Research on the Impact Mechanism of ESG Performance on Financial Performance of Real Estate Enterprises: Based on the Dual Perspective of Corporate Credit and Ownership Concentration

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Abstract. With the rapid development of ESG concept and the government's emphasis on sustainable development, real estate enterprises, as an important pillar industry of the national economy, their ESG practices are crucial to enhance their competitiveness, shape their social image and achieve sustainable development. However, most of the existing studies focus on the direct relationship between ESG and corporate financial performance, while ignoring the role of ownership structure and corporate credit level. This paper focuses on the influencing mechanism between ESG performance and financial performance of Chinese listed real estate companies, and uses the data of A-share listed real estate companies from 2016 to 2023 to systematically reveal the internal relationship between ESG performance and financial performance of real estate companies through multiple regression analysis and mediating effect test. The study finds that ESG performance of real estate enterprises is significantly positively correlated with financial performance, while ownership concentration plays a negative moderating role in this relationship, that is, improving ESG performance can promote financial performance, and high ownership concentration may weaken the positive impact of ESG practices. As a mediating variable, corporate credit level positively affects the relationship between ESG performance and financial performance, indicating that good ESG performance can improve financial performance by improving corporate credit level. The research conclusion emphasizes that listed real estate companies need to recognize the positive impact of ESG performance, and formulate strategies to improve ESG management level, while paying attention to the optimization of ownership structure to avoid excessive concentration. The government should strengthen supervision, guide enterprises to pay attention to ESG issues, and optimize the market environment, so as to promote the comprehensive and coordinated development of economy, society and environment.

Keywords: ESG performance; Financial performance; Real estate enterprises; Corporate credit; Concentration of ownership

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1 Introduction

Since the beginning of the 21st century, China's economy has shifted from high-speed growth to high-quality development, showing a new trend. The government has actively promoted sustainable development, and the ESG concept has attracted wide attention. As a core indicator to measure the environmental, social and governance aspects of enterprises, enterprise ESG has become the focus of research in achieving the goal of "carbon peak" and "carbon neutrality". Studies have shown that ESG is closely linked to corporate financial performance, and investors have begun to include ESG as an important factor in their investment portfolios and seek long-term stable returns.

Over the past few years, China's real estate sector has been crucial to the economy, involving multiple fields and a long industrial chain. In recent years, real estate companies have not only pursued economic benefits, but also focused on ESG performance. However, due to less self-owned funds, more debt financing and high financial leverage, real estate enterprises have shortcomings in ESG practice. This affects enterprise credit and investor confidence, and has a negative impact on their financial performance and sustainable development.

Therefore, in the context of pursuing common prosperity, it is of great significance to study the relationship between ESG performance and financial performance of real estate companies, as well as the mediating role of corporate credit level. A comprehensive study on this issue will help to enhance the sustainable development ability of real estate enterprises, promote the healthy development of the industry, enhance the overall competitiveness, improve market reputation and investor confidence, and promote the comprehensive and coordinated development of economy, society and environment.

At present, there are three main methods to study the relationship between corporate environment, society and governance (ESG) and financial performance. The first is the case analysis method, which deeply analyzes typical enterprises and studies how ESG affects financial performance. The second is the literature review method, which sorts out relevant domestic and foreign literature, summarizes the consensus and objections of current research, and provides a theoretical basis for subsequent research. The third method is empirical analysis, which uses questionnaire survey or listed company data and uses statistical empirical analysis technology to empirically test the association between ESG and financial performance.

Through literature review, it is found that few studies on the relationship between ESG performance and financial performance are based on listed real estate enterprises, especially lack of in-depth discussion on enterprise credit level and ownership concentration. In order to enhance the reliability of the research, this paper adopts the data of A-share listed real estate enterprises from 2016 to 2023, selects the enterprise credit level as the mediating variable and the ownership concentration as the moderating variable, and comprehensively reveals the internal relationship between ESG performance and financial performance of listed real estate enterprises by means of multiple regression and mediating effect test. This paper provides a reference for policy making and enterprise practice.

Based on this, the marginal contribution of this paper is as follows:

On the one hand, this paper focuses on the real estate industry: different from previous studies, this paper focuses on the real estate industry and deeply explores the impact mechanism of ESG and financial performance of real estate enterprises. On the other hand, this paper explores the mediating and moderating effects: considering the debt repayment pressure, credit risk and equity complexity faced by real estate enterprises, this paper analyzes the mediating and moderating effects of these factors on the relationship between ESG and financial performance from the perspective of enterprise credit level and equity concentration.

