasGupta (2022) finds that financial performance shortfalls motivate firms to undertake improved ESG practices to maintain future legitimacy. Fafaliou et al. (2022) show that firm's growth opportunities are heavily related with their ESG related reputational risk. Li, Zhang and Zhao (2022) find that higher ESG ratings mitigate firms' default risk. He et al. (2022) find that firms with ESG information disclosure have lower idiosyncratic risk than their counterparts. Li, Xu and Jing (2022) show that the enhancement of ESG score leads to higher returns and lower risks.

The third research body investigates the costs of ESG inputs. Despite numerous studies of ESG performances concerning stock market and firm-level performance, little research has been conducted regarding the complexity behind and potential loss caused by overemphasizing ESG performances. In recent years, abundant government subsidies and media attention have enticed many companies to improve their ESG performances. However, the effects of growing social awareness on ESG practice remain debatable. Hong and Kacperczyk (2009) showed that for companies in alcohol, tobacco, and gaming industries with great litigation risk, their stocks have higher required returns. Lioui and Tarelli (2022) propose that the abnormal return of a company is negatively impacted by the level of ESG media attention and positively impacted by the variation in ESG media attention. Pedersen et al. (2021) construct an ESG-adjusted efficient frontier to demonstrate a negative correlation between securities' expected returns and investors' awareness of ESG performance in a market.

Finally, there are relevant theoretical studies. The principal–agent theory refers to the conflict in interests and priorities that arises when one person or entity (the "agent") takes actions on behalf of another person or entity (the "principal"). The problem worsens when there is a greater discrepancy of interests and information between the principal and agent, as well as when the principal lacks the means to punish the agent. The deviation from the principal's interest by the agent is called "agency costs". Common examples of this relationship include corporate management (agent) and shareholders (principal), elected officials (agent) and citizens (principal), or brokers (agent) and markets (buyers and sellers, principals). In all these cases, the principal must be concerned with whether the agent is acting in the best interest of the principal. The concepts of moral hazard and conflict of interest relate to the principal-agent problem. The principal–agent problem typically arises where the two parties have different interests and asymmetric information (the agent having more information), such that the principal cannot directly ensure that the agent is always acting in their (the principal's) best interest, particularly when activities that are useful to the principal are costly to the agent, and where elements of what the agent does are costly for the principal to observe. The agency problem can be intensified when an agent acts on behalf of multiple principals. When one agent acts on behalf of multiple principals, the multiple principals must agree on the agent's objectives. They face a collective action problem in governance, as individual principals may lobby the agent or otherwise act in their individual interests rather than in the collective interest of all principals. Results may include free riding in steering and monitoring, duplicate steering and monitoring, or conflict between principals, all leading to high autonomy for the agent. The multiple principal problem is particularly serious in the public sector, where multiple principals are common and both efficiency and democratic accountability are undermined in the absence of salient governance.

The other related theory is Signaling theory, which explains how signals management success or failure is communicated to the owner. Signal theory related to information asymmetry. The positive thing in signaling theory is where companies that provide good information will set them apart with companies that do not have “good news” by informing to the market about their condition, a signal of good future performance the future provided by companies whose past financial performance is not good will not be trusted by the market. In economics and finance literature, signal theory is intended to explicitly reveal evidence that parties within the company (corporate insiders, consisting of officers and directors) generally have better information about the company’s condition and prospects than outsiders, for example investors, creditors, or the government, even shareholders. In other words, the company has the advantage of mastering information than outsiders who have an interest in the company. The condition in which one party has an excess of information while the other party does not in financial theory is called information asymmetry. In contrast, signaling theory focuses mainly on actions insiders take to intentionally communicate positive, imperceptible qualities of the insider. Insiders could potentially inundate outsiders with observable actions, but not all these actions are useful as signals. There are, however, two chief characteristics of efficacious signals. The first is signal observability, which refers to the extent to which outsiders can notice the signal. If actions insiders take are not readily observed by outsiders, it is difficult to use those actions to communicate with receivers.

Based on the literature review, the variables can be classified into three major categories:

Input Variables: Represent the ESG performance indicators such as ESG scores, carbon emissions, and media attention.

Output Variables: Capture the financial outcomes including stock returns, risk exposure, and abnormal returns.

Control Variables: Include firm-specific and market-specific factors such as firm size, leverage, and market risk, which help to isolate the effect of ESG performance on financial outcomes.

