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NEKN02 Master Essay

The Influence of ESG Ratings on Financial

Performance of Listed Companies in Developing Countries:

A Case Study of China's Market

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Abstract

In this study, we use the Chinese market over the period 2012–2022 as a case to investigate the impact of environmental, social, and governance (ESG) ratings on the financial performance of publicly traded companies in developing countries. After measuring Return on Assets and Tobin's Q as explanatory variables, we found a significant positive correlation between financial performance and ESG ratings. This indicates that firms with higher ESG ratings have better profitability and market valuation.

Further analyses show that social responsibility and corporate governance factors have a greater effect on financial performance than environmental factors. ESG ratings positively affect the financial performance of both non-state-owned and state-owned firms, suggesting a growing emphasis on ESG factors in the Chinese market.

【**Keywords**】: ESG ratings; Financial Performance; China; Return on Assets; Panel Data Analysis; Fixed effect.

Acknowledgements

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1. Introduction

1.1 Background and Context

The concept of ESG can be traced back to the 1970s, when developed countries first raised the issue of the imbalance between economic growth and environmental protection (Friede et al., 2015). With the acceleration of globalization in recent decades, the challenges faced by companies have become increasingly severe. These challenges are not limited to the deterioration of the natural environment, such as the increase in extreme weather events caused by global warming (Khan et al., 2016), but also include the complexity of social problems, such as poverty, war, and increasing inequality (Clark et al., 2015). Therefore, in this context, the global attention to the concept and practice of environment, society, and governance (ESG) continues to rise (Friede et al., 2015).

Compared with ESG systems that have been established for decades in developed countries, developing countries are still in the early stages of ESG integration. Although the concept of ESG investment was first proposed by the United Nations Environment Program in 2005, it was only in the past decade that the concept of ESG began to receive widespread attention in China (Zhang et al., 2023). China's ESG assessment platforms have updated their assessment methods in the past five years, and most A-share listed companies have started to release ESG reports in the past two years. This shows that Chinese companies and regulators are beginning to realize the importance of integrating ESG factors into corporate operations and financial decisions (China Securities Regulatory Commission, 2021). In December 2020, the release of the White Paper on ESG Development in China aimed to advocate the principles of responsible investment, promote the development of ESG practices, and promote the sustainable development of China's economy. The Chinese president's pledge at the 75th UN General Assembly to peak carbon emissions by 2030 and become carbon neutral by 2060 could have a significant impact on the ESG landscape for companies. Recent Chinese government policies aimed at promoting green finance and enhancing ESG disclosure further highlight the importance of ESG considerations. These policies include a decision by the executive meeting of The State Council in 2017 to designate certain provinces as pilot zones for green finance reform and innovation, and the Environmental Information

Disclosure System Reform Plan issued by the Ministry of Ecology and Environment in 2021, which proposes to establish a mandatory environmental information disclosure system by 2025. The General Rules for Enterprise ESG Information Disclosure and the General Rules for Enterprise ESG Evaluation, which were officially released and implemented in June 2022, are conducive to China's ESG ecological development. The Service Specification for ESG Evaluation Agencies, issued in December 2022, focuses on the quality and efficiency of enterprises in different fields and at different stages of development and promotes the further standardization of ESG evaluation. These measures are of great significance to promote the excellence and strength of enterprises, promote the high-quality development of enterprises, promote regional sustainable development, and form a good social evaluation mechanism. Meanwhile, on February 8, 2024, the China Securities Regulatory Commission stressed the importance of listed companies increasing the proportion of sustainability reporting and ESG disclosure, while standardizing corporate ESG management practices to ensure the dominance of authoritative rating agencies in the competitive environment.

1.2 Research Objectives and Questions

With the environmental crisis caused by global climate change and the volatility of financial markets, a sound ESG rating system can not only improve the efficiency of business operations and reduce investor risks but also mitigate the impact of business operations on the environment. At present, the concept of ESG has matured in developed countries, but it is only in its infancy in China. Since the start of the COVID-19 pandemic in 2020, the global economy has been in a state of recession. The policy shift in the post-pandemic era has brought about changes in the global division of labor, and the trend of multi-layered production and the multi-polarization of consumption structure is accelerating (Butollo et al., 2024). As the largest developing country in the world, China is gradually strengthening the efficient regulation of its financial market in order to steadily recover its economy. Currently, China adopts a "voluntary disclosure" model for corporate information disclosure, and there are fewer ESG rating systems in place. Most scholars study the impact of ESG ratings on corporate financial performance in developed countries, with few studies focusing on developing countries. Therefore, examining the impact of China's ESG ratings on corporate financial performance can fill this gap. The purpose of our research is to explore the impact of

ESG ratings on corporate ROA in different periods and industries by constructing empirical financial models. Generally, we have two specific research questions:

Q1: In China, do companies with higher ESG scores tend to achieve better financial performance?

Q2: Do different internal factors of companies affect their ESG ratings, leading to varying financial performance outcomes?

Through the results of regression analysis, we can provide effective guidance for enterprise development, enhance competitiveness, optimize the financing environment, and offer reasonable investment strategy suggestions for investors to comprehensively evaluate enterprise prospects. After incorporating ESG scoring factors, enterprise performance is influenced not only by traditional financial ratios and enterprise size but also by non-financial indicators, which have become crucial for evaluating the quality and effectiveness of enterprise management. Integrating ESG into the evaluation system offers a new perspective for performance management. Historically, corporate finance theory primarily focused on ratio analysis of solvency, operating capacity, and profitability, rarely considering ecological environment factors. However, with the increasing popularity of the green sustainable development concept, environmental pollution and related remediation costs have become significant expenditure items for enterprises. Introducing the ESG score as an influential factor enhances corporate finance theory, aiding investors in better allocating investments, obtaining excess returns, and supervising enterprise management. Corporate managers can leverage ESG factors to optimize performance management and management by objectives. Industry regulators can better regulate companies by classification, unify ESG evaluation criteria, implement reward and punishment systems, and optimize information disclosure systems.

This paper has two innovative points. The first is the consideration of more control variables, leading to the finding that a higher ESG score can improve financial performance, the financing environment, and competitiveness. Second, different heterogeneity analyses were added to ensure the comprehensiveness of the analysis. It is found that environmental factors have no significant influence on financial performance, while social responsibility and corporate governance factors have a

significant positive impact on financial performance. Furthermore, ESG scores have little influence on the financial performance of enterprises regardless of whether they are state-owned.

The rest of this article is structured as follows: Section 2 is a literature review that describes ESG factors and financial performance, as well as current research on their relationship. Section 3 covers research methods, primarily describing model construction, variable selection, data screening, and statistical methods. Section 4 is empirical analysis, which includes descriptive statistics of the samples, regression analysis, and tests for endogeneity, stability, intermediary effects, and heterogeneity. Section 5 presents the Results and Discussion, analyzing the regression results. The final section summarizes the full text, presenting the conclusions of our research and making recommendations on areas that companies, investors, and governments should prioritize in the future.