2 Literature Review

2.1 Research on the Relationship between ESG and Financial Performance of Enterprises

The relationship between ESG performance and financial performance has attracted significant academic attention in recent years, yet research conclusions remain inconsistent. While a majority of studies find a positive correlation between ESG performance and corporate financial performance, other research suggests a negative or even non-linear relationship.

Most studies show that ESG performance is positively correlated with corporate financial performance, Friede (2015) found that good ESG practices can improve financial performance by enhancing corporate image, reducing risks, and mitigating financing constraints [1]. Similarly, Huang (2021) identified a positive relationship between ESG performance and corporate financial performance using electronic and keyword search strategies[2]. Alareeni (2020) used panel regression analysis to demonstrate a positive correlation between ESG disclosure and performance indicators for S&P 500 listed companies in the United States[3]. Other studies, such as those by Wang Bo et al. (2022) [4], Wang Lin et al. (2022) [5], Xu et al. (2022) [6], Sun Kaijie (2022) [7], and Jian (2023) [8], further support the positive link between ESG and financial performance in various sectors.

However, some studies suggest a negative correlation, often attributed to cultural differences, image constraints, or market immaturity. For example, Duque et al. (2021) found a negative correlation in Latin American markets due to public disapproval of corporate ESG initiatives[9]. Garcia et al. (2017) observed that environmentally sensitive companies facing image constraints may struggle to translate ESG performance into financial gains [10]. Zhang Xianhua et al. (2021) argued that the negative correlation in the Chinese market stems from the early stages of ESG adoption and the lack of full integration with international markets [11].

Finally, a smaller subset of studies suggests a non-linear relationship, often attributed to factors like investor sentiment, information lags, or the intensity of ESG investment. For instance, Landi et al. (2018) found that ESG ratings did not translate into expected excess returns for Italian companies due to limited investor interest[12]. Chen Jing (2019) posited that information lags hinder short-term correlations between ESG and financial

performance[13]. Lyu (2023) observed that moderate ESG investment can improve financial performance in the luxury industry, while excessive investment may have negative consequences[14]. Dang (2022) theorized that while heavy polluting companies may initially experience a negative correlation between ESG performance and financial performance due to upfront costs, improved ESG performance can ultimately drive a shift in competitive advantage and lead to financial improvements[15].

The complexity of the relationship between ESG and financial performance highlights the need for careful consideration of research context, the use of appropriate methods, and a comprehensive analysis to arrive at accurate conclusions.

2.2 Research on the Influencing Factors between Enterprise ESG and Financial Performance

The literature shows that there are internal mediating variables and external moderating variables in the influencing mechanism between ESG and financial performance. Internal mediating variables include corporate innovation, digital transformation, corporate information transparency, etc. The external moderating variables include institutional environment, company size, external pressure, industry competition, public opinion supervision and so on. To provide a reference for the follow-up research on the relationship between ESG and financial performance. Xin Jin et al. (2023) pointed out that corporate innovation plays a mediating role in the influence path, and institutional environment plays an external moderating role[16]. Yaghoub Abdi et al. (2022) studied the impact of ESG on corporate financial performance of 38 global airlines and found that company size can regulate the impact of both[17]. Zhu Aiping et al. (2024) found that digital transformation of A-share listed companies in Shanghai and Shenzhen can strengthen the promotion effect of ESG performance on corporate performance[18]. Yang et al. (2023) found that corporate information transparency of China's A-share listed companies, as an internal intermediary variable, connects ESG performance with financial performance, which plays an important role in reducing information asymmetry and improving investor confidence[19]. Xu (2023)[20] and Zhuang (2023)[21] conducted an empirical analysis on the Shanghai and Shenzhen stock markets and all A-share listed companies respectively. The study finds that ESG performance can improve the financial performance of enterprises by alleviating financing constraints, reducing risk taking, and improving R&D investment and marketing competitiveness. CAI Wenxia et al. (2023) predicted that external pressure, industry competition and public opinion supervision have A positive impact on a relationship, and technological innovation is the internal intermediary mechanism for ESG performance to improve the financial performance of Chinese A-share enterprises[22]. Wang (2023) studied computer, communication and other electronic equipment manufacturing enterprises [23], and Xie (2023) studied 398 listed companies[24], both of which analyzed that green innovation can play a mediating role in the relationship between ESG and enterprise financial performance.