Additionally, the theoretical frameworks provide an essential foundation for understanding the relationship between ESG performance and financial outcomes, with Principal-Agent Theory addressing information asymmetry and Signaling Theory highlighting the role of positive signals in reducing uncertainty.

## Conceptual Framework

This paper focuses on the relationship between ESG scores, stock market performance, and related costs of Chinese listed companies, revealing a positive correlation between ESG scores and stock market performance of Chinese listed companies. Based on the research objectives, the study develops the following research framework:

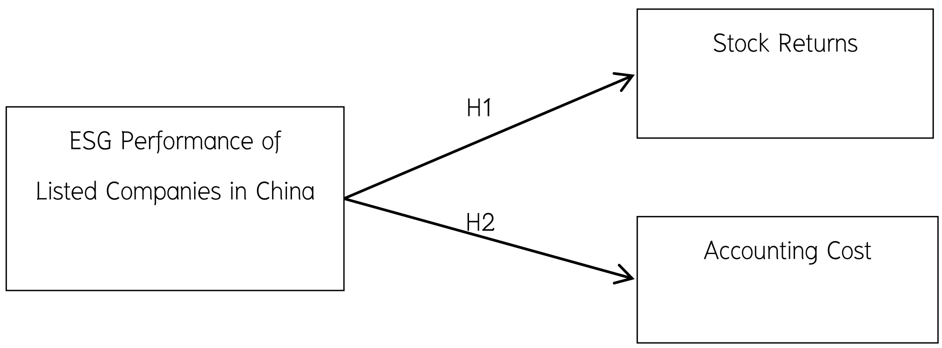


**Figure 1** Modeling the effect of ESG performance on stock returns and accounting costs of Chinese listed companies.

Based on the above research model and research framework, the independent variables in this study are ESG performance of Chinese listed companies. The dependent variables are stock returns, corporate accounting costs. Among them, corporate accounting costs include selling costs, management costs, financing costs, R&D costs and tax expenses.

## Research Methodology

This section sets up the hypotheses to tests in the following sections. The central goal of this paper to analyze the relationship between ESG scores, equity market performances, and related costs for Chinese public companies. Relying on the foundational principles of principal-agent theory and signaling theory, stakeholders and investors utilize the reputation and the broader societal implications of a business as a proxy for the intrinsic value of its stock. This reputation is, in turn, intricately intertwined with the company's ESG performances. Therefore, the higher ESG scores are associated with better efforts in ESG practices, and then the firm builds a better image, as well as improves the corporate reputation. As a result, the firm's stock generates a higher return and a lower risk. This study hence proposes Hypothesis 1.

H1: For the listed firms in China, higher ESG scores generate higher stock returns and lower stock risk on average.

Furthermore, most of ESG practices require public firms to spend money to initial the related projects, so firm's efforts in ESG should be linked to its costs. As a results, the accounting costs should be positively related to firm's effort on CSR practices. For Chinese listed companies, there may be a relationship between higher accounting costs and higher ESG (Environmental, Social, and Corporate Governance) scores, the main reason may be that higher accounting costs usually mean that the company invests more in financial reporting and compliance, reflecting a sound corporate governance structure. This transparency can help improve a company's performance in ESG scores, as investors and stakeholders place a higher value on a company's transparency and accountability. Many companies may include higher accounting costs in their financial management, mainly to drive sustainability programs or improve social responsibility, which may directly enhance their performance in environmental and social areas. Some listed companies in China that emphasize accounting details and corporate governance tend to be more forward-looking, and this kind of thinking can help to develop a long-term development strategy that meets ESG standards and increases the sustainability of the company. Therefore, this study develops the following hypothesis 2.

H2: For the listed firms in China, higher accounting costs generate higher ESG scores on average.

To tests these two hypotheses, we construct an appropriate population and sample and use correlation analysis, regression analysis, and causality tests to provide empirical support to the discussion and hypotheses in the following sections. We obtain the annual ESG score of A-share listed companies in Chinese market from SynTao Green Finance ST$\alpha$R ESG Database and its ESG Risk Radar System, which includes total score (ESG), environment score (ENV), social score (SOC), governance score (GOV), management score (MAN), and risk score (RIS). Furthermore, I obtain company's annual financial costs data from CSMAR database, which include sales costs, administrative costs, financing costs, R&D costs, and tax expenses. The sample period is from 2015 to 2021.

For the stock market data, we obtain the monthly holding period returns for each public-listed firm, as well as the Fama-French factors (SMB for size factor, HML for B/M factor, RMW for profitability factor, and CMA for investment factor) for Chinese stock markets. The sample period is also from 2015 to 2021.