2. Literature Review

2.1 Conceptual Framework: ESG Factors

ESG information disclosure refers to the dissemination of corporate Environmental, Social, and Governance (ESG) information, which involves sharing relevant data with both internal and external stakeholders. This practice is crucial for optimizing internal governance and strengthening risk control within enterprises. Additionally, it plays a significant role in enhancing the confidence of external stakeholders and improving information transparency (Gangi et al., 2019). Currently, there is no universal standard for ESG information disclosure worldwide. At this stage, effective ESG disclosure requires not only the proactive efforts of enterprises but also supportive government policies, especially under special circumstances. At present, ESG disclosure requires both awareness from the companies themselves and, in certain cases, support from government policies. Due to the existence of disclosure costs (Verrecchia et al., 1983) and the issue of information asymmetry in disclosures, ESG participation can be regarded as a predictive factor for ESG disclosure according to the voluntary disclosure theory (Dye et al., 1985). Voluntary ESG disclosure can effectively reduce the idiosyncratic volatility and downside risk of company stocks (Reber et al., 2021). Apart

from voluntary disclosure, government support in the realm of ESG disclosure is also crucial. However, without sufficient research to determine the optimal threshold for ESG disclosure, government-mandated disclosure methods are unlikely to achieve policy objectives (Olsen et al., 2021). Of course, the quality of ESG disclosure is also paramount. Lengthy and complex sustainability reports may lead to information overload for investors and blur the relationship between sustainable development plans and core value creation activities within companies (Wu et al., 2019). Compared with China, which introduced the concept of ESG later, the ESG information disclosure system in Europe and the United States is relatively complete, although the form and detail of ESG reports vary from company to company (Ioannou et al., 2017). Many companies comply with the Global Reporting Initiative (GRI) guidelines in their ESG reporting (Vigneau et al., 2015). Increasingly, companies are adopting non-traditional methods such as the Internet and social media to disclose ESG information (Eberle et al., 2013). Recent studies have found that disclosing ESG performance through the framework of integrated reporting (IR) can effectively enhance the competitiveness of enterprises (Rabaya et al., 2021). The main reason why ESG information disclosure has garnered increasing attention is that the information disclosed can fully reflect the financial performance, market value, and sustainable development capability of enterprises. ESG information disclosure can effectively improve enterprise performance, and high-quality ESG disclosure can generate stronger competitive advantages (Mohammad et al., 2021). A study of listed companies in the FTSE 350 index found that there is a positive correlation between the level of ESG disclosure and enterprise value (Li et al., 2017). Another study argues that while ESG disclosure is important for corporate profits, the actions related to ESG are also crucial (Yoo et al., 2021).

2.2 Prior Studies on ESG Ratings and Financial Performance

Many studies suggest that ESG performance is positively related to financial performance. Based on data from 235 European banks from 2007 to 2016, it was found that ESG has a significant positive impact on corporate performance, measured by ROA, ROE, and Tobin's Q (Buallay, 2019). By studying the performance of European banks listed on the Dow Jones Sustainability Index (DJSI) from 2003 to 2013, it was found that banks' reputation for social responsibility is conducive to their performance

(Forcadell et al., 2017). A study examining the impact of corporate social responsibility on the cost of equity capital using American companies as samples showed that higher rankings in corporate social responsibility are associated with lower costs of equity financing. Regarding industrial environmental sensitivity, Yoon et al. (2018) argued that the variance in the impact of ESG performance on corporate performance across industries with different environmental sensitivities is due to stakeholders' inconsistent expectations of ESG performance in these industries. In addition to studying the impact of ESG performance on financial performance, research has shown that improvements in enterprise performance also have a significant positive impact on ESG performance investment (Chen et al., 2021). DasGupta et al. (2022) confirmed that insufficient financial performance encourages enterprises to take practical actions to improve ESG. Through data analysis of European countries, it was found that not only does the market positively impact ESG information disclosure of enterprises, but also that better economic development increases the efficiency of ESG ratings for enterprise reporting. This means that mandatory information disclosure by enterprises promotes financing and improves economic development efficiency (Eliwa et al., 2021). As an emerging economy with a large number of enterprises, exploring the impact of China's ESG rating may yield similar results. Based on a study of 2000 academic articles analyzing the relationship between ESG and corporate financial performance (CFP), it was found that analyzing this relationship is reasonable and well-founded, with 90% of the results indicating a non-negative relationship between ESG and CFP. The positive effect of ESG on CFP is stable over time. Through regional comparative analysis, it was found that the effect in developed regions is significantly higher than in non-developed regions, and the positive effect in emerging markets is higher than in developed markets (Friede et al., 2015).

Conversely, some studies argue that ESG performance is negatively related to financial performance. Brammer et al. (2006) and related studies show that ESG responsible investment can worsen financial performance, with a negative correlation between the two (Branco et al., 2008). Scholars supporting this view argue that shareholders need to bear the corresponding implementation costs when participating in ESG, leading to higher expenses and negatively impacting financial performance. Some studies suggest that ESG practices do not have a positive impact on corporate financial performance within five years (Sachin et al., 2021). Using neoclassical economics research methods,

Duque-Grisales et al. (2021) analyzed data from 104 multinational companies from Brazil, Chile, Colombia, Mexico, and Peru from 2011 to 2015, concluding that there are significant externalities in enterprise ESG investment and that managers may use ESG investment as a tool to pursue their own interests. Consequently, ESG behavior has a significantly negative correlation with enterprise performance.

2.3 ESG in Developing Countries

Due to the slow development of ESG rating systems in developing countries, sustainable development strategies are crucial to the economic development and social progress of these nations. By discussing the influence of Corporate Governance (CG) on Firm Value (FV), it is concluded that enterprises in developing countries must adopt strong governance mechanisms to improve their financial performance. These measures include increasing the proportion of female senior executives and female employees, increasing the number of foreigners on the board of directors, and establishing an independent board structure (Ayishetu et al., 2024). The study found that gender diversity on the board of directors is more beneficial to ESG ratings. However, the impact of the proportion of female directors on ESG ratings is significant in developed countries but not in developing countries (Wasiuzzaman et al., 2023). Research on Malaysia, a specific developing country, found that individual E, S, and G scores and comprehensive ESG scores do not significantly impact profitability (ROE) and corporate value. There is no significant difference in performance between enterprises with ESG ratings and those without them. However, the comprehensive ESG rating has a significantly positive impact on the company's cost of capital (Atan et al., 2018). Since Malaysia's ESG rating system has not been developed for long, and there is a large economic gap between Malaysia and China, this earlier research may yield different results compared to the current study. By comparing the impact of ESG ratings on mining enterprises in different regions, it is found that although the number of ESG reports in developing countries is higher than in developed countries, the quality is relatively poor. The correlation between ESG information disclosure and market value in developed countries is higher than in developing countries. Specifically, the market value of mining companies in developed countries is strongly correlated with S and G disclosures, while the market value of mining companies in developing countries is strongly correlated with E disclosure (Huang et al., 2024). Research in developing

countries indicates a strong positive correlation between ESG ratings and the frequency of investor visits to enterprises. Institutional investors can promote enterprises to improve their ESG levels by enhancing the quality of accounting information, increasing investment in environmental protection, and boosting media attention. This suggests that strong supervision and a relatively developed ESG rating system are significant for economic development (Jiang et al., 2022).

A large body of literature shows that ESG information disclosure plays a crucial role in the development of ESG. Although some studies suggest a negative correlation, most studies argue that ESG has a positive correlation with the development and financial performance of enterprises from various perspectives. However, the development of China's ESG rating system is relatively late, and there is no unified ESG disclosure standard or regulatory system.