To sum up, ESG performance does not directly affect financial performance, but through internal intermediary and external moderating factors. When studying the relationship between ESG and financial performance, it is necessary to select appropriate mediating and moderating variables based on the characteristics of research objects, and comprehensively consider the influence of relevant factors.

2.3 Research on ESG and Financial Performance of Listed Real Estate Companies

At present, most of the research on ESG of listed real estate companies in China focuses on case studies based on a single enterprise, covering information disclosure, enterprise competitiveness, economic consequences and enterprise value. For example, Zhu Rui (2023) studied Longfor Group and found that its ESG performance was positively correlated with financial performance, which was conducive to sustainable development and brand improvement, but environmental protection investment also brought cost pressure. It is suggested to strengthen carbon information disclosure and fund management, issue green bonds, and optimize building energy conservation [25].

Cui Yuxin (2023), taking Country Garden as an example, studied the impact of ESG performance on the economic consequences of real estate enterprises, and found that the improvement of ESG rating can increase market value, alleviate financing constraints, enhance profitability and solvency, and improve enterprise value [26]. Ma (2023) showed that the long-term orientation of real estate enterprises is conducive to their ESG performance by analyzing the case of Vanke. ESG performance positively affects corporate reputation, revenue, operation, financing cost and profitability, and enhances the comprehensive financial performance and value of enterprises[27]. Li Pei (2024) studied the ESG information disclosure of Vanke Group and put forward questions and suggestions. She believed that Vanke ESG has a high level of information disclosure, but there are problems such as lack of commitment to authenticity and insufficient integrity. To this end, she suggested to strengthen third-party audit, improve information transparency, improve quantitative index disclosure and other optimization measures [28].

However, there are few empirical analyses, mainly covering the impact of carbon regulation on corporate ESG actions and research on ESG performance and corporate competition. For example, Lee C L et al. (2024) analyzed the impact of carbon regulation policies on listed real estate data in 37 countries on ESG actions in the real estate industry, and found that the implementation of ETS can improve corporate environmental responsibility, while the impact of carbon tax is not obvious[29]. Chen (2023) took four listed real estate companies as cases, built a scoring model of ESG and corporate competitiveness through literature research and qualitative analysis, and conducted empirical research. The results show that ESG performance is positively correlated with enterprise competitiveness, but it is affected by the external economic environment. Studies also suggest that ESG performance helps to enhance corporate competitiveness and promote sustainable economic development[30].

2.4 Literature Review and Innovations of This Paper

Through the review and analysis of relevant literature, it is found that the research objects of the existing research on the impact mechanism of ESG performance and financial performance of enterprises have shifted from large-scale objects to more refined and professional small-scale objects. That is, they focus on small-scale objects, including the electronics manufacturing industry studied by Zhang (2023)[31], the high-tech

manufacturing enterprises studied by Yao (2023)[32], the financial intermediaries studied by Yu (2020)[33], and the listed power companies in China studied by Changhong Zhao et al. (2018)[34]. This change shows that the research field is gradually deepening and specialized.

In view of this, this paper studies the listed real estate companies in China, considering their debt repayment pressure, credit risk and equity complexity based on panel data from 2016 to 2023. Taking corporate credit level as the mediating variable and ownership concentration as the moderating variable, this paper uses multiple regression and mediating effect test methods to explore the impact mechanism of ESG factors on corporate financial performance. This paper aims to comprehensively understand the relationship between ESG performance and financial performance of listed real estate companies in China, and provide a scientific basis for promoting ESG practice.

3 Theoretical Analysis and Research Hypotheses

3.1 ESG Performance and Corporate Financial Performance

ESG performance is an important indicator to measure a company's performance in terms of sustainability. In theory, good ESG performance can enhance a company's reputation and attract more investors and consumers, thereby improving its market competitiveness and financial performance. First of all, real estate development will generate a lot of waste and carbon emissions. Implementing green building, energy conservation and emission reduction measures can reduce environmental impact, improve energy efficiency, reduce operating costs and improve financial performance. At the same time, increased consumer awareness of environmental protection and increased demand for green residential and commercial properties will help boost sales prices and rental income. Secondly, real estate companies can improve their corporate image and increase the attractiveness of their projects by considering community needs in project planning and construction. Commitments to consumers, such as ensuring construction quality and providing quality property services, can enhance customer loyalty and increase a company's market share. In addition, because the real estate industry is capital intensive and has a long investment cycle, an effective governance structure is needed to ensure the safety of funds and the smooth progress of projects. A good governance structure can reduce agency costs, improve decision-making efficiency, reduce financial risks, and thus enhance the financial performance of enterprises.

