



ESG and Administrative Costs in Equity Trading: Evidence from China

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Abstract: Recent findings suggest that firms with higher Environmental, social, and governance (ESG) scores may experience lower stock returns, contrary to the common belief that better ESG performance enhances market reputation and stock returns. This study aims to investigate the relationship between ESG performance, management costs, and stock returns by introducing an "ESG-cost framework." The framework proposes that the costs incurred in implementing ESG practices can reduce revenue, offsetting the positive effects of strong ESG performance. Using an empirical analysis of firms based on both their ESG scores and management costs, the study finds that firms with low management costs gain the most from high ESG scores, while those with high costs may see diminished stock returns despite strong ESG performance. Additionally, the study proposes trading strategies that integrate ESG scores and cost considerations, demonstrating that these strategies yield better returns than traditional market indices. These findings offer a new perspective on ESG decision-making and provide valuable insights for constructing effective trading strategies.

Keywords: ESG Performance, ESG-Cost Framework, Administrative Costs, Return Prediction, Portfolio Stock Selection, Corporate Governance, Sustainable Investing

1. Introduction

Environmental, social, and governance (ESG) aspects have come to occupy a pivotal role in companies' decision-making frameworks. Enterprises with exceptional ESG scores are more likely to attain favorable positions in financial markets, thereby enhancing their stock performance. This underscores the growing emphasis investors place on ESG criteria when allocating capital, aiming to support businesses that are not only profitable but also responsible and sustainable in their operations. Consequently, companies face increasing pressure to integrate ESG considerations into their strategic planning, proactively managing their environmental impact, engaging in positive social practices, and adhering to robust governance standards. This shift in investor sentiment has the potential to reshape the business landscape, with companies that prioritize ESG factors potentially reaping long-term benefits, including enhanced brand reputation, increased customer loyalty, and reduced risk exposure.

However, from a short-term perspective, integrating ESG factors into the decision-making process could require companies to invest in various initiatives that might significantly impact their immediate financial positions. This highlights the importance of maintaining a balanced viewpoint that considers both short-term and long-term factors. When companies allocate financial resources to adopt and implement ESG practices, it usually results in improved ESG performance. Nevertheless, this enhanced performance often leads to an increase in accounting expenses, which can, in turn, decrease overall revenues. These expenses mainly include the following four types:

1. Compliance costs: Companies need to invest more resources to ensure their business activities comply with relevant regulations and policy requirements. This includes hiring professional consultants, conducting internal audits, and preparing reporting documents, each of which requires substantial time and money.
2. Technology upgrading and transformation: To achieve green production, companies may need to introduce advanced environmental protection equipment and technologies, which often have long payback periods and require expensive maintenance.
3. Social responsibility projects: Although social responsibility projects can enhance a company's social image and brand value, they require significant

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financial investment. These projects are often long-term and sustainable, requiring enterprises to have stable funding sources and strong organizational capabilities.

4. Governance structure optimization: Strengthening corporate governance structures can improve decision-making efficiency and transparency but will also increase management costs and complexity.

This issue arises in numerous industries. For example, the environmental technology industry, as a pioneer in promoting the green transformation of society, often carries the expectation of high ESG performance. However, these companies frequently face high R&D costs, sunk costs from rapid technological iteration, and compliance costs under strict environmental standards. While they have successfully reduced production costs and improved energy efficiency, the initial investment is substantial, and market acceptance is often limited due to high prices in the early stages of market promotion, resulting in unsatisfactory financial returns in the short term.

Moreover, in socially responsible industries, high ESG performance is often closely linked to extensive public welfare projects and socially responsible investments. These companies not only focus on economic benefits but also consider social welfare a responsibility. However, this dual pursuit is often accompanied by high administrative costs. These measures undoubtedly improve ESG scores, but behind them are large operations teams, complex supply chain management, and strict financial audit processes.

The main contributions of this paper are twofold. First, it provides a comprehensive analysis of ESG practices, considering both their beneficial and detrimental effects on businesses. The focus of this study is to scrutinize the impact of a company's administrative expenses on the correlation between ESG initiatives and financial returns. By examining this relationship, the paper aims to shed light on the discrepancy between the theoretical preference for ESG practices and the empirical evidence observed in the marketplace. Understanding this conflict is crucial for grasping the practical implications of ESG investments and may offer valuable insights for firms looking to integrate these practices into their operations.

Second, the paper demonstrates that, from the perspective of equity investors, when both ESG and administrative costs are considered, superior trading strategies can be developed. In the Chinese equity market, investors could earn abnormal returns by longing high-ESG stocks with low administrative costs, and shorting low-ESG stocks with low administrative costs.

The remainder of this paper is structured as follows: Section 2 reviews the existing literature in the field of ESG, capital market performance, and the costs of ESG. Section 3 outlines the empirical research design. Section 4 presents the empirical results and discussion. Finally, Section 5 concludes the paper.