## Research Results

Table 1 presents summary statistics of all the variables in this paper. Panel A shows that the firm's costs are heavily positively skewed, in which the average values are much larger than 75th percentiles. Among all types of costs, sales costs and administrative costs are greater than the other costs, and more volatile. In Panel B, the ESG scores have small standard deviation and approximately normally distributed, indicating the ESG performances of Chinese firms are relatively stable. Panel C shows that the stock returns of public firms are positive on average (1.61% each month), and the return distribution is slightly positive skewness; mean return is larger than median return, and the positive deviation is larger than negative deviation. For the Fama-French factor portfolios in China, they all have relatively large standard deviations compared to their average values. Moreover, size and profitability portfolios have positive average returns, but size and B/M portfolios have negative median returns.

**Table 1** Summary Statistics

| **Panel A: Cost Variable (in million yuan)** | | | | | |
|---|---|---|---|---|---|
| | **Sales** | **Adm** | **Fin** | **R&D** | **Tax** |
| Mean | 709.85 | 722.16 | 253.92 | 320.93 | 331.91 |
| Standard Dev. | 3,220.32 | 3,236.89 | 1,034.82 | 1,291.44 | 1,934.85 |
| 5th percentile | 5.88 | 27.52 | –44.97 | 5.24 | –14.12 |
| 25th percentile | 31.20 | 73.75 | –0.35 | 31.19 | 8.45 |
| Median | 102.97 | 170.28 | 22.55 | 77.51 | 36.88 |
| 75th percentile | 404.46 | 463.73 | 134.80 | 207.03 | 158.17 |
| 95th percentile | 2,662.63 | 2,292.57 | 1,114.17 | 993.92 | 1,147.88 |

| **Panel B: ESG Score** | | | | | | |
|---|---|---|---|---|---|---|
| | **ESG** | **MAN** | **RIS** | **ENV** | **SOC** | **GOV** |
| Mean | 47.98 | 16.59 | 95.07 | 46.80 | 52.51 | 44.70 |
| Standard Dev. | 4.17 | 7.68 | 6.03 | 6.29 | 4.74 | 6.22 |
| 5th percentile | 42.75 | 8.13 | 83.13 | 38.61 | 46.27 | 34.68 |
| 25th percentile | 45.50 | 11.67 | 92.81 | 42.86 | 49.25 | 40.63 |
| Median | 47.38 | 15.00 | 97.50 | 46.05 | 52.27 | 44.64 |
| 75th percentile | 49.63 | 18.96 | 100.00 | 49.30 | 54.85 | 49.11 |
| 95th percentile | 55.75 | 33.13 | 100.00 | 58.54 | 60.82 | 54.74 |

| **Panel C: Return Variable (in percentage)** | | | | | |
|---|---|---|---|---|---|
| | **Ret** | **SMB** | **HML** | **RMW** | **CMA** |
| Mean | 1.61 | 0.54 | –0.52 | 0.37 | –0.42 |
| Standard Dev. | 5.50 | 1.42 | 0.93 | 0.82 | 1.14 |
| 5th percentile | –4.08 | –0.82 | –1.39 | –0.64 | –1.77 |
| 25th percentile | –0.83 | –0.33 | –1.26 | –0.40 | –1.77 |
| Median | 1.00 | –0.25 | –0.13 | 0.38 | 0.45 |
| 75th percentile | 3.48 | 1.66 | 0.06 | 1.24 | 0.72 |
| 95th percentile | 8.85 | 2.02 | 1.09 | 1.24 | 0.72 |

To further investigate the relationship between the ESG performances and firm's costs and equity market performances, we compute the Pearson correlations among these variables. Table 2 shows the correlation matrix among these variables.