3. Data

3.1 Methodology

Our analysis focuses on Chinese A-share listed companies between 2012 and 2022. This study adopts the fixed effects model regression analysis to explore the impact of ESG ratings on firms' financial performance. This model can help us control for some unobservable and time-invariant firm and industry characteristics, so as to better estimate the effects of explanatory variables on the explained variables. Through the Hausman test, we further determine that the fixed effects model is more appropriate for this study compared to the random effects model. To address the endogeneity issue, the instrumental variable (IV) approach and two-stage least squares estimation (2SLS) are used in this study. For robustness testing, we replace the explanatory variables as Tobin's Q for regression analysis. In addition, we conduct mediation effect analysis and heterogeneity analysis to explore whether ESG ratings indirectly affect financial performance by influencing access to capital, and the impact of different ESG dimensions and ownership structure on financial performance.

3.2 Sample Selection and Data Collection

Our primary database encompasses the years 2012 to 2022, primarily consisting of matched data from Sino-securities and the China Stock Market & Accounting Research Database (CSMAR). Details of the Sino-securities ESG rating system are provided in Appendix A. While Sino-securities' ESG index provides data as early as 2009, the availability of comprehensive and reliable data for other essential variables, including financial performance indicators and firm characteristics, is more consistent from 2012 onwards. This 10-year period offers a balance between having a sufficient number of observations for robust statistical analysis and ensuring data quality and comparability across firms and years. Additionally, the choice of 2022 as the endpoint reflects data availability at the time of the study. Data for the year 2023 have not been fully accessible or finalized during the research process.

The study sample comprises Chinese A-share listed companies, with Sino-securities furnishing pertinent information on ESG indices for Chinese listed entities, while CSMAR supplies data on fundamental company aspects and institutional ownership, encompassing metrics such as asset return rate, asset-liability ratio, and company size. Initially, we matched the two datasets utilizing stock codes and years as the principal identifiers.

To ensure the quality and comparability of our data, we implemented several processing steps. Firstly, we excluded companies under special treatment (ST) or particular transfer (PT). This was done to avoid atypical financial behavior that could potentially distort our analysis.

Furthermore, we refined our sample by excluding companies with liabilities exceeding assets, as indicated by asset-liability ratios above 1. Such companies are likely to be experiencing significant financial distress. Additionally, considering the unique characteristics of financial sector business models and reporting practices, we opted to exclude firms from this sector to mitigate any potential bias.

To maintain a consistent sample and prevent survivorship bias, we removed companies that were delisted during the study period. Given the large sample size and the potential biases introduced by data imputation, observations with missing data for regression variables were also excluded. This ensures that our results are not influenced by incomplete data.

Finally, we applied winsorization to continuous variables, limiting extreme values to the 1st and 99th percentiles, to address potential bias from outliers and ensure robust regression results. And our final dataset included 3,377 listed companies over a 10-year period (T=10).

3.3 Variable Definitions and Measurement

3.3.1 Variable Selection

At present, there is no exact definition of corporate ESG performance within the Chinese context, and global ESG rating agencies do not assign significant weight to A-share stocks. For instance, MSCI's initial rating of over 400 A-share listed companies was only completed in mid-2018, demonstrating a lack of alignment with research conducted by domestic Chinese institutions. While several domestic ESG assessment platforms exist, such as Bloomberg, SynTao Green Finance, Hexun.com, and WIND, most of these platforms commenced their data collection after 2015. This limited timeframe does not align with our objective of investigating the long-term value effects of ESG performance. Therefore, we opted for the Sino-securities' ESG index, which offers comprehensive data spanning from 2012 to 2022. This selection is further justified by two key advantages. First, Sino-securities boasts the highest update frequency and broader coverage among available databases. Second, their methodology balances international ESG rating standards with considerations for the specific developmental context of Chinese companies, resulting in an index that is more attuned to the unique characteristics of the Chinese market.

For regression analysis, we converted the Sino-securities' ESG ratings from the highest rating of "AAA" to the lowest rating of "C" into numerical values, with higher values representing better ESG performance. The detailed conversion scale is presented in Appendix B.

3.3.2 Corporate Value

Corporate value can be assessed through various metrics. In this research, we utilize return on assets (ROA) as the dependent variable to signify internal financial performance, indicating a company's asset efficiency and profitability. A higher ROA

suggests better asset management and financial performance. Another common method is employing Tobin's Q to gauge corporate value. It is defined as the company's market value divided by the reset cost of assets and is widely used to evaluate a company's long-term market worth and growth prospects (Wernerfelt & Montgomery, 1988; Mak & Kusnadi, 2005). Hence, in the robustness test section of this paper, we substitute Tobin's Q for ROA as the dependent variable to ensure the consistency of research outcomes across different corporate value metrics.

3.3.3 Control Variables

To account for factors other than ESG ratings that may influence a company's financial performance, we included seven control variables in our analysis, and these explanations and calculation formulas for these control variables are provided in Appendix C.

First, we control for company size (measured as the natural logarithm of total assets) as it is a key determinant of financial performance (Fatemi, Glaum, and Kaiser 2018). And include years since listing as a control variable, as it may affect a company's governance structure, transparency, and financing capabilities (Dhaliwal et al. 2011).

Second, we consider a company's financial risks and operational status. We include the debt-to-equity ratio, as higher leverage can negatively impact profitability due to increased financial risks and interest expenses (Aboud and Diab 2018; Atan et al. 2018). We also choose the revenue growth rate, as this index indicates the extent of the company's business expansion and ability to create value (Friede, Busch, and Bassen 2015; Velte 2017). The other one is a cash flow ratio, which assesses the company's financial situation by measuring its ability to repay debt and its financial flexibility (Eccles, Ioannou, and Serafeim 2014).

After considering asset structure and equity concentration will also impact financial performance, we choose the tangible asset ratio and the largest shareholder's ownership ratio (top1) as control variables. The tangible asset ratio influences financial risk and stability (Huang and Ge 2024; Qureshi et al., 2020), while the top1 ratio affects both corporate governance and financial performance (Wasiuzzaman and Subramaniam 2023; Ayishetu Bukari, Osei Agyemang, and Bawuah 2024).

4. Empirical Analysis

4.1 Model Specification

To explore the correlation between ESG ratings and financial performance, we developed Model (1).

$$\text{ROA}_{i,t,j} = \alpha_0 + \alpha_1 \text{ESG}_{i,t,j} + \alpha_2 Controls_{i,t,j} + \text{Year}_t + \text{industry}_j + \text{Individual}_i + \varepsilon_{i,t,j} \quad (1)$$

In this model, the subscripts 't', 'i', and 'j' represent the year, individual company, and industry, respectively. $\text{ROA}_{i,t,j}, \text{ESG}_{i,t,j}, Controls_{i,t,j}$ represent the return on assets, ESG rating, and the set of control variables for firm i in industry j at time t, respectively. α_0 denotes the constant term, capturing the baseline ROA when all other explanatory variables are held constant. We anticipate a positive coefficient α_1 for the ESG rating variable, suggesting a positive association between higher ESG ratings and firm financial performance. The model adopts time, industry, and firm-specific fixed effects to address potential biases due to temporal, sectoral, and firm-level variations that might influence ROA. Finally, $\varepsilon_{i,t,j}$ represents the error term, encompassing the unexplained variation in ROA.

4.2 Descriptive Statistics

Table 1: Descriptive Statistics

Note: This table presents descriptive statistics (means, medians, and standard deviations) for the variables used in our regression models. Variable definitions are provided in the last section. Company size is measured by the natural logarithm of total assets. "top1" represents the percentage of shares held by the largest shareholder, reflecting ownership concentration. The sample consists of Chinese A-share listed companies spanning the period 2012-2022.