2. Literature Review

2.1. ESG and Asset Allocation

Given the escalating significance of environmental, social, and governance (ESG) factors in evaluating a company's overall value, a vast body of academic research has emerged, exploring the intricate connections between a firm's ESG practices and its financial performance. It is widely recognized that a strong ESG record serves as a key driver of shareholder value, significantly influencing not only a company's reputation but also its sustained profitability. Numerous studies have demonstrated a positive correlation between a company's ESG scores and its ability to offer attractive returns to investors. For instance, Broadstock et al. (2021) illustrated how portfolios with superior ESG ratings tend to outperform those with lower ratings, particularly during times of financial turmoil. This highlights the fact that companies prioritizing ESG considerations are not only more resilient during economic downturns but also potentially better positioned to seize market opportunities.

Bolton and Kacperczyk (2021) similarly discovered that firms with higher carbon dioxide emissions face steeper required rates of return on their equities. Their comprehensive research, which considered variables like firm size, book-to-market ratio, and other determinants of stock returns, underscores that investors are increasingly factoring a company's environmental impact into its stock valuation. Avramov et al. (2022) explored the market implications of ESG uncertainty, revealing that as uncertainty around ESG intensifies, the market premium demanded by investors for holding stocks rises, accompanied by a corresponding decline in the demand for these stocks. This underscores the potential for ESG issues to introduce additional risk and volatility into the market.

Furthermore, Zhang et al. (2021) examined the effects of ESG policies in policy-driven markets, focusing particularly on the influence of the 2016 *Guideline for Establishing a Green Financial System*. Their findings indicate that this policy initiative significantly strengthened the positive correlation between a company's ESG performance and its stock's abnormal returns. They also noted that firms with strong ESG profiles predict higher future excess returns, suggesting that investors may anticipate long-term benefits from these profiles. Collectively, these studies emphasize the multifaceted ways in which ESG performance can influence financial outcomes, underscoring the growing relevance of ESG considerations for investors and the necessity for companies to integrate these factors into their strategic decision-making processes. Naveed et al. (2020) show that ESG factors predict individual investor asset allocation decisions in the context of the Pakistan Stock

Exchange, with environmental and governance factors having more weight than social factors. Grima et al. (2022) propose that the strength of non-pecuniary desires, along with pecuniary expectations and risk preferences, are important determinants of optimal portfolio choice. De Spiegeleer et al. (2023) suggest that ESG rating data analysis does not provide clear-cut evidence for enhanced portfolio performance, whether high or low ESG scores, in the STOXX Europe 600 or the Russell 1000 index. Aswani et al. (2024) show that stock returns are correlated only with unscaled emissions estimated by data vendors, not with unscaled emissions actually disclosed by firms.

Enhanced ESG performance plays an instrumental role in minimizing the vulnerability of equity markets to risk. DasGupta's (2022) research revealed that substandard financial results motivate companies to adopt more robust ESG practices, thereby bolstering their long-term credibility and sustainability. Building on this insight, Fafaliou et al. (2022) emphasized the significant correlation between a company's growth potential and the risks associated with its ESG reputation. They highlighted that a strong ESG profile not only enhances a company's image but also helps identify and capitalize on emerging business opportunities. Additionally, Li et al. (2022) demonstrated a direct correlation between improved ESG scores and reduced credit default risk for firms. This underscores the tangible financial gains that companies can achieve by prioritizing ESG initiatives. Furthermore, companies that effectively disclose ESG information tend to experience lower idiosyncratic risk compared to those that do not. This practice signifies transparency and serves as a strategic approach to risk management and minimization. Lastly, Li et al. (2022) provided compelling evidence that an increase in a company's ESG score leads to more favorable financial outcomes, marked by higher returns and reduced overall risk. This research underscores the importance of considering ESG factors as integral components of investment strategies, as they significantly influence the risk-return profiles of portfolios. The interconnectedness between ESG performance and financial health highlights the growing recognition of sustainability as a key driver of long-term business success. Biasin et al. (2024) show that portfolios with environmental scores above the sample average offer enhanced diversification benefits.

2.2. Accounting Costs and Equity Market Performances

Despite numerous studies exploring the influence of ESG performance on stock market and firm-level outcomes, research into the complexities and potential risks stemming from an overemphasis on ESG metrics remains scarce. Recently, government subsidies and heightened media scrutiny have propelled many companies to enhance their ESG profiles. However, the implications of society's growing awareness of ESG practices remain contentious. Hong and Kacperczyk (2009) revealed that companies in the alcohol, tobacco, and gaming industries, which face significant litigation risks, command higher required returns for their stocks. Lioui and Tarelli (2022) proposed a theory suggesting an inverse correlation between the extent of abnormal returns generated by a company and the intensity of ESG media coverage, while fluctuations in ESG media attention positively influence such returns. Pedersen et al. (2021) introduced an ESG-adjusted efficient frontier, highlighting the inverse relationship between the anticipated returns of securities and investors' perceptions of ESG performance in the market. Expanding on this discussion, the question of whether an ESG-focused investment strategy truly aligns with long-term value creation remains elusive.