**Table 2** Correlation Matrix between ESG Scores, Costs, and Stock Performances

| | ESG | MAN | RIS | ENV | SOC | GOV |
|---|---|---|---|---|---|---|
| Return | 0.027 | 0.005 | 0.038 | -0.005 | 0.032 | 0.035 |
| | (0.004) | (0.622) | (<0.001) | (0.620) | (0.001) | (<0.001) |
| Std of Return | -0.051 | -0.101 | 0.105 | -0.042 | -0.004 | -0.058 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (0.648) | (<0.001) |
| Skewness of Return | -0.001 | -0.020 | 0.036 | -0.018 | 0.004 | 0.018 |
| | (0.914) | (0.041) | (<0.001) | (0.064) | (0.699) | (0.064) |
| Kurtosis of Return | -0.026 | -0.027 | 0.006 | -0.031 | 0.003 | -0.018 |
| | (0.007) | (0.005) | (0.521) | (0.001) | (0.791) | (0.057) |
| Sales Cost | 0.101 | 0.287 | -0.375 | 0.154 | 0.003 | 0.028 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (0.726) | (0.004) |
| Adm Cost | 0.091 | 0.315 | -0.444 | 0.094 | 0.010 | 0.076 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (0.277) | (<0.001) |
| Fin Cost | 0.108 | 0.311 | -0.408 | 0.089 | 0.049 | 0.091 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (<0.001) |
| R&D Cost | 0.178 | 0.335 | -0.358 | 0.171 | 0.095 | 0.100 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (<0.001) |
| Tax Cost | 0.079 | 0.258 | -0.358 | 0.091 | -0.014 | 0.073 |
| | (<0.001) | (<0.001) | (<0.001) | (<0.001) | (0.149) | (<0.001) |

Note: the numbers in brackets are p-values. Bold means significant at least at 10% level.

In Table 2, most of variables are significantly correlated (except for social scores). Specifically, most of ESG related scores are positively correlated with average returns and all the costs, while negatively correlated with standard deviation and kurtosis of stock returns. However, risk score seems to have different patterns; the correlation between risk score and standard deviation is positive, while the correlation between risk score and all costs variables are negative.

Research Objective 1: The relationship between ESG scores and stock returns and stock risks of Chinese listed companies.

Given the above objective. The paper then proceeds to examine the relation among ESG performances, costs, and equity market performances based on regression analysis. Firstly, we show the ESG effects on firm's equity market performance by estimating equation (1) below, which include average return, standard deviation of return, skewness of return, and kurtosis of return.

$$R_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \sum \beta_F F_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where $ESG_{i,t}$ is the ESG related scores for each firm and each year, $F_{i,t}$ is the vector of controlling variables (we use Fama-French factors).

**Table 3** Regression Results on Stock Returns

| | [1] | [2] | [3] | [4] | [5] | [6] |
|---|---|---|---|---|---|---|
| ESG | 0.036*** | | | 0.031** | | |
| | [2.87] | | | [2.43] | | |
| MAN | | 0.019** | | | 0.016** | |
| | | [2.50] | | | [2.13] | |
| RIS | | 0.045*** | | | 0.037*** | |
| | | [4.68] | | | [3.90] | |
| ENV | | | -0.019** | | | -0.024*** |
| | | | [-2.12] | | | [-2.68] |
| SOC | | | 0.037*** | | | 0.040*** |
| | | | [3.04] | | | [3.35] |
| GOV | | | 0.027*** | | | 0.024*** |
| | | | [3.01] | | | [2.73] |
| SMB | | | | -0.548 | -0.580 | -0.560 |
| | | | | [-4.53] | [-4.79] | [-4.64] |
| HML | | | | -0.981 | -1.038 | -1.009 |
| | | | | [-4.21] | [-4.45] | [-4.34] |
| RMW | | | | -2.181 | -2.145 | -2.173 |
| | | | | [-7.86] | [-7.72] | [-7.83] |
| CMA | | | | -0.547 | -0.463 | -0.511 |
| | | | | [-1.75] | [-1.48] | [-1.63] |
| Adj. $R^2$ | 0.07% | 0.18% | 0.19% | 4.30% | 4.37% | 4.45% |

Note: The numbers in brackets are t-values. *, **, and *** represent for significant at 10%, 5%, and 1%.

Table 3 shows the regression results of stock returns on the ESG scores, with Fama-French factors as controlling variables. The results show that the ESG scores have significant impacts on firm's stock returns, both for the regressions with controlling variables or not. Moreover, ESG, management, risk, social, and governance scores are positively related to stock returns, indicating that firms with higher ESG performances, on average, generate better stock returns. However, the environment score shows the opposite effect, in which firms with greater environment score have lower stock returns. For the scales of coefficients, each one-unit improvement of ESG scores, stock returns could increase by 2 bps to 4 bps (reduction for improvement of environment score).

We also analyst the impacts of ESG performances on the volatility of stock returns (measured by standard deviation and kurtosis). Table 4 presents the regression results. The ESG performances significantly affect the volatilities of returns, except for risk score on kurtosis. Opposite to the results on stock returns, the coefficients on the volatilities are mostly negative. For example, one-unit improvement of ESG score, standard deviation of return reduces by 0.11%, and kurtosis of return reduces by 1.437%. Therefore, the improvement of ESG performances, on average, could reduce the volatility of firm's stock return.