VarName	Obs	Mean	SD	Min	Median	Max
ESG	21552	4.1283	1.086	1.00	4.00	7.00
E	21552	1.9504	1.180	1.00	2.00	7.00
S	21552	4.2026	1.120	1.00	4.00	7.00
G	21552	5.2623	1.398	1.00	6.00	8.00
roa	21552	0.0373	0.065	-0.37	0.04	0.25
tobinq	21552	2.0199	1.384	0.80	1.59	16.65
size	21552	22.3990	1.309	19.56	22.20	26.81
listage	21552	2.2093	0.749	0.00	2.30	3.40
lev	21552	0.4392	0.202	0.04	0.43	0.91
growth	21552	0.1682	0.415	-0.67	0.10	3.95
cashflow	21552	0.0465	0.066	-0.20	0.05	0.26
tangible	21552	0.9090	0.098	0.45	0.94	1.00
top1	21552	33.5253	14.608	7.86	31.10	75.79

As shown in Table 1, we observe variations among sample companies in various aspects including financial performance, size, leverage level, and equity structure. The average ROA is 0.37% with a substantial standard deviation (SD) of 0.065, indicating a wide range of profitability across firms. The mean ESG score is 4.13 (SD=1.09), while the individual constituents, environment (E), social (S), and governance (G), have average scores of 1.95 (SD=1.18), 4.20 (SD=1.12), and 5.26 (SD=1.39), respectively. This variation suggests differences in ESG performance across firms. The average Tobin's Q is 2.02 (SD=1.38) and ranges from 0.80 to 16.65, reflecting diverse market valuations. Our sample includes companies with a variety of sizes, listing ages, leverage ratios, growth rates, cash flow ratios, tangible asset ratios, and ownership structures, as shown by the respective ranges and standard deviations in Table 1.

4.3 Correlation Analysis

Table2: Correlation Analysis

Note: This table shows the pairwise correlations between all variables. Correlation coefficients range from -1 to 1, with -1 indicating a perfect negative correlation, 0 indicating no correlation, and 1 indicating a perfect positive correlation. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	ESG	E	S	G	roa	tobinq	soe
ESG	1						
E	0.485***	1					
S	0.950***	0.465***	1				
G	0.618***	0.058***	0.567***	1			
roa	0.205***	0.00200	0.184***	0.271***	1		
tobinq	-0.096***	-0.112***	-0.108***	0.016**	0.180***	1	
soe	0.104***	0.045***	0.094***	0.162***	-0.071***	-0.144***	1
size	0.234***	0.242***	0.245***	0.039***	0.013*	-0.375***	0.353***
listage	-0.039***	0.077***	-0.026***	-0.115***	-0.173***	-0.061***	0.421***
lev	-0.057***	0.102***	-0.032***	-0.246***	-0.340***	-0.265***	0.275***
growth	-0.00700	-0.036***	-0.017**	-0.00800	0.257***	0.053***	-0.085***
cashflow	0.087***	0.049***	0.082***	0.122***	0.394***	0.103***	-0.00100
tangible	0.113***	0.041***	0.113***	0.124***	0.038***	-0.034***	0.140***
top1	0.103***	-0.00600	0.081***	0.175***	0.132***	-0.100***	0.229***
	size	listage	lev	growth	cashflow	tangible	top1
size	1						
listage	0.415***	1					
lev	0.503***	0.351***	1				
growth	0.022***	-0.078***	0.0110	1			
cashflow	0.065***	0	-0.175***	0.019***	1		
tangible	0.057***	0.032***	0.138***	-0.148***	-0.022***	1	
top1	0.200***	-0.072***	0.062***	-0.015**	0.092***	0.147***	1

Table 2 reveals a noteworthy positive correlation between ESG ratings and corporate financial performance. This relationship is statistically significant at the 1% level, as indicated by the 0.205 correlation coefficient between ESG scores and ROA. This suggests that companies with better ESG performance tend to have higher asset return rates, supporting the hypothesis of a positive correlation between ESG performance and corporate value as stated in Q1.

Additionally, we find significant correlations between some control variables and ROA. For example, company size is positively correlated with ROA, indicating that larger companies often have higher profitability, possibly due to their typically greater resources and stronger market competitiveness. Leverage is negatively correlated with

ROA, suggesting that companies with higher debt levels often have lower profitability, likely due to increased financial risk and interest burden.

Table 2 also highlights a high correlation between social responsibility (S) and overall ESG scores, which is logical as S constitutes a key component of the ESG framework. Although removing highly correlated variables is a common practice to mitigate multicollinearity issues, we retained S as a separate variable in our analysis. This is because we plan to investigate the individual effects of E, S, and G factors on corporate financial performance in subsequent analyses.

Subsequently, we will conduct regression analysis to further explore the impact of ESG on corporate financial performance while controlling for other factors.

4.4 Regression Analysis

Table 3: Baseline regression results

Note: This table presents the results from our baseline regressions examining the impact of ESG ratings on firm ROA, controlling for various firm characteristics. We present three models with varying fixed effects specifications. Model (1) excludes fixed effects, Model (2) includes industry, individual firms, and year fixed effects. coefficient represents the predicted change in ROA for a unit increase in the corresponding independent variable, after accounting for the influence of other variables in the model. T-statistics are reported in brackets, with ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	roa	roa
ESG	0.006***	0.003***
	(17.38)	(7.01)
size	0.008***	0.020***
	(21.85)	(20.27)
listage	-0.008***	-0.014***
	(-14.30)	(-8.08)
lev	-0.113***	-0.157***
	(-51.64)	(-41.66)
growth	0.041***	0.033***
	(47.08)	(38.83)
cashflow	0.302***	0.198***
	(53.90)	(30.88)
tangible	0.070***	-0.015**
	(18.46)	(-2.53)
top1	0.000***	0.000***
	(11.49)	(7.65)
_cons	-0.191***	-0.327***
	(-24.74)	(-11.99)
Industry	No	Yes
Year	No	Yes
Individual	No	Yes
N	2.2e+04	2.2e+04
R^2	0.358	0.151
F	1500.640	117.046

To investigate the influence of ESG ratings on corporate ROA, we built two regression models that controlled for firm size, listing age, leverage ratio, revenue growth rate, cash flow ratio, tangible asset ratio, and ownership concentration of the largest shareholder.

Refer to Table 3, model (1) reveals that without considering industry and year fixed effects, the coefficient of 0.006 suggests that a one-unit increase in ESG rating (for

instance, moving from BBB to A) is associated with a 0.6% increase in ROA, holding all else equal.

To determine the most suitable model specification, we conducted the Hausman test. The results favored a fixed-effects model over a random-effects model. Model (2) expands upon Model (1) by introducing individual, industry, and year fixed effects. In this model, the ESG rating coefficient remains positive and statistically significant at the 1% level, although its magnitude decreases to 0.003. This suggests that even after considering potential influences from industry and year effects, a one-unit increase in ESG rating still leads to a 0.3% increase in ROA.

Furthermore, the coefficients of control variables are generally consistent with theoretical expectations and statistically significant across both models. For instance, firm size exhibits a positive and statistically significant coefficient, indicating that larger firms tend to show higher profitability. Specifically, holding other factors constant, a one percent increase in firm size (measured by the natural logarithm of total assets) leads to a 0.8% increase in ROA in Model (1), and a 2% increase in Model (2). On the other hand, leverage ratio (lev) has a negative and statistically significant coefficient. This finding aligns with the understanding that higher leverage often translates to greater financial risk and a heavier interest burden, thus potentially hindering profitability. A one percentage point increase in leverage results in a 11.3% decrease in ROA in Model (1), and a 15.7% decrease in Model (2), all else equal.