The growing interest in ESG practices has led to a proliferation of ESG-themed investment funds and products, but the performance of these investments has been inconsistent. One of the key challenges in evaluating ESG investments is the lack of standardized metrics and frameworks. Different companies and investors may interpret "good" ESG performance differently, leading to discrepancies in how these factors are weighted and incorporated into investment decisions. This lack of standardization not only makes it difficult to compare the performance of ESG investments but also opens the door to potential greenwashing, where companies overstate their ESG credentials to attract investors.

Moreover, the complex interrelationships between ESG factors make it difficult to isolate their individual impacts on investment performance. For instance, a company's environmental performance may be positively correlated with its social performance but negatively correlated with its governance practices. This interconnectedness makes it challenging to determine the net impact of ESG factors on investment returns. Another important consideration is the potential for ESG factors to become overvalued in the market. As more investors flock to ESG investments, the prices of these assets may become inflated, leading to a misallocation of capital and potentially lower returns. This is particularly true in the case of "ESG buzzwords" and "ESG fads," where companies and investors latch onto popular ESG trends without adequately assessing their true impact and long-term sustainability.

In conclusion, while ESG factors are increasingly incorporated into investment decisions, the complexities and risks associated with overemphasizing these metrics cannot be ignored. Standardization, rigorous evaluation, and a balanced approach are necessary to ensure that ESG investments align with long-term value creation.

Numerous studies show that large expenses on a firm's balance sheets significantly affect capital market performance. Penman and Zhang (2020) show that the growth rate of expected earnings is positively related to expected stock returns, and the accruals-to-cash ratio is negatively related to expected stock returns. Bansal et al.

(2021) show that investors perceive downward real earnings management as a risk factor, leading them to discount stock prices at a higher rate. Artikis et al. (2022) show that accounting distortions play significant roles in driving the asset growth anomaly in European equity markets, which is more pronounced in countries with greater market efficiency, fewer barriers to arbitrage, stronger corporate governance, and less managerial discretion over earnings.

2.3. Theories of Portfolio Selection

Pursuant to the rational economic man (REM) hypothesis and the anticipated utility theory, Markowitz (1952) formulated the pioneering mean-variance (MV) theory, which serves as a streamlined approach for portfolio optimization. To simplify the assessment, financial risk is quantified by the second moment of the return distribution, making normally distributed returns a natural fit within the MV framework. However, the MV theory has faced criticisms, primarily because investor behavior in financial markets is not always rational. This suggests that additional factors beyond variance must be considered to more comprehensively capture the risks associated with return variations.

In the vast landscape of financial literature, a significant portion focuses on unravelling the complex interplay between skewness and jump risk. Cox and Ross (1976) introduced the concept of jump risk, describing random and discrete shifts in asset prices at unexpected times. Merton (1976) further enhanced this model with the hybrid jump-diffusion process, which posits that asset prices experience significant jumps interspersed with consistent, modest movements. The jump-diffusion process disaggregates overall return variability into variance and jumps, positing that overall risk comprises two distinct components: volatility risk, measuring consistent price fluctuations, and jump risk, quantifying abrupt shifts in asset prices. This framework has sparked numerous studies providing empirical evidence that higher-order moments, notably skewness, are crucial in mitigating jump risk.

Lai (1991), Briec et al. (2007), and Wang and Xia (2012) advanced the field by formulating mean-variance-skewness portfolio frontiers, which serve as comprehensive instruments for encapsulating and quantifying jump risk through skewness. Patton (2004) emphasized the importance of integrating skewness and asymmetric dependence in risk assessment, resulting in statistically and economically significant improvements in portfolio returns. Harvey et al. (2010) highlighted the importance of considering skewness in portfolio selection. Bekaert and Popov (2019) observed a positive correlation between skewness and variance, suggesting that skewness can also estimate the aggregate magnitude of return deviations. This intricate interplay between variance and skewness provides investors and risk managers with additional insights and tools to navigate financial markets more effectively.

3. Empirical Research Design

3.1. Data and Descriptive Statistics

To thoroughly investigate the impact of accounting costs on the correlation between ESG factors and stock investment returns, we adopt a comprehensive methodology that includes single sorting, double sorting, and portfolio performance analyses in the subsequent sections of our research. We acquire the annual ESG scores of companies listed on the Chinese mainland market using data from the SynTao Green Finance STaR ESG Database and its ESG Risk Radar System. This provides a robust foundation for understanding the ESG landscape of the companies within our sample. To delve deeper into the financial aspects, we obtain annual administrative cost data from the CSMAR database, a renowned source for comprehensive Chinese stock market data. This enables us to assess the financial implications of ESG practices and how they influence the bottom line of these firms. The sample period for our analysis spans from 2015 to 2021.