**Table 4** Regression Results on Volatility of Stock Returns

| | **Std. Dev. of Return** | | | **Kurtosis of Return** | | |
|---|---|---|---|---|---|---|
| | **[1]** | **[2]** | **[3]** | **[1]** | **[2]** | **[3]** |
| ESG | -0.110*** | | | -1.437*** | | |
| | [-6.37] | | | [-2.83] | | |
| MAN | | -0.077*** | | | -0.874*** | |
| | | [-7.41] | | | [-2.86] | |
| RIS | | 0.073*** | | | -0.446 | |
| | | [5.57] | | | [-1.15] | |
| ENV | | | -0.060*** | | | -1.198*** |
| | | | [-4.98] | | | [-3.34] |
| SOC | | | 0.043** | | | 0.902* |
| | | | [2.60] | | | [1.86] |
| GOV | | | -0.077*** | | | -0.705** |
| | | | [-6.50] | | | [-2.02] |
| SMB | 1.246 | 0.989 | 1.270 | 12.291 | 12.009 | 12.378 |
| | [6.62] | [5.24] | [6.76] | [2.22] | [2.15] | [2.23] |
| HML | 0.183 | -0.221 | 0.208 | 43.989 | 43.543 | 43.656 |
| | [0.53] | [-0.64] | [0.61] | [4.34] | [4.27] | [4.31] |
| RMW | -0.336 | -0.178 | -0.339 | -48.278 | -48.103 | -47.863 |
| | [-0.87] | [-0.46] | [-0.89] | [-4.27] | [-4.25] | [-4.23] |
| CMA | -0.895 | -0.348 | -0.938 | -66.018 | -65.415 | -65.728 |
| | [-1.98] | [-0.77] | [-2.07] | [-4.94] | [-4.86] | [-4.92] |
| Adj. $R^2$ | 3.59% | 4.55% | 3.86% | 0.26% | 0.26% | 0.32% |

Note: The numbers in brackets are t-values. *, **, and *** represent for significant at 10%, 5%, and 1%.

Research objective 2: The relationship between higher accounting costs and ESG scores of listed companies in China.

Given the above research objective 2, we now examine the relationship between ESG scores and firm's costs, based on the following regression specification of equation (2).

$$ESG_{i,t} = \beta_0 + \sum \beta_c COST_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where $COST_{i,t}$ is the vector of cost variables, which include sales costs, administrative costs, financing costs, R&D costs, and tax expenses. Table 5 presents the regression results. For regression 1-5, all costs significantly positively affect firm's ESG separately, with costs of ten billion yuan increases ESG score by around 2 to 6. in regression 6, the coefficients of sales cost, financing cost, and R&D cost are still positive, but coefficients of administrative cost and tax cost become negative because of endogeneity issue. Combining the results of single-factor and multi-factor regressions, R&D cost should be the most important input to improve firm's ESG score.

**Table 5** Regression Results on Costs

| | [1] | [2] | [3] | [4] | [5] | [6] |
|---|---|---|---|---|---|---|
| Sales Cost | 1.896*** | | | | | 1.251*** |
| | [12.53] | | | | | [5.10] |
| Adm Cost | | 2.143*** | | | | -1.191*** |
| | | [12.92] | | | | [-3.20] |
| Fin Cost | | | 6.116*** | | | 3.881*** |
| | | | [12.77] | | | [6.27] |
| R&D Cost | | | | 5.689*** | | 5.047*** |
| | | | | [17.52] | | [11.77] |
| Tax Cost | | | | | 3.128*** | -6.038 |
| | | | | | [9.90] | [-1.25] |
| Adj. $R^2$ | 1.68% | 1.78% | 1.74% | 3.23% | 1.05% | 3.85% |

Note: The numbers in brackets are t-values. *, **, and *** represent for significant at 10%, 5%, and 1%.

We also examine the impacts of R&D cost, the most important input for ESG enhancement, on the other scores. Table 6 shows the results of regressions. The R&D costs heavily affect firm's management score and risk score, but by opposite directions. Each ten billion yuan of R&D input could increase firm's management score by 20, on average, but decrease firm's risk score by almost 16, because the input of R&D may reduce firm's budget in risk control. The results on environment, social, and governance scores are like those with overall ESG score, with significant positive coefficients, and relatively small R-squares, indicating the input of R&D could improve firm's ESG performance through the aspects of environment, social, and governance.