Based on the above analysis, this paper proposes the following research hypotheses:

H1: ESG performance of real estate enterprises has a significantly positive impact on their financial performance.

3.2 Moderating Effect of Ownership Concentration

Ownership concentration refers to the degree to which a company's shares are concentrated in the hands of minority shareholders. From a theoretical point of view, ownership concentration of real estate companies is considered to play a negative moderating role in the influencing mechanism between corporate ESG performance and financial

performance. First of all, ESG is now a key criterion to evaluate whether a company can sustain its development. In real estate companies with high ownership concentration, the decision-making power is often in the hands of minority shareholders, which may restrict the development of ESG performance of the company, because these minority shareholders may focus more on short-term interests than long-term environmental and social responsibilities. Secondly, higher ownership concentration may damage the internal governance balance of the company, weaken the effectiveness of supervision and balance mechanism, and then affect the effect of ESG on the financial performance of the company. In addition, high ownership concentration may also weaken the flexibility and adaptability of companies in dealing with market fluctuations and risks, which also limits the positive impact of ESG performance on financial performance. Finally, high ownership concentration may also limit the company's ability in financing and investment, which may depriving the company of the funds needed to improve ESG performance, thus affecting the improvement effect of ESG performance on financial risk management.

Based on the above analysis, this paper proposes the following research hypotheses:

H2: Corporate ownership concentration has a negative moderating effect on the relationship between ESG performance and corporate financial performance.

3.3 Mediating Effect of Credit Level

Credit rating, as a quantitative reflection of an enterprise's reputation in market activities, is an important indicator to measure the degree of market trust of an enterprise. A real estate company's excellent performance in ESG can significantly improve its credit rating, which in turn has a positive effect on financial performance. The specific effects are as follows: first, real estate companies with outstanding ESG performance will have an easier time obtaining support from financial institutions, which will not only help reduce their financing costs, but also improve the efficiency of their capital operation, thus promoting the growth of financial performance. Secondly, these companies' good ESG records will help them attract more investors and partners, enhance their market competitiveness, and have a positive impact on their financial performance in the long run. Finally, as companies with good ESG performance tend to be able to effectively manage operational risks and have strong risk resistance, it also helps to maintain and enhance the stability of their financial performance.

Based on the above analysis, this paper proposes the following research hypotheses:

H3: Credit level plays an intermediary role between ESG and financial performance of real estate enterprises.

4 Experimental Design

4.1 Sample Description and Data Source

Based on the sample of listed real estate companies in China's A-share market from 2016 to 2023, this study explores the relationship between corporate ESG rating and corporate performance. Although the ESG concept has developed relatively late in

China, the evaluation system of domestic rating agencies is continuously optimized. This study uses the ESG rating data of Shanghai China Securities Index Information Service Co., LTD. The rating agency fully draws on the international mainstream methods and practices, while considering the national conditions and the characteristics of China's capital market, which is suitable for the study of Chinese listed companies. In addition, the ESG rating of China Securities Index Information Service Co., Ltd. has A wide coverage and strong timeliness, which can fully cover the listed companies in China A-share market. Other data come from the CSMAR financial database.

At the same time, in order to ensure the scientific and accurate research results, this paper also selects the initial research samples according to the following conditions: (1) excluding financial samples. Financial listed companies are regulated by the government, and their accounting treatment is very different from that of other industries. In order to ensure the consistency of research, the previous literature excludes these companies, and this paper also follows this principle. (2) ST, SST, *ST and PT samples are excluded. These companies usually have poor operating conditions and may whitewash their financial statements to avoid delisting. Therefore, in order to reduce the possible bias to the research results, this paper eliminates such abnormal research samples; (3) After removing the samples with missing values and outliers, the unbalanced panel data of 272 "enterprise-year" observations are obtained. The sample size is moderate, which ensures the credibility of the research conclusion. Data analysis and processing work in this paper mainly through the software Stata15.0 to complete.