In addition to company-level data, we also gather stock market data from the CSMAR database, focusing specifically on the monthly holding period returns for each publicly listed firm. This is crucial for understanding the financial performance of these companies over time. To gauge overall market performance, we include the CSI market index, a widely followed benchmark. The comprehensive dataset covers the period from 2015 to 2022.

Table 1 provides an abbreviated overview of the numerical characteristics of all the variables explored and discussed in this scholarly work. Notably, the ESG scores—representing Environmental, Social, and Governance performance—show a very low degree of variability, as indicated by their minimal standard deviation. These scores also display a pattern resembling a near-normal distribution, implying a high degree of consistency and stability in the ESG performance of Chinese corporations. This finding underscores the relatively uniform approach Chinese firms are adopting toward ESG concerns, which is a significant and positive development in the corporate world.

In stark contrast to the ESG scores, the data on administrative costs reveal a more erratic and volatile nature, characterized by significant fluctuations. This is further emphasized by the presence of a heavy positive skew in the distribution of these costs, indicating that the data is skewed toward higher values. The average administrative costs are found to be significantly higher than the 75th percentile, highlighting the disparity and potential inefficiencies in administrative expenditures among these firms.

Regarding stock returns, we observe an average monthly return of approximately 1.61%. While this figure is positive, the returns are not uniformly distributed. The distribution exhibits slight positive skewness, a statistical phenomenon indicating that the average return is higher than the median return. This suggests that typical monthly returns tend to be higher than those observed in the middle of the distribution. Additionally, this skewness implies that higher returns occur more frequently than lower ones, further emphasizing the positive performance trend in the stock market as represented by these publicly traded firms.

Table 1: Descriptive statistics

	ESG	Adm Cost (in million yuan)	Return (in percentage)
Mean	47.98	722.16	1.61
Standard Dev.	4.17	3,236.89	5.50
5th percentile	42.75	27.52	-4.08
25th percentile	45.50	73.75	-0.83
Median	47.38	170.28	1.00
75th percentile	49.63	463.73	3.48
95th percentile	55.75	2,292.57	8.85

Source: calculated by the author

The table presents the summary statistics for ESG scores, administrative costs, and stock returns. Each row reports the average value, standard deviation, 5th percentile, 25th percentile, median, 75th percentile, and 95th percentile.

To gain a deeper understanding of the intricate relationship among ESG scores, administrative expenses, and stock returns, we conducted a comprehensive Pearson correlation analysis. This thorough examination was designed to determine whether, and how, these key variables are interconnected. As shown in Table 2 of our findings, the correlation matrix illustrates a substantial positive correlation between a company's ESG score and its corresponding stock returns. This suggests a clear linkage between a company's commitment to ESG principles and its ability to generate attractive returns for its investors. A higher ESG score, it appears, is a material factor in increasing the desirability of a company's stock to potential investors.

However, the analysis also revealed a notable positive correlation between a company's ESG score and its administrative costs. This finding suggests a direct relationship between a company's focus on ESG issues and the financial resources it allocates toward these initiatives. It appears that in their pursuit of improving ESG profiles, companies may need to invest more in administrative activities related to these areas.

Unfortunately, the relationship between administrative costs and stock returns tells a different story. Here, we observe a significant negative correlation, indicating that as administrative costs increase, stock returns may potentially decrease. This inverse relationship suggests that higher expenses associated with ESG initiatives do not always translate into improved stock performance.

Table 2: Correlation matrix

	ESG	Adm Cost	Return
ESG	1	0.091 (<0.001)	0.027 (0.004)
Adm Cost		1	-0.025 (0.010)
Return			1

Source: calculated by the author

The table displays the correlations among ESG scores, administrative costs, and stock returns. The numbers in parentheses represent p-values, and the numbers in bold indicate statistically significant results.

Given these findings, it is evident that companies must navigate a delicate balance when pursuing ESG goals. On the one hand, there are clear benefits to enhancing ESG scores, which can positively influence stock returns and attract investors. On the other hand, the reality of increased administrative costs could dampen stock returns. Therefore, companies should adopt a measured approach, carefully weighing the trade-offs involved in investing in ESG practices to ensure that the benefits outweigh the costs and that such investments ultimately lead to sustainable growth and enhanced shareholder value.

3.2. Sorting Analysis

In this section, we apply sorting approaches to investigate the return predictability of ESG in stock return estimates. The advantages of sorting approaches lie in their ability to unravel complex interconnections and patterns in data analysis and relationship modelling. These methods not only simplify intricate interactions but also reveal hidden insights and trends. Moreover, sorting approaches offer clarity and simplicity, organizing data in a structured and ordered manner, which allows analysts to gain new perspectives, develop hypotheses, and inform evidence-based decision-making.

We form an equal-weighted quintile portfolio and rebalance it annually using ESG scores. In the single-

sorting analysis, individual stocks are sorted into five groups based on their ESG scores (1 to 5), from the lowest (quintile 1) to the highest (quintile 5). Five quintile portfolios are developed and held for the following year. We present the average monthly returns and standard deviations of these five portfolios, as well as the differences between the lowest and highest portfolios.