**Table 6** Regression Results on Costs

| | MAN | RIS | ENV | SOC | GOV |
|---|---|---|---|---|---|
| R&D Cost | 19.976*** | -15.759*** | 8.295*** | 3.406*** | 4.678*** |
| | [34.29] | [-36.98] | [16.74] | [9.17] | [9.67] |
| Adj. $R^2$ | 11.24% | 12.84% | 2.92% | 0.89% | 0.99% |

Note: All the costs are united by ten billion yuan. The numbers in brackets are t-values. *, **, and *** represent for significant at 10%, 5%, and 1%.

## Discussions

First, this study shows that better ESG performance of Chinese listed companies generates better stock returns. However, the effect of the environmental score is the opposite, i.e., the higher the environmental score, the lower the stock return of the company. The improvement of ESG performance can reduce the volatility of the company's stock return. This shows that corporate initiative to take social responsibility can be recognized by society and can establish a good social image of the company, and the strengthening of corporate governance can also improve corporate performance, which ultimately achieves the improvement of corporate stock returns. The situation that the environmental score is opposite to the corporate stock return may be because enterprises need to invest a lot of environmental costs in strengthening the environment, and these expenditures of environmental costs are offset by the benefits of the enterprise. For ESG better performance can reduce the volatility of stock reporting, which shows that excellent corporate ESG scores make corporate returns more stable, and companies in the business with also be able to avoid investment winds more effectively.

Second, this study shows that there is a strong relationship between the ESG performance of Chinese listed companies and corporate operating costs, of which the most influential is corporate R&D costs. This study measures corporate operating costs through selling costs, management costs, financing costs, R&D costs, and tax expenses, and through statistical analysis of the data, it is found that higher costs can improve ESG performance, with corporate R&D costs having the most obvious impact. This is because companies' investment in R&D helps to improve their ESG performance. R&D activities not only drive technological innovation, but also promote improvements in environmental protection, social responsibility, and corporate governance. In addition, good ESG performance can enhance firms' access to social capital, improve managers' short-sighted behavior, and alleviate financing constraints, thus promoting firms' innovation output.

## Knowledge from Research

1. This study is to some extent conducive to inspiring Chinese listed companies to assume more social responsibility in their operations. This study is conducive to promoting enterprises to actively improve their ESG performance, investing in green innovation, making it possible to internalize external environmental pollution and gain economic benefits at the same time, and shifting the business objectives and management thinking of listed companies from short-term profit maximization to an increased focus on long-term value enhancement.  As the mind map follows:

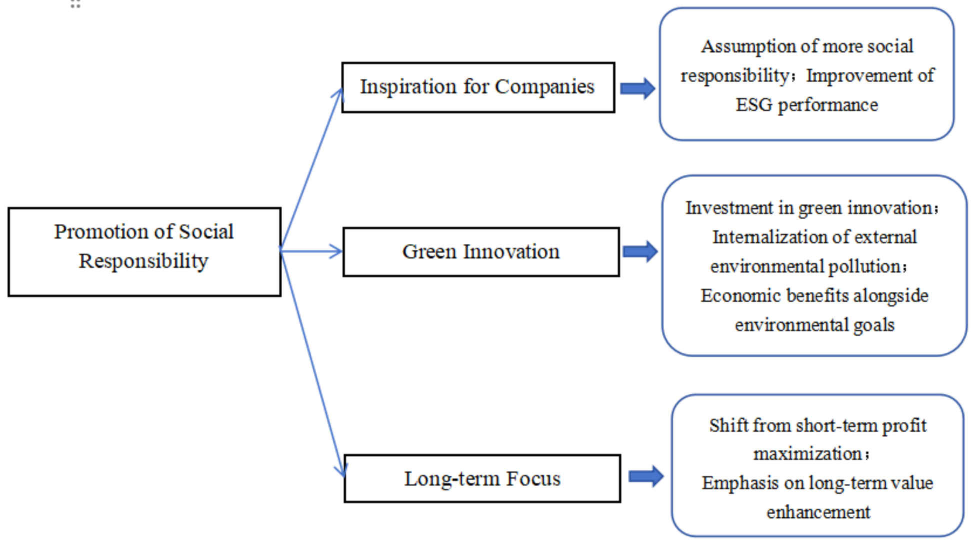


**Figure 2** Mind mapping the overall finding.

2. This study further promotes the understanding and thinking of the corporate sector, scholars, and the government on the issue of how corporate ESG performance affects corporate value. Good ESG performance can enhance corporate stock returns, which prompts the corporate sector, scholars, and government departments to study and take measures to improve corporate ESG scores, which in turn helps to promote corporations to take on more social responsibility, enhance the level of green innovation, and strengthen corporate governance to create more value for society. As the mind map follows:

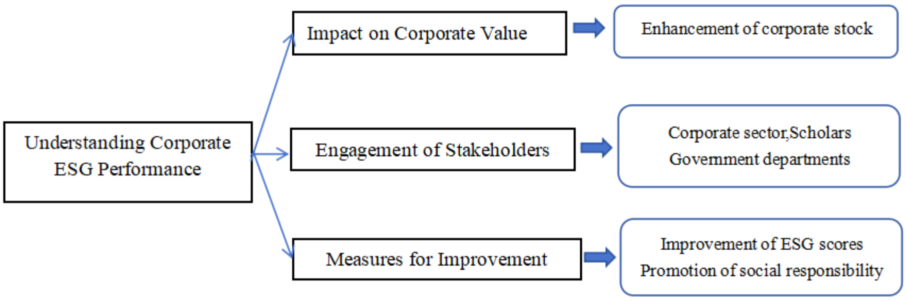


**Figure 3** Mind mapping the overall finding

3. This study is conducive to the regulatory authorities to rationally guide the investment behavior of investors, and provide a reference value for investors to screen investment targets. Enterprises with excellent ESG performance can enhance their stock returns, as investors, when choosing stocks and securities for investment, they can prioritize enterprises with excellent ESG performance, which provides a new choice of reference for investors to invest in securities. As the mind map follows:

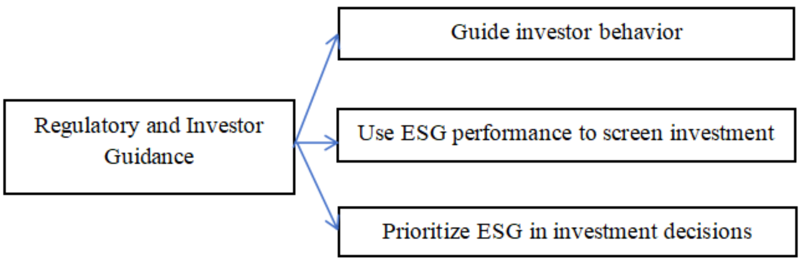


**Figure 4** Mind mapping the overall finding

## Conclusion

To investigate the impacts of ESG practices for Chinese public firms, and develop better strategies in ESG input, this paper examines the relationship between ESG scores, equity market performances, and related costs based on data of Chinese public companies. The results show that greater ESG scores, on average, generate higher stock returns and lower risk, which provide empirical evidence for firm's efforts in ESG practices. On average, ESG score increase by 1 brings higher stock return by 2-4 bps, and lower volatility by 0.1%.

Moreover, this paper empirically analyses the relationship between ESG performances of publicly traded companies and their costs about the ESG input and show that higher costs could improve better ESG performance. On average, public firms could raise ESG score by 1 for cost of every 2 billion yuan. Public firms must keep a high level of ESG performance to satisfy public expectation, which require large cost, and may have conflict with their operating strategies. Therefore, inputs for ESG performance and sufficient operating budget become trade-off in firm's decision-making.

Finally, the paper sheds light on optimizing firms' decision-making process for determining their ESG input level by examining the potential limitations of implementing ESG practices without meticulous cognition. This paper shows that firms should not unlimitedly increase their costs in ESG practices because the enhancement of ESG scores requires a great amount of input, which may affect firm's daily operating. For limited budget, Chinese public firm could focus on input of R&D, since R&D costs has the greatest influences on firm's ESG scores, among all types of costs.

## Suggestions

The suggestions are twofold. On the one hand, Chinese listed companies should actively implement ESG concepts, promote corporate innovation, and assume social responsibility. Chinese listed public companies should strengthen the construction of corporate culture, fully integrate ESG concepts into corporate culture, and fully integrate them into employee training, customer service, trade transactions, product development, and other aspects, to enhance corporate value more effectively. Enterprises should pay attention to corporate innovation, including institutional innovation behavior and technological innovation behavior, improve institutional innovation mechanisms, and ensure technological innovation and management innovation. Enterprises should take the initiative to assume social responsibility, cooperate with China's government and regulatory authorities to disclose effective ESG information, and assist in improving China's ESG evaluation system.