4.2 Variable Selection and Measurement

Explained variable: This paper explores the impact of ESG performance on financial performance, especially how ESG performance improves the operating results and financial status of enterprises, brings financial returns and benefit inflows to enterprises, and creates value for shareholders. In line with ESG's concept of long-term value creation and sustainable development, this paper uses return on equity (ROE) to measure corporate financial performance, and uses return on assets (ROA) to conduct robustness test.

Explanatory variables: ESG rating data used in this study are from China Securities Index Corporation. Different from the rating systems used by rating agencies such as Bloomberg, Syntao Green and MSCI, the ESG rating results published by China Securities Index Company use the comprehensive scores obtained as a letter grade, that is, from AAA to C. A rating of BBB or above is considered a leading level. This paper uses the comprehensive score (ESG2) to measure the ESG performance of enterprises, and assigns 1 to 9 points to each level (ESG1) for robustness test.

Mediating variable: This study uses the credit rating (LC) of listed companies as the proxy variable of credit level, and the data are from the listed company loan sub-database of CSMAR. The credit rating is classified by letter grade, and the quantitative processing is carried out in this study, such as 'A' corresponds to 3 points, 'B' corresponds to 2 points, 'C' corresponds to 1 point, '+' adds 0.5 points, '-' minus 0.5 points. The higher the score, the better the credit status. Since the data are at a daily frequency,

this study also calculates the average score of a firm's credit rating within the year to reflect its annual credit level.

Moderating variables: The real estate industry is characterized by capital intensity, policy sensitivity and cyclicality, which may be amplified in firms with high ownership concentration and have a profound impact on ESG practice. High ownership concentration usually means that the decision-making power is concentrated in the hands of a few shareholders, who may pursue short-term interests and ignore the long-term investment and strategic planning required by ESG practice. In order to measure ownership concentration, this study uses the shareholding ratio of the largest shareholder as a moderator variable for in-depth research.

Control variables: In order to enhance the rationality of the model construction and consider other factors that may affect the financial performance of enterprises, referring to the research of Wen et al. [35] (2008), Zhu et al. [36](2014) and Zhu Aiping[20](2024), This study selects enterprise SIZE (SIZE), enterprise AGE (AGE), enterprise GROWTH (GROWTH), ownership concentration (TOP1), enterprise production conditions (EPC), the proportion of independent directors (IND), and employees' work efficiency (EWE). At the same time, the year (TEAR) and the registered region (Place) are controlled. See Table 1 for the names, codes and definitions of main variables.

Table 1. Definitions of main variables

Types of variables	Variable name	Code	Definition Instructions
Explained variable	Financial erformance	ROE	Net profit/net assets after tax
Explanatory variables	ESG	ESG2	According to the comprehensive score of ESG evaluation of China Securities
Mediating variable	Corporate credit rating	LC	According to CSMAR listed company credit rating
Moderating variables	Ownership concentration	TOP1	Shareholding ratio of the largest shareholder
Control variables	Enterprise size	SIZE	Natural logarithm of a business's total assets
	Age of business	AGE	Natural logarithm of firm age
	Firm growth	GROWTH	Operating profit growth rate
	Ownership concentration	TOP1	Shareholding ratio of the largest shareholder
	Enterprise production conditions	EPC	Natural logarithm of a firm's net fixed assets
	Proportion of independent directors	IND	Number of independent directors/total number of directors
	Employee productivity	EWE	Total profits/number of employees
	Effect of region	PLACE	(Dummy variable) Each place of incorporation corresponds to a dummy variable where the base place of incorporation is omitted

4.3 Model Construction

Firstly, F test was conducted on the sample data, and the result was F(33, 230) = 6.64, Prob > F = 0.0000, p value was less than 0.05, so the null hypothesis was rejected and the fixed effect model was selected. Then, the Hausman Test was used to judge the fixed effect model and the random effect model, and the result was chi2(7) = 42.25, Prob>chi2 = 0.0000, p value less than 0.05, so the fixed effect model was selected. Considering that the research time is short and the financial performance of real estate enterprises may be affected by the difference of registration place, this paper mainly conducts regression analysis with fixed individual and regional effects.