In conclusion, our findings consistently demonstrate a positive and significant relationship between ESG ratings and firm ROA, even after controlling for industry, year, and firm-specific effects. This indicates that firms with better ESG performance tend to achieve higher profitability, backing the growing importance of ESG considerations in the business landscape.

4.5 Endogeneity Test

There may be a potential endogeneity between ESG ratings and corporate financial performance. Here are two key issues that cause endogeneity: reverse causality, where strong financial performance facilitates ESG investments and thus higher ratings, potentially inflating the estimated impact of ESG; and omitted variable bias, where

unobserved factors could simultaneously influence both ESG ratings and financial performance, leading to spurious correlations.

To address endogeneity problem in this model, we adopt an instrumental variable (IV) approach, as Ni et al. (2014) used explanatory factors as instruments, we employ lagged one-period ESG ratings (L.ESG) as our instrument. This choice is justified on two grounds. First, L.ESG exhibits a strong correlation with current ESG ratings, satisfying the relevance requirement for a valid instrument. Second, L.ESG is unlikely to be affected by the current period's ROA, thus fulfilling the exogeneity requirement.

Table 4: First-Stage Results of Two-Stage Least Squares (2SLS) Regression

Note: This table presents the results of the first stage of the 2SLS regression analysis. Model (1) replicates the baseline regression with individual firm fixed effects, while Model (2) presents the 2SLS results using lagged ESG rating (L.ESG) as an IV for the current ESG rating. T-statistics are addressed in parentheses, with ***, **, and * denoting significance at the 1%, 5%, and 10% levels.

	(1)	(2)
	roa	roa
ESG	0.003***	
	(7.01)	
L.ESG		0.010***
		(15.26)
size	0.020***	0.009***
	(20.27)	(18.39)
listage	-0.014***	-0.005***
	(-8.08)	(-6.40)
lev	-0.157***	-0.121***
	(-41.66)	(-44.22)
growth	0.033***	0.043***
	(38.83)	(40.00)
cashflow	0.198***	0.321***
	(30.88)	(47.93)
tangible	-0.015**	0.049***
	(-2.53)	(10.87)
top1	0.000***	0.000***
	(7.65)	(8.20)
_cons	-0.327***	-0.221***
	(-11.99)	(-21.35)
Industry	Yes	Yes
Individual	Yes	Yes
Year	Yes	Yes
N	2.2e+04	1.7e+04
R^2	0.151	0.368
F	117.046	169.177

As per the first-stage F-statistic test, if the F-statistic of a single instrumental variable exceeds 10, it is generally assumed that there is no issue with weak instrumental variables (Stock & Yogo, 2005). This is because a higher F-value indicates a stronger correlation between the IV and the endogenous explanatory variable, thus rendering the IV estimation outcome more reliable. Table 4 displays the estimation outcomes of 2SLS, where the model (2) demonstrates an F-value of 169.177, indicating the absence of weak instrumental variables. This suggests the chosen instrumental variables are

effective and dismisses overidentification problems. In comparison to the baseline regression model (1), in the model (2), the coefficient of ESG becomes 0.010, significantly at the 1% level, with the coefficient's absolute value experiencing an increase. This signifies that post addressing endogeneity issues, the positive impact of ESG on ROA becomes more obvious.

4.6 Robustness Checks

Robustness testing is an essential part of empirical research to ensure the reliability and wide adaptability of the results. In section 3.3 above, we mentioned that in this paper, Tobin's Q is chosen to replace ROA as an explanatory variable for the robustness test. In Table 2 of the correlation analysis in Section 4.3, it is evident that there exists a certain correlation between Tobin's Q and ROA.

$$\text{T}obin'sQ_{\text{i,t,j}} = \alpha_0 + \alpha_1 \text{ESG}_{\text{i,t,j}} + \alpha_2 Controls_{i,t,j} + \text{Year}_t + \text{industry}_j + \text{Individual}_i + \varepsilon_{\text{i,t,j}} (2)$$

Table 5: Robustness Regression

Note: This table presents the results of robustness checks examining the relationship between ESG ratings and Tobin's Q, an alternative measure of firm value. We replicate the baseline regression specification with individual firm fixed effects (Column 1) and present two additional models with varying fixed effects specifications: (2) without fixed effects, (3) with industry, individual firms, and year fixed effects. The coefficients represent the estimated change in Tobin's Q associated with a one-unit increase in the corresponding independent variable, holding all other variables constant. T-statistics are reported in parentheses, with *, **, and *** denoting significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	roa	tobinq	tobinq
ESG	0.003***	-0.021**	0.017**
	(7.01)	(-2.47)	(2.08)
size	0.020***	-0.403***	-0.598***
	(20.27)	(-46.57)	(-31.58)
listage	-0.014***	0.255***	0.627***
	(-8.08)	(19.48)	(18.44)
lev	-0.157***	-0.718***	0.152**
	(-41.66)	(-13.65)	(2.12)
growth	0.033***	0.244***	0.101***
	(38.83)	(11.64)	(6.26)
cashflow	0.198***	2.345***	1.193***
	(30.88)	(17.41)	(9.78)
tangible	-0.015**	0.226**	0.351***
	(-2.53)	(2.49)	(3.07)
top1	0.000***	-0.002***	-0.002
	(7.65)	(-2.67)	(-1.26)
_cons	-0.327***	10.592***	12.794***
	(-11.99)	(56.93)	(24.70)
Industry	Yes	No	Yes
Year	Yes	No	Yes
Individual	Yes	No	Yes
N	2.2e+04	2.2e+04	2.2e+04
R^2	0.151	0.180	0.157
F	117.046	592.840	120.183

After employing Tobin's Q as the dependent variable, the results reveal a positive association between ESG ratings and Tobin's Q, although the significance of this association varies across certain models. Notably, in models with individual company fixed effects, ESG ratings significantly influence Tobin's Q at a 1% confidence level, with a coefficient of 0.003. Conversely, in models without fixed effects, although the impact of ESG ratings on Tobin's Q is negative, it remains statistically significant at a

5% confidence level, with a coefficient of -0.021. It's worth mentioning that some unchanging features of companies, such as governance structure, industry status, and brand effects, are not eliminated in models without fixed effects, potentially biasing the estimates. Furthermore, in models incorporating industry, year, and individual company fixed effects, ESG ratings significantly affect Tobin's Q at a 5% confidence level, with coefficients of 0.017. Robustness tests indicate that even when considering industry and time factors, the positive impact of ESG ratings persists regardless of whether ROA or Tobin's Q is utilized as a measure of corporate financial performance.

4.7 Analysis of Mediating Effects:

Through previous research, we find that financing constraints can weaken the positive impact of digital finance on firms' financial performance (Yilin et al., 2022). It is also a mediating variable between ESG ratings and corporate green innovation (Yuming et al., 2022). Based on these studies, we speculate that there is a potential mediation mechanism of financing constraints on the relationship between ESG ratings and financial performance.

To explore whether financing constraints have a mediating effect, we obtain the Kaplan-Zingales (KZ) index directly from the CSMAR database. This index is created by Kaplan & Zingales (1997) and developed to match the Chinese context by Tan Yue and Xia Fang (2011) and Wei Zhihua et al. (2014). It is a widely used measure of corporate financing constraints, with higher scores on this index indicate greater funding constraints and lower finance efficiency.