In the double-sorting analysis, individual stocks are first sorted into five groups according to their administrative costs (1 to 5), from the lowest (quintile 1) to the highest (quintile 5) at the end of each year. Then, individual stocks in each quintile are sorted into five groups based on their ESG scores. This results in 25 double-sorted portfolios. We report the average monthly returns, standard deviations, and the differences between the lowest and highest portfolios.

4. Empirical Results

4.1. Return Predictability of ESG

To investigate the return predictability of ESG performance in return estimates, we first use a single-sorting approach to form equal-weighted quintile portfolios. At the end of each year, individual stocks are sorted into five groups according to their ESG scores. The results are summarized in Table 3. The statistics in the columns report the average monthly returns, standard deviations, skewness, and kurtosis of ESG-sorted portfolios for the following years. The row labelled “5-1” corresponds to the difference in average monthly returns between Portfolio 5 and Portfolio 1, with t-statistics reported in square brackets.

Table 3: Post-one-year returns and variations of ESG-sorted portfolios

		Average Return (%)	Standard Deviation (%)	Skewness	Excess Kurtosis
Rank	ESG				
1	42.23	0.66	11.33	0.33	1.06
2	45.17	0.46	11.57	0.32	0.99
3	46.91	0.51	11.34	0.26	0.85
4	48.96	0.69	11.07	0.27	0.96
5	54.41	0.76	10.33	0.26	0.80
5-1		0.10	-1.00***	-0.07**	-0.26***
		[0.71]	[-3.25]	[-2.57]	[-3.18]

Source: calculated by the author

The table shows the single-sorting result of ESG scores on capital market performance. Each column reports the average return, standard deviation, skewness, and kurtosis for the following year. Portfolios are ranked by their ESG scores from lowest (1) to highest (5), and the 5-1 reports the difference between the highest and lowest portfolios. The numbers in brackets are t-statistics, and the numbers in bold indicate statistical significance.

In Table 3, despite the increase in ESG scores, the average monthly returns do not show a significant increase, which is inconsistent with the expectation that ESG enhances a firm’s stock return. On the other hand, the average standard deviations, skewness, and kurtosis of portfolios decrease significantly as ESG scores increase. These results support existing literature suggesting that better ESG performance could significantly reduce a firm’s stock risk.

Next, we examine the joint impacts of administrative costs and ESG scores on post-stock returns and risk. Table 4 shows the post-one-year returns of double-sorted portfolios based on administrative costs and ESG scores. First, individual stocks are equally separated into five groups by administrative costs. Then, the stocks in each group are sorted into five subgroups based on their ESG scores. In the first column, representing firms with very low administrative costs, post-returns are significantly positively correlated with ESG scores, suggesting that firms with low administrative costs and high ESG scores are preferred by investors. Although the ESG-return relationship for all firms is insignificant, firms that improve their ESG performance with limited costs are still favored in the stock market. In contrast, the right four columns show insignificant results. As firms’ administrative costs increase, ESG’s positive effect on stock performance may be offset by the high costs. In total, better ESG performance does not lead to higher stock returns when administrative costs are large.

Table 4: Post-one-year returns of double-sorted portfolios based on ESG and administrative costs

Rank		1	2	3	4	5
Adm Cost (in billion)		0.13	0.32	0.59	1.09	6.30
Rank	ESG					
1	42.34	0.18	0.65	0.63	0.73	0.51
2	45.25	0.60	0.16	0.71	0.69	0.83
3	47.24	0.45	0.37	0.65	0.81	0.79
4	49.26	0.49	0.76	0.37	0.90	0.35
5	53.88	0.62	0.49	0.93	0.88	0.85
5-1		0.44*	-0.15	0.30	0.15	0.33
		[1.74]	[-0.46]	[1.08]	[0.35]	[0.75]

Source: calculated by the author

The table shows the double-sort result of ESG scores on stock returns for the following year. Portfolios are ranked by ESG scores from lowest (1) to highest (5), and by administrative costs from lowest (1) to highest (5). The 5-1 report the difference between the highest and lowest portfolios. The numbers in brackets are t-statistics, and the numbers in bold indicate statistical significance.

Tables 5 to 7 show the joint impacts of administrative costs and ESG scores on firms' post-stock risk. Table 5 demonstrates that although the portfolio standard deviation decreases with increasing ESG scores for portfolios across all administrative cost levels, only the result for the medium cost level is significant. The main reason is that investors may overlook ESG inputs when a firm's administrative costs are very low and lose trust in ESG scores when administrative costs are very high. As a result, only portfolios with a medium level of administrative costs show a significantly negative relationship between ESG and post-standard deviation.