Based on the theoretical analysis, this part firstly constructs an empirical model to test the impact of real estate esg performance on financial performance, as follows: (1)

$$ROE_{i,t} = \alpha_0 + \alpha_1 ESG2_{i,t} + \alpha_{i,t} \sum Controls_{i,t} + \sum PLACE + \varepsilon_{i,t} \tag{1}$$

Where i represents individual and t represents time. ROE is the explained variable, representing return on equity. ESG2 is the core explanatory variable, representing the ESG comprehensive score of real estate enterprises. Controls are a series of control variables, including TOP1, SIZE, EPC, CROWTH, EWE, IND and AGE, which affect corporate financial performance. At the same time, the dummy variable of region effect PLACE is added. ε is the random error term.

In order to verify the moderating effect of ownership concentration (TOP1) on the relationship between ESG performance and enterprise performance, the first-order interaction term TOP1×ESG2 of ownership concentration and ESG performance is introduced to set Model (2).

$$ROE_{i,t} = \alpha_0 + \alpha_1 ESG2_{i,t} + \alpha_2 TOP1_{i,t} + \alpha_3 TOP1_{i,t} \times ESG2_{i,t} + \alpha_{i,t} \sum Controls_{i,t} + \sum PLACE + \varepsilon_{i,t} \tag{2}$$

Where i denotes individual and t denotes time. ROE is the explained variable and represents return on equity; ESG2 is the core explanatory variable, representing the ESG comprehensive score of real estate enterprises. In order to study the moderating effect of ownership concentration of real estate enterprises (TOP1), TOP1 is removed from the control variable Controls, SIZE, EPC, CROWTH, EWE, IND and AGE are retained, and the dummy variable PLACE of region effect is added. ε is the random error term.

In order to test the impact mechanism of enterprise ESG performance on financial performance, this paper refers to the mediating effect analysis method of Jiang Ting (2022), and only examines the impact of explanatory variables on mediating variables in the empirical analysis, so as to avoid the problem of inconsistent estimation of direct effect coefficient [37]. Therefore, on the basis of Model (1), this paper adds enterprise credit level (LC) to construct mediating effect model (3), so as to explore the role of enterprise credit level in the relationship between ESG performance and financial performance.

$$LC_{i,t} = \alpha_0 + \alpha_1 ESG2_{i,t} + \alpha_{i,t} \sum Controls_{i,t} + \sum PLACE + \varepsilon_{i,t} \tag{3}$$

Where i represents the individual and t represents time. The explained variable LC is the enterprise credit level, and the core explanatory variable ESG2 is the ESG2 comprehensive score of real estate enterprises. Controls refers to the control variables that affect the financial performance of enterprises, including TOP1, SIZE, EPC, CROWTH, EWE, IND, AGE, and the dummy variable PLACE representing the regional effect. ε is the random error term.

5 Empirical Results and Analysis

5.1 Descriptive Statistical Analysis

In order to preliminarily understand the characteristics of variables, the sample size, mean, standard deviation, minimum and maximum values of each variable are described in detail in this section.

Table 2. Descriptive statistics of main variables

Variables	Sample size	Mean	Standard deviation	Minimum	Maximum
ESG1	272	5.158	0.838	3	7
ESG2	272	78.27	3.985	69.2	86.21
ROA	272	0.02	0.021	-0.066	0.085
ROE	272	0.076	0.088	-0.298	0.291
LC	272	8.493	0.426	8	9
TOP1	272	43.215	12.923	15.24	80.65
SIZE	272	24.923	1.315	22.606	28.195
EPC	272	19.964	1.85	15.436	23.274
CROWTH	272	0.037	1.347	-4.349	6.933
EWE	272	910909.29	1151213.4	-2903685.5	4252311
IND	272	0.384	0.078	0.231	0.583
AGE	272	3.284	0.185	2.565	3.638

According to the descriptive statistics in Table 2, the mean value of ROA is 0.02, the maximum value is 0.085, and the minimum value is − 0.066, indicating that the level of financial performance of enterprises varies greatly. The mean value of corporate credit level LC is 8.493, the standard deviation is 0.426, the minimum value is 8, and the maximum value is 9, indicating that there are differences in corporate credit levels and they need to be improved. The mean value of ESG2 performance is 78.27, and the difference between the minimum value and the maximum value is 17.01, indicating that there are significant differences in the ESG performance of listed real estate companies. There are gaps in the control variables across firms, which may have an

impact on firm performance. The mean value of VIF among variables is 1.74, which is much less than 10, indicating that the multicollinearity problem is small.