The constructed model for the mediation variable is as follows:

$$KZ_{i,t,j} = \rho_0 + \rho_1 ESG_{i,t,j} + \rho_2 Controls_{i,t,j} + Year_t + industry_j + Individual_i + \varepsilon_{i,t,j} \quad (3)$$

$$ROA_{i,t,j} = \sigma_0 + \sigma_1 ESG_{i,t,j} + \sigma_2 KZ_{i,t,j} + \sigma_3 Controls_{i,t,j} + Year_t + industry_j + Individual_i + \varepsilon_{i,t,j} \quad (4)$$

Table 6:   Mediation Effect Regression

Note: This table shows regression results examining whether the impacts of ESG ratings on ROA is mediated by financing constraints. List (1) uses baseline model to regress ROA on ESG ratings, List (2) uses upon model (3) to regress the financing constraint measure (KZ index) on ESG ratings, and List (3) uses model (4) to regress ROA on ESG ratings, the financing constraint measure, and control variables. Coefficients represent the estimated

change in the dependent variable for a one-unit increase in the corresponding independent variable, remains other variables constant. T-statistics are reported in parentheses, with *, **, and *** denoting significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	roa	kz	roa
ESG	0.003***	-0.024***	0.003***
	(7.01)	(-3.12)	(6.69)
kz			-0.007***
			(-16.25)
size	0.020***	-0.648***	0.016***
	(20.27)	(-36.46)	(15.46)
listage	-0.014***	1.142***	-0.007***
	(-8.08)	(35.75)	(-3.69)
lev	-0.157***	6.556***	-0.113***
	(-41.66)	(97.58)	(-24.44)
growth	0.033***	-0.292***	0.031***
	(38.89)	(-19.15)	(36.49)
cashflow	0.198***	-13.047***	0.111***
	(30.88)	(-113.82)	(13.26)
tangible	-0.015**	-1.135***	-0.023***
	(-2.52)	(-10.56)	(-3.80)
top1	0.000***	-0.001	0.000***
	(7.65)	(-0.95)	(7.59)
_cons	-0.327***	14.113***	-0.232***
	(-12.00)	(29.00)	(-8.39)
Industry	Yes	Yes	Yes
Individual	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	2.2e+04	2.2e+04	2.2e+04
R^2	0.151	0.642	0.163
F	117.158	679.268	121.162

From Table 6, it is evident that in list (2), the coefficient of ESG is -0.024 and significant at the 1% level. This indicates that, higher ESG ratings are associated with lower financing constraints. Upon inclusion of the KZ index, the coefficient of ESG remains significant at the 1% level, with no change in its value compared to list (1). The coefficient of the KZ index is -0.007 and significant at the 1% level, implying that for every 1-unit increase in financing constraints, the company's ROA decreases by 0.7%. Based on the regression results, we can preliminarily infer the existence of a partial mediating effect of ESG on ROA, meaning ESG can influence ROA both directly and indirectly by mitigating financing constraints.

To further validate the presence and strength of the mediating effect, we conducted Bootstrap tests.

Table 7: Bootstrap Test Results

Note: _ bs _ 1 is an indirect effect and _ bs _ 2 is a direct effect. (P) and (BC) represent the 95% percentile and bias-corrected bootstrap confidence intervals, respectively; *, * *, * * * represent significant at the level of 10 %, 5 % and 1 %, respectively.

	Observed Coef.	Bias	Bootstrap Std. Err.	[95% Conf. Interval]		
_bs_1	-0.0032015	-1.63e-06	0.0004269	-0.004035	-0.002399	(P)
				-0.0004006	-0.0002391	(BC)
_bs_2	-0.00911342	7.07e-0.06	0.00040346	-0.0098995	-0.0082825	(P)
				-0.0099103	-0.0083109	(BC)

As shown in Table 7, it is evident that the average indirect effect is -0.0032, with a 95% confidence interval of [-0.004035, -0.002399]. Since it does not encompass 0, we affirm that ESG indeed exerts an indirect influence on ROA by alleviating financing constraints. In simpler terms, companies with superior ESG performance find it easier to secure financing, thereby enhancing their profitability. Similarly, the average direct effect is -0.0091, with a 95% confidence interval of [-0.008995, -0.008109], also excluding 0, indicating a significant direct positive impact of ESG on ROA.

While the indirect effect is statistically significant, its magnitude is smaller than that of the direct effect. This suggests that the impact of ESG ratings on ROA primarily occurs through direct pathways, with the mediating role of financing constraints is relatively weak.

In summary, our findings indicate that ESG ratings influence financial performance through both direct and indirect pathways. While the direct effect is stronger, the statistically significant indirect effect, mediated by financing constraints, highlights the importance of considering this additional mechanism. This result supports previous research suggesting that financial constraints play a mediating role in the relationship between ESG factors and firm performance.

4.8 Heterogeneity Analysis:

4.8.1 Effects of Individual ESG Factors

We substitute the original ESG rating with three indicators: Environmental (E), Social Responsibility (S), and Corporate Governance (G), individually, to scrutinize their effects on financial performance.

$$ROA_{i,t,j} = \beta_0 + \beta_1 E_{i,t,j} + \beta_2 Controls_{i,t,j} + Year_t + industry_j + Individual_i + \varepsilon_{i,t,j} \quad (5)$$

$$ROA_{i,t,j} = \gamma + \gamma_1 S_{i,t,j} + \gamma_2 Controls_{i,t,j} + Year_t + industry_j + Individual_i + \varepsilon_{i,t,j} \quad (6)$$

$$ROA_{i,t,j} = \delta_0 + \delta_1 G_{i,t,j} + \delta_2 Controls_{i,t,j} + Year_t + industry_j + Individual_i + \varepsilon_{i,t,j} \quad (7)$$

Table 8: Impact of Individual ESG Dimensions on ROA

Note: This table presents regression results examining the impact of individual ESG dimensions (Environmental - E, Social - S, and Governance - G) on firm ROA, controlling for various firm characteristics. We replicate the baseline regression specification with individual firm fixed effects, replacing the overall ESG rating with each dimension separately. The coefficients represent the estimated change in ROA associated with a one-unit increase in the corresponding independent variable, holding all other variables constant. T-statistics are reported in parentheses, with *, **, and *** denoting significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	roa	roa	roa	roa
ESG	0.003***			
	(7.01)			
E		-0.001		
		(-1.47)		
S			0.003***	
			(7.52)	
G				0.003***
				(8.12)
size	0.020***	0.021***	0.020***	0.020***
	(20.27)	(21.40)	(20.27)	(20.46)
listage	-0.014***	-0.015***	-0.014***	-0.014***
	(-8.08)	(-8.39)	(-8.07)	(-7.53)
lev	-0.157***	-0.160***	-0.157***	-0.155***
	(-41.66)	(-42.69)	(-41.83)	(-40.79)
growth	0.033***	0.033***	0.033***	0.033***
	(38.83)	(38.71)	(38.84)	(38.77)
cashflow	0.198***	0.198***	0.198***	0.198***
	(30.88)	(30.76)	(30.84)	(30.90)
tangible	-0.015**	-0.014**	-0.015**	-0.016***
	(-2.53)	(-2.34)	(-2.52)	(-2.72)
top1	0.000***	0.000***	0.000***	0.000***
	(7.65)	(7.82)	(7.71)	(7.58)
_cons	-0.327***	-0.333***	-0.328***	-0.333***
	(-11.99)	(-12.20)	(-12.02)	(-12.23)
Industry	Yes	Yes	Yes	Yes
Individual	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	2.2e+04	2.2e+04	2.2e+04	2.2e+04
R^2	0.151	0.148	0.151	0.151
F	117.046	115.986	117.210	117.422

Through heterogeneity analysis, we've identified significant variations in how different dimensions of ESG ratings influence corporate financial performance. Regression

results reveal that the direct impact of environmental factors on ROA is statistically insignificant, with a coefficient of -0.001, failing to reach significance. However, the enhancement of social responsibility factors has a significantly positive effect on ROA, evident at the 1% confidence level, with a coefficient of 0.003. Similarly, the coefficient of corporate governance factors on ROA is also 0.003, significant at the 1% confidence level, indicating that robust corporate governance positively influences corporate financial performance.