Table 5: Post-one-year return standard deviation of double-sorted portfolios based on ESG and administrative costs

Rank		1	2	3	4	5
Adm Cost (in billion)		0.13	0.32	0.59	1.09	6.30
Rank	ESG					
1	42.34	12.04	11.94	11.86	11.01	10.10
2	45.25	11.84	11.74	11.91	11.34	10.48
3	47.24	11.73	11.71	11.21	10.92	9.83
4	49.26	12.00	11.87	11.24	10.47	9.62
5	53.88	10.84	10.99	10.67	10.97	9.74
5-1		-1.20	-0.94	-1.19***	-0.05	-0.36
		[-1.23]	[-1.32]	[-3.39]	[-0.10]	[-0.71]

Source: calculated by the author

The table shows the double-sort result of ESG scores on standard deviation over the following year. In each row, portfolios are ranked by their ESG scores from lowest (1) to highest (5), and in each column, portfolios are ranked by their administrative costs from lowest (1) to highest (5). The 5-1 report the difference between the highest and lowest portfolios. The numbers in brackets are t-statistics, and the numbers in bold indicate significant results.

Table 6 shows that only portfolios with a medium level of administrative costs have a significantly negative relationship between ESG and post-skewness, a pattern similar to that observed with post-standard deviation. However, skewness in stock returns not only conveys information about volatility but also measures potential gains and losses. As a result, ESG-concerned investors do not exhibit a preference for gains or aversion to losses since ESG and post-skewness are negatively correlated at all levels of administrative costs.

Table 6: Post-one-year return skewness of double-sorted portfolios based on ESG and administrative costs

Rank		1	2	3	4	5
Adm Cost (in billion)		0.13	0.32	0.59	1.09	6.30
Rank	ESG					
1	42.34	0.28	0.30	0.34	0.35	0.37
2	45.25	0.32	0.30	0.35	0.21	0.43
3	47.24	0.29	0.22	0.19	0.25	0.38
4	49.26	0.38	0.30	0.15	0.22	0.38
5	53.88	0.18	0.27	0.10	0.32	0.27
5-1		-0.10	-0.03	-0.24*	-0.03	-0.11
		[-0.73]	[-0.50]	[-1.90]	[-0.36]	[-1.09]

Source: calculated by the author

The table shows the double-sort result of ESG scores on return skewness over the following year. In each row, portfolios are ranked by their ESG scores from lowest (1) to highest (5), and in each column, portfolios are ranked by their administrative costs from lowest (1) to highest (5). The 5-1 report the difference between the highest and lowest portfolios. The numbers in brackets are t-statistics, and the numbers in bold indicate significant results.

Table 7 shows the post-one-year kurtosis of double-sorted portfolios based on administrative costs and ESG scores. The results show similar patterns to those of post-returns. In the first column, where firms' administrative costs are very small, post-kurtosis is significantly positively correlated with ESG scores. This suggests that investors have confidence in firms with low administrative costs and high ESG scores, leading them to overestimate the right tail of the return distribution and underestimate the left tail. On the other hand, the right four columns show negative correlations, especially for groups 3 and 5. As administrative costs increase, investors become more concerned about the potential for extreme losses due to high accounting costs. Thus, better ESG performance results in larger stock kurtosis when administrative costs are high.

Table 7: Post-one-year return kurtosis of double-sorted portfolios based on ESG and administrative costs

Rank		1	2	3	4	5
Adm Cost (in billion)		0.13	0.32	0.59	1.09	6.30
Rank	ESG					
1	42.34	0.79	1.18	1.45	0.88	0.95
2	45.25	0.93	0.89	1.08	1.18	0.85
3	47.24	0.83	0.87	0.85	0.82	0.96
4	49.26	1.17	0.99	0.86	0.79	0.94
5	53.88	0.99	0.91	0.90	0.76	0.39
5-1		0.21*	-0.27	-0.55***	-0.12	-0.56***
		[1.78]	[-1.57]	[-2.85]	[-0.64]	[-2.71]

Source: calculated by the author

The table shows the double-sort result of ESG scores on return kurtosis over the following year. In each row, portfolios are ranked by their ESG scores from lowest (1) to highest (5), and in each column, portfolios are ranked by their administrative costs from lowest (1) to highest (5). The 5-1 report the difference between the highest and lowest portfolios. The numbers in brackets are t-statistics, and the numbers in bold indicate significant results.

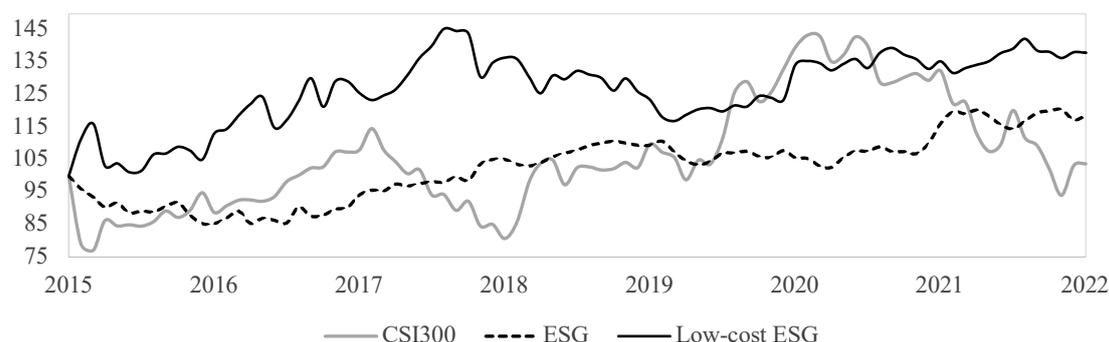
4.2. Trading Strategies of ESG and Costs