On the other hand, firms should strengthen the investment of enterprise ESG costs to enhance long-term performance and strengthen the enterprise's anti-risk ability and market competitiveness. This study concludes that increasing corporate costs can significantly enhance corporate ESG performance. For this reason, as a listed company in China, it is necessary to increase the investment in corporate ESG costs, thus reducing corporate financing costs. Enterprises should take the initiative to disclose ESG information, which will help the relevant regulatory authorities to recognize the risks in advance and intervene in enterprises promptly to avoid the occurrence of "black swan" events, thus creating a better environment for the development of enterprises.

## References

Avramov, D., Cheng, S., Lioui, A., & Tarelli, A. (2021). Sustainable investing with ESG rating uncertainnty. *Journal of Financial Economics, 145*(2), 642-664. https://doi.org/10.1016/j.jfineco.2021.09.009

Bolton, P., & Kacperczyk, M. (2021). Do investors care about carbon risk?. *Journal of Financial Economics, 142*(2), 517-549. https://doi.org/10.1016/j.jfineco.2021.05.008

Broadstock, D., Chan, K., Cheng, L., & Wang, X. (2020). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance Research Letters, 38,* 101716. https://doi.org/10.1016/j.frl.2020.101716

DasGupta, R. (2022). Financial performance shortfall, ESG controversies, and ESG performance: Evidence from firms around the world. *Finance Research Letters, 46,* 102487. https://doi.org/10.1016/j.frl.2021.102487

Fafaliou, I., Giaka, M., Konstantios, D., & Polemis, M. (2022). Firms' ESG reputational risk and market longevity: A firm-level analysis for the United States. *Journal of Business Research, 149,* 161-177. https://doi.org/10.1016/j.jbusres.2022.05.010

He, F., Qin, S., Liu, Y., & Wu, J. (2022). CSR and idiosyncratic risk: evidence from ESG information disclosure. *Finance Research Letters, 49,* 102936. https://doi.org/10.1016/j.frl.2022.102936

Ho, V. H. (2018). Sustainable finance & China's green credit reforms: A test case for bank monitoring of environmental risk. *Cornell International Law Journal, 51*(3), 609-681. http://dx.doi.org/10.2139/ssrn.3124304

Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics, 93*(1), 15-36. DOI:10.2139/ssrn.766465

Jin, A. (2021). Research on high ESG investment preferences of insurance funds--analysis based on long-term value investment path of companies. *Finance and Economics,* (11), 14-24.

Li, H., Zhang, X., & Zhao, Y. (2022). ESG and Firm's Default Risk. *Finance Research Letters, 47,* 102713. https://doi.org/10.1016/j.frl.2022.102713

Lin, Y., Fu, X.M., & Fu, X. (2021). Varieties in state capitalism and corporate innovation: Evidence from an emerging economy. *Journal of Corporate Finance, 67,* 101919. DOI: 10.1016/j.jcorpfin.2021.101919

Lioui, A., & Tarelli, A. (2022). Chasing the ESG factor. *Journal of Banking and Finance, 139,* 106498. https://doi.org/10.1016/j.jbankfin.2022.106498

Lööf, H., Sahamkhadam, M., & Stephan, A. (2022). Is corporate social responsibility investing a free lunch? The relationship between ESG, tail risk, and upside potential of stocks before and during the COVID-19 crisis. *Finance Research Letters, 46,* 102499. https://doi.org/10.1016/j.frl.2021.102499

Ma, X., Wang, J., & Qin, E. (2016). ESG disclosure system of listed companies. *China Finance,* (16), 33-34.

Pedersen, L., Fitzgibbons, S., & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. *Journal of Financial Economics, 142*(2), 572-597. https://doi.org/10.1016/j.jfineco.2020.11.001

Qiu, M., & Yin, H. (2019). Corporate ESG performance and financing cost in the context of ecological civilization construction. *Quantitative Economic and Technical Economics Research,* (3), 108-123. https://doi.org/10.13653/J.CNKI.Jqte.2019.03.007

Yang, Y., Orzes, G., Jia, F., & Chen, L. (2021). Does GRI sustainability reporting pay off? an empirical investigation of publicly listed firms in China. *Business & Society, 60*(7), 1738–1772. https://doi.org/10.1177/0007650319831632

Zhang, X., Zhao, X., & Qu, L. (2021). Do green policies catalyze green investment? Evidence from ESG investing developments in China. *Economics Letters, 207,* 110028. DOI:10.1016/j.econlet.2021.110028