4.8.2 ESG and Financial Performance across Ownership Structures

To explore whether ownership structure influences the relationship between ESG ratings and financial performance, this study includes a state-owned enterprise (SOE) indicator that categorizes firms into SOEs and non-SOEs. This categorization is based on the unique characteristics and different motivations that SOEs may have in implementing ESG initiatives.

As emphasized by Zhou et al. (2022), according to stakeholder theory, SOEs typically operate under higher social expectations and face greater pressure from various stakeholders, including the government, to demonstrate strong ESG performance. This pressure arises from their perceived role in achieving broader societal goals beyond profit maximization. Therefore, we hypothesize that, compared to non-SOEs, ESG ratings have a more significant positive impact on the financial performance of SOEs.

To test this hypothesis, we introduce an interaction term (ESGsoe) in the regression analysis, which is the product of the ESG rating and the SOE dummy variable (1 for SOEs and 0 for non-SOEs). If the coefficient on the ESGsoe interaction term is statistically significant and positive, it will indicate a stronger positive relationship between ESG ratings and financial performance in SOEs. This result would support the view that stakeholder pressure and social expectations are key drivers in the link between ESG and financial performance in SOEs.

$$ROA_{i,t,j} = \theta_0 + \theta_1 ESG_{i,t,j} + \theta_2 \left(ESG_{i,t,j} * SOE_{i,t,j} \right) + \theta_3 Controls_{i,t,j} + Year_t + industry_j$$
$$+ Individual_i + \varepsilon_{i,t,j} \qquad (8)$$

Table 9: ESG and Financial Performance Across Ownership Structures

Note: This table presents regression results considering the moderating role of ownership. Companies' Ownership Structures are classified as dummy variables. To state-owned enterprises (soe) are denoted by a value of 1, and to non-state-owned enterprises are denoted by a value of 0. We include an interaction term (ESGsoe), which is the product of ESG ratings and the SOE dummy variable, to assess whether the impact of ESG ratings on ROA differs between SOEs and non-SOEs. The coefficients represent the estimated change in ROA associated with a one-unit increase in the corresponding independent variable, holding all other variables constant. T-statistics are reported in parentheses, with *, **, and *** denoting significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	roa	roa	roa
ESG	0.003***	0.003***	0.003***
	(7.01)	(7.00)	(6.66)
soe		-0.008***	-0.003
		(-3.05)	(-0.69)
ESGsoe			-0.001
			(-1.44)
size	0.020***	0.020***	0.020***
	(20.27)	(20.29)	(20.29)
listage	-0.014***	-0.014***	-0.014***
	(-8.08)	(-7.88)	(-7.83)
lev	-0.157***	-0.156***	-0.156***
	(-41.66)	(-41.50)	(-41.51)
growth	0.033***	0.033***	0.033***
	(38.83)	(38.74)	(38.74)
cashflow	0.198***	0.198***	0.198***
	(30.88)	(30.86)	(30.85)
tangible	-0.015**	-0.015**	-0.015**
	(-2.53)	(-2.49)	(-2.48)
top1	0.000***	0.000***	0.000***
	(7.65)	(7.43)	(7.41)
_cons	-0.327***	-0.325***	-0.327***
	(-11.99)	(-11.91)	(-11.96)
Industry	Yes	Yes	Yes
Individual	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	2.2e+04	2.2e+04	2.2e+04
R^2	0.151	0.151	0.151
F	117.046	115.389	113.625

The moderating effect of ownership structure on the relationship between ESG ratings and financial performance indicates that, within state-owned enterprises (SOEs), while the positive impact of ESG ratings on financial performance exists, there is a tendency

for the coefficient of this impact to increase, signifying a more pronounced influence of SOEs in this aspect. Regression findings reveal that the coefficient of ESG ratings on ROA is 0.003, consistently significant at a 1% confidence level across all models, indicating a notable positive effect of ESG ratings on corporate financial performance irrespective of ownership structure. Although the coefficient of SOEs on ROA is negative, reflecting that SOEs encounter more challenges in operational efficiency and financial returns, the coefficient of the interaction term (ESG*SOE) is -0.001, exhibiting an increasing trend, albeit not reaching significance. This suggests a potential enhancement of the positive impact of ESG ratings on financial performance within SOEs. Despite the nonsignificant results, it can be deduced that under heightened social expectations and stakeholder pressures, the influence of ESG ratings on financial performance is more pronounced for SOEs compared to non-SOEs.

5. Discussion

This paper investigates the impact of environmental, social, and governance (ESG) ratings on firm financial performance, measured by return on assets (ROA) and Tobin's Q, through empirical analysis. Using data from Chinese A-share listed companies spanning from 2012 to 2022, we construct a fixed effect panel regression model and conduct various robustness tests and endogeneity tests. The results indicate a positive association between higher ESG ratings and better financial performance. Superior environmental, social, and governance performance not only enhances market value (Tobin's Q) but also improves actual operating performance (ROA). Companies demonstrating excellent performance in ESG domains convey a message to the market about their balanced development across economic interests, environmental protection, and social benefits. Furthermore, firms with exceptional ESG performance tend to engage in higher levels of information disclosure with better quality, leading institutional investors to perceive them as having more insider information and thus being more attractive for investment. Additionally, firms with strong ESG performance typically operate within a more stringent regulatory environment, engaging in both external monitoring and internal self-regulation to gain social recognition and returns. Consequently, these enterprises make comprehensive efforts in environmental protection, social responsibility fulfillment, and corporate governance improvement.

Institutional investors view such enterprises as having high long-term investment value and are inclined to increase their shareholding ratio. ESG ratings alleviate financing constraints by enhancing corporate ROA. Companies with high ESG ratings generally exhibit higher transparency and lower operational risk, making investors more willing to provide funds and thus reducing financing costs. Therefore, strong ESG performance enables enterprises to access lower-cost financing, thereby enhancing their financial position and investment capacity. Further heterogeneity analysis reveals that social responsibility and corporate governance factors exert a more significant impact on corporate financial performance, while environmental factors demonstrate a relatively weaker impact. This underscores the importance for enterprises to prioritize the promotion of social responsibility and governance structure when formulating ESG strategies. Moreover, ESG ratings positively influence financial performance for both state-owned enterprises (SOEs) and non-SOEs, although they may have different resources and goals in implementing ESG practices. SOEs receive considerable support from the government and are subject to stringent government supervision, leading to higher requirements for their ESG practices. Consequently, SOEs conduct ESG practices not only for economic returns but also to meet state requirements. Additionally, society holds higher expectations for the ESG performance of SOEs, potentially diminishing the value enhancement effect of their ESG performance as society may perceive their compliance with national standards as the norm.