Now, let us delve into a strategy based on arbitrage, aiming to craft a balanced and diversified portfolio. This strategy incorporates the dynamic interplay between ESG scores and their corresponding returns, while also considering the administrative costs associated with various firms. Our objective is to formulate long-short trading strategies that effectively counterbalance the negative effects stemming from both low ESG scores and high administrative costs. To execute this approach, we establish long positions in firms that occupy the top tier of ESG scores and incur the lowest administrative costs. Conversely, we adopt short positions in companies that rank lowest in ESG scores and maintain similarly high administrative costs. This methodology enables us to capitalize on market discrepancies and inefficiencies while effectively managing risk.

Furthermore, we emphasize the importance of regular portfolio rebalancing to maintain the desired risk-return ratio. Consequently, we will undertake this rebalancing exercise annually during our chosen sample period. This ensures our portfolio remains aligned with our investment goals and is prepared to navigate market uncertainties. For comparative analysis, we will also establish a long-short portfolio solely based on ESG scores. This will allow us to evaluate the influence of administrative costs on overall portfolio performance.

Figure 1 offers a visual depiction of the net portfolio value over time. The solid black line represents the value of the long-short portfolio, which considers both ESG scores and administrative costs. Conversely, the black dashed line represents the value of the long-short portfolio that relies solely on ESG scores. Lastly, the solid grey line signifies the value of the CSI300 index, serving as a benchmark for comparison. The results are noteworthy: the value of our low-cost ESG long-short portfolio surpasses that of the ESG-only portfolio and the CSI300 index, underscoring the effectiveness of our strategy in delivering superior returns. Furthermore, the ESG-focused long-short portfolio has exhibited incremental growth during the market downturn from 2020 to 2022, suggesting that the ESG-oriented strategy offers some resilience against market crashes.

In conclusion, our arbitrage strategy, which incorporates both ESG scores and administrative costs, has emerged as a successful methodology for generating compelling risk-adjusted returns. The annual rebalancing exercise at the year's end strengthens the resilience of our portfolio. Comparing it with portfolios solely reliant on ESG scores highlights the importance of considering all relevant factors, including costs, in portfolio construction. The robust performance of our ESG-focused long-short portfolio during market downturns validates its potential as a valuable asset for investors navigating the complexities of the contemporary financial landscape.

**Figure 1:** Values of ESG-sorted and Market Portfolios

The figure shows the portfolio values of the different trading strategies, initialized at \$100. The black solid line, black dashed line, and grey line represent the low-cost ESG portfolio, the ESG portfolio, and the CSI 300 index, respectively.

To summarize, based on the empirical analyses above, we find important practical implications: first, we confirm that the correlation between ESG and post-return is significantly positive, controlling for firms' low administrative costs. Second, these results can be applied to portfolio strategies, demonstrating that arbitrage portfolios deliver superior returns compared to common benchmarks such as the CSI300 index.

Table 8: Return, risk, and Sharpe ratios of ESG trading strategies

	Average Return (%)	Standard Deviation (%)	Sharpe Ratio
Low-cost ESG Portfolio	0.44	3.50	0.08
Median-cost ESG Portfolio	0.30	2.98	0.04
High-cost ESG Portfolio	0.33	2.77	0.06
ESG Portfolio	0.23	2.09	0.03
CSI300 Market	0.20	5.49	0.01
3-month Government Bond Rate (Risk-free)	0.17		

Source: calculated by the author

The table shows the portfolio performance of the trading strategies. Each column reports the portfolio returns, standard deviation, and Sharpe ratios. The Low-cost ESG Portfolio, Median-cost ESG Portfolio, and High-cost ESG Portfolio are portfolios that consider administrative costs. The ESG portfolio is based solely on ESG scores. The CSI 300 is a market index, and a 3-month government bond is used as a risk-free asset.

4.3. Practical Implications

From the perspective of corporate governance, firms often face the reality that high administrative costs can weaken the positive relationship between ESG performance and capital market outcomes. This observation reveals not only the complex and delicate balance in corporate operations but also offers profound insights for corporate strategic planners and policymakers.