6. Conclusion

6.1 Limitations

Given the belated introduction of the ESG concept in China, it follows that the data available is limited in both temporal scope and the number of companies assessed, in stark contrast to the wealth of data available in developed nations. Furthermore, China currently lacks a standardized ESG rating system. Consequently, the ESG scores utilized may not offer a comprehensive reflection of companies' performance across environmental, social, and governance dimensions. Hence, when conducting ESG evaluations in the Chinese market, it's imperative to exercise caution regarding the limitations of available data and the incompleteness of rating metrics.

6.2 Optimizing the Disclosure System of ESG Information

Improving the ESG information disclosure system is crucial for enhancing the standards of the ESG rating system. ESG is not only integral to the long-term development of enterprises but also aligns with the nation's "dual carbon" goal and the principles of green and sustainable development. With the increasing demand for information disclosure regarding the environment, social responsibility, and corporate governance, there is a pressing need for unified implementation rules, an open ESG information service platform, and standardized ESG information disclosure guidelines to facilitate both horizontal and vertical comparisons among enterprises.

Firstly, the principle of "voluntary disclosure" should transition gradually towards "mandatory disclosure." Initially, it could be compulsory for listed companies in the CSI 300 index to disclose their ESG information, with subsequent phases gradually extending this requirement to all listed companies in their annual reports following a pilot program. Secondly, attention should be paid to setting disclosure content and accounting standards. Since the ESG performance of enterprises is closely linked to financial distress, accounting methods should prioritize indicators related to financial distress to provide investment references for investors concerned about enterprise financial risks. Furthermore, in terms of disclosure content, distinctions should be made between enterprises with different ownership structures. Market expectations for state-owned enterprises (SOEs) typically emphasize superior corporate governance, while their performance in environmental and social responsibility may be prominent but overshadowed by governance concerns. Conversely, non-SOEs are assessed based on their performance across environmental, social, and governance aspects. Therefore, SOEs should be required to disclose corporate governance details extensively to drive improvement in governance capabilities. Non-SOEs, on the other hand, should aim for comprehensive disclosure across all three aspects. Moreover, third-party institutions should be incentivized to actively participate in collecting and releasing ESG information. Collaboratively establishing ESG information disclosure and evaluation standards tailored to industry characteristics is essential. Strengthening the sharing and application of ESG-related data by environmental protection departments and relevant agencies ensures reliable data sources for ESG evaluations. This is crucial for investors and financial institutions to explore investment value through enterprise ESG

performance and for enterprises to enhance their willingness to disclose ESG information.

6.3 Establishing an ESG Assessment Framework Suitable for the Chinese Market

As the ESG rating system is still a nascent financial concept in China, the country has yet to establish a unified ESG rating standard. In many cases, foreign standards are adopted for rating purposes. However, foreign ESG standards were developed relatively early, presenting a considerable disparity with the Chinese context, thereby limiting their applicability. Consequently, there is an urgent need to develop an ESG evaluation system tailored to China's national conditions.

Firstly, it is imperative to consider the requirements of investors and devise accurate evaluation models accordingly. Investors adhering to ESG principles prioritize non-financial information, while those following traditional investment philosophies focus more on enterprises' financial performance. Given the divergent concerns of these investor groups, the compatibility of the evaluation system is compromised. Hence, when formulating specific indicators for the ESG evaluation system, it is essential to comprehensively address the non-financial factors of interest to investors. Assigning different weights based on their significance and incorporating suitable qualitative and quantitative indicators are necessary. Such a customized evaluation model will aid institutional investors in making investment decisions, bolster institutional investors' inclination towards ESG investment, drive investment growth, and augment enterprise value. Secondly, enterprises with varying ownership structures should be distinguished in terms of evaluation indicators and their respective weights. Market responses to improvements in ESG performance differ between state-owned enterprises (SOEs) and non-SOEs. Enhanced ESG performance among non-SOEs tends to elicit a more positive market reaction and exert a greater positive impact on enterprise value. Given the market's differentiated perceptions of ESG performance between SOEs and non-SOEs, generalized evaluation models are unsuitable. When devising evaluation models for non-SOEs, their performance across all three dimensions should be fully considered possible, with the weights of indicators across the three dimensions roughly equalized. Conversely, SOEs are typically expected to shoulder greater environmental and social

responsibilities, and their corporate governance capabilities are subject to closer scrutiny.

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Appendix

Appendix A: ESG Rating Evaluation System - Sino-Securities Index Methodology

This table presents the evaluation system employed by Sino-Securities for constructing their ESG rating index. The framework considers three primary dimensions: Environment (E), Social (S), and Governance (G), with several sub-categories within each dimension.

Dimension	Sub-categories	Corresponding Indicators
Environment (E)	Resource Utilization	water consumption, Land use, material consumption, energy consumption,
	Environmental Efficiency	Industrial emissions, wastegas, wastewater, solid waste
	Environmental Compliance	Environmental permits, environmental violations, green factories
	Human Capital	Occupational health & safety, employee training, R&D investment
Social (S)	Product Responsibility	Product quality and safety, customer relationships, after-sales service
	Social Contribution	Donations, social welfare, poverty alleviation, community engagement
	Data Security & Privacy	Data security and privacy protection
	Shareholder Rights	Shareholder rights protection
Corporate Governance (G)	Information Disclosure	ESG information, financial reports, transparency, information timeliness
	Governance Quality	ESG governance structure, decision-making process, incentive mechanisms
	External Oversight	Major shareholders, institutional investors, media coverage, social supervision
	Business Ethics	Anti-corruption, fair competition, ethical management

Appendix B: Conversion of Sino-securities ESG Ratings to Numerical Values

Note: This table illustrates the conversion of categorical ESG ratings from Sino-Securities into numerical values for use in our regression analysis. The numerical values maintain the ordinal ranking of the ESG ratings, with higher values representing better ESG performance.

ESG Rating	Numerical Value
AAA	9
AA	8
A	7
BBB	6
BB	5
B	4
CCC	3
CC	2
C	1

Appendix C: Calculation of Control Variables

Note: This table presents the formulas used to calculate the control variables included in our regression models. These variables capture various firm characteristics that may influence financial performance, such as size, age, leverage, profitability, and ownership structure.

Variable	Explanation	Formula
Company size (size)	Natural logarithm of total assets	$\ln(\text{Total Assets})$
Years listed (ListAge)	Number of years since the company went public	$\ln(\text{year of current year} - \text{year of listing} + 1)$
Asset-liability ratio (Lev)	Percentage of total liabilities to total assets	$\dfrac{\text{Year} - \text{end Total Liabilities}}{\text{Year} - \text{end Total Assets}} \times 100\%$
Revenue growth rate (Growth)	Percentage change in operating income from the previous year	$\left(\dfrac{\text{Current year operating income}}{\text{Previous year operating income}} - 1\right) \times 100\%$
Cash flow ratio (Cashflow)	Ratio of operating cash flow to total assets, expressed as a percentage	$\dfrac{\text{Operating Cash Flow}}{\text{Total Assets}} \times 100\%$
Tangible asset ratio (tangible)	Ratio of tangible assets to total assets, expressed as a percentage	$\left(\dfrac{\text{Total assets} - \text{Net intangible assets}}{\text{Total assets}} - \dfrac{\text{Net goodwill}}{Total\ assets}\right) \times 100\%$
Proportion of shares held by major shareholders (Top1)	Percentage of total shares held by the largest shareholder	$\dfrac{\text{Shareholding of the largest shareholder}}{\text{Total shares}} \times 100\%$