To address this issue, firms could adopt the following strategies. First, firms can reduce administrative costs by optimizing processes, improving efficiency, and introducing advanced data analysis technologies to strengthen internal management and technological innovation. Second, firms should establish a long-term ESG strategic planning framework, integrating ESG concepts into their long-term development strategy and formulating corresponding implementation plans and assessment indicators to ensure effective execution. Third, firms could strengthen communication and cooperation with stakeholders by establishing robust communication mechanisms with investors, customers, suppliers, governments, and social organizations to jointly promote the adoption and practice of ESG concepts. Finally, firms should enhance self-regulation and transparency, actively disclosing ESG-related information and welcoming public scrutiny to boost their credibility.

Sustainability-focused investors are increasingly concerned about building portfolios that are both stable and socially responsible. Based on the impact of administrative costs, investors should carefully consider ESG portfolio strategies. First, investors should clarify screening criteria for administrative costs and ESG performance, such as setting reasonable upper limits for administrative cost ratios and ESG score thresholds, ensuring the selected companies demonstrate both high operational efficiency and sustainable development capabilities. Second, investors should regularly monitor and evaluate the administrative costs and ESG performance of the companies in their portfolios and adjust the allocation ratios as necessary to ensure the portfolio remains in optimal condition and meets investment objectives.

5. Conclusions

Despite the widespread belief that a stellar ESG rating enhances a company's prospects for achieving higher returns, current empirical studies reveal that stocks of companies with higher ESG scores may underperform those with lower scores in terms of subsequent realized returns. This apparent paradox presents a dilemma, leading this article to propose an ESG cost rationale. Specifically, the expenditures incurred by firms in implementing ESG practices might constrain their revenues, potentially negating the favorable influence of ESG on stock returns. Research indicates that companies with low management costs can optimize their stock returns by improving their ESG scores. Ultimately, when costs are effectively managed, the relationship between ESG and returns becomes more predictive and can proficiently guide investment portfolio allocation decisions.

To elaborate on this paradox, it is evident that although companies with high ESG ratings excel in social and environmental stewardship, they may incur higher costs in achieving such standards. These costs encompass investments in environmental protection, enhanced employee benefits, and more rigorous corporate governance frameworks. Such incremental expenses could reduce the company's profitability, ultimately affecting stock returns. Conversely, companies with lower ESG ratings might avoid these additional costs due to shortcomings in environmental, social, and governance practices, leading to higher returns in some cases. However, this approach may entail long-term risks, such as reputational damage, compliance risks, and potential investor

withdrawals.

This article introduces a novel perspective—specifically, the ESG cost perspective—to elucidate this phenomenon. This viewpoint underscores the pivotal role of management costs in shaping the relationship between ESG practices and stock returns. By exploring the interaction between ESG performance and returns under different management cost scenarios, we gain deeper insights into balancing risk and reward in investment decisions. The research findings reveal that for firms with minimal management costs, enhancing ESG scores significantly boosts stock returns. This suggests that organizations adept at executing effective ESG strategies while maintaining low overheads can provide superior investment returns to investors.

The main limitation of this paper stems from the small sample size of ESG performances in China. Since the accumulation of ESG data in China is still in its early stages, the small sample size limits both the depth and breadth of this study and may raise questions about the validity of the research results under different market conditions or longer sample periods. Although ESG information disclosure has gradually increased in recent years in China, it remains fragmented and non-standardized. ESG data disclosure standards vary across industries and enterprises, making data collection and integration challenging. This fragmentation and non-standardization affect the comparability and reliability of the data, and therefore the validity of the research conclusions.

Furthermore, the diversity of market conditions is another important factor. As a rapidly developing economy, China's market environment is complex and dynamic. Factors such as policy adjustments, industry changes, and shifting consumer preferences can profoundly impact ESG performance. As a result, the research findings based on limited ESG data may not fully reflect the actual market situation and may lose relevance under different market conditions. Additionally, the length of the sample period is a key factor affecting the accuracy of the research results. ESG is a long-term and continuous process, and its effects often take time to manifest. However, with limited ESG data, researchers often must rely on shorter sample periods, which may lead to findings that do not accurately capture the long-term effects of ESG, thereby introducing potential biases.

Overall, this study highlights the dynamic relationship between ESG ratings and stock returns, emphasizing the critical role of company management costs in shaping this relationship. These findings carry significant practical implications for investors, offering deeper insights into the risks and rewards associated with ESG investments and providing a fresh perspective for formulating portfolio allocation strategies.

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Data availability statement: We acquire the annual ESG scores of companies listed on the Chinese mainland market, utilizing data from the SynTao Green Finance STαR ESG Database and its ESG Risk Radar System. We obtain the firm's annual administrative costs from the CSMAR database, which is a renowned source for comprehensive Chinese stock market data. The chosen sample period for our analysis spans from 2015 to 2021. In addition to the company-level data, we also gather stock market data from the same CSMAR database. Specifically, we focus on obtaining the monthly holding period returns for each publicly listed firm, which is crucial in understanding the financial performance of these companies over time. Moreover, we include the CSI market index, a widely followed market benchmark, to gauge the overall market performance of the individual firms' stock returns. This comprehensive dataset covers from 2015 to 2022.

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