5.2 Benchmark Regression Analysis

When studying the impact of ESG performance on financial performance of real estate enterprises, the basic regression analysis of corporate ESG on financial performance is necessary. Column (1) of Table 3 shows that enterprise ESG performance is significantly positively correlated with financial performance at the 10% level. Hypothesis H1 is proved. This shows that the improvement of ESG performance not only does not increase costs and affect profits, but also brings more financing opportunities and resource advantages, reduces operational risks, wins a more favorable operating environment, affects the decisions of stakeholders, expands market share, and significantly promotes the improvement of financial performance.

5.3 Analysis on the Moderating Effect of Ownership Concentration

In the research on the influence mechanism of ESG performance on financial performance of real estate enterprises, ownership concentration as a moderating variable is of great significance. As real estate enterprises are usually characterized by capital intensive, long project cycle and strong regional characteristics, their governance structure is relatively complex, and the degree of ownership concentration directly affects the efficiency of corporate decision-making and long-term development. ESG practice emphasizes sustainable development and social responsibility. Ownership concentration may affect the company's investment in ESG improvement and its emphasis on long-term strategic planning, which will further affect investors' evaluation and investment confidence in the company. Therefore, ownership concentration should be considered in the study to fully understand the relationship between ESG practices and corporate financial performance.

Therefore, on the basis of Column (1) of Table 3, the interaction term between ownership concentration and corporate ESG performance is added, and TOP1 and ESG2 are centralized. The regression results are shown in Column (2) of Table 3, the coefficient of the interaction term is significantly negative at the level of 5%, indicating that the reverse impact of ESG performance on financial performance is enhanced, and the ownership concentration plays a reverse moderating role. Hypothesis H2 is proved.

Possible reasons include: high ownership concentration leads to enterprises being controlled by a small number of large shareholders, who may focus too much on short-term interests and ignore long-term sustainable development. At the same time, high ownership concentration may make the management lack of supervision and constraints, leading to self-interested behavior of the management and neglect of ESG performance. In addition, high ownership concentration may also lead to less democratic and transparent decision-making, which may affect ESG performance. Therefore, ownership concentration plays a reverse moderating role in the relationship between ESG performance and financial performance.

5.4 Mediating Effect Analysis of Corporate Credit Level

Due to the capital-intensive, long-term investment, strict risk management and compliance requirements of the real estate industry, as well as consumers' attention to social responsibility, enterprises with good ESG performance usually get higher credit ratings, thus obtaining more favorable financing conditions in the capital market. In addition, good ESG performance helps to enhance brand image, attract consumers, and improve sales and financial performance. In the real estate industry with fierce competition and frequent cooperation, enterprises with good ESG performance are more likely to gain the trust of partners, so as to obtain more favorable cooperation conditions. Therefore, when studying the impact of ESG performance on financial performance of real estate enterprises, it is crucial to explore the intermediary role of enterprise credit level.

The test results are shown in the table. Column (3) of Table 3 shows that the coefficient of corporate ESG performance on corporate credit level is significantly positive, indicating that corporate credit level plays a mediating role between ESG performance and financial performance. Hypothesis H3 is proved. This may be because good ESG performance improves corporate reputation and image, enhances investor confidence, and thus improves corporate credit level. Enterprises with high credit level are more likely to obtain more financing channels and lower costs, which improves their financial performance. At the same time, good ESG performance means that enterprises are better able to cope with environmental, social and governance risks, reduce the overall risk level, and improve their credit rating and financial performance. Therefore, ESG performance enhances financial performance by improving the credit level.

Table 3. Multiple regression analysis

Variables	(1)	(2)	(3)
	ROE	ROE	LC
ESG2	0.091 *	0.082 *	0.038 * *
	(1.855)	(1.685)	(2.394)
TOP1		0.164	
		(1.244)	
TOP1*ESG2		-0.128 * *	
		(-2.546)	
Controls	Control	Control	Control
_cons	0.004	-0.023	0.066 * * *
	(0.128)	(-0.637)	(5.950)
Area effect	Yes	Yes	Yes
Individual effect	Yes	Yes	Yes
N	272	272	272
R^2	0.623	0.634	0.362
F	47.579	44.021	16.282

Note: ***p<0.01, **p<0.05, *p<0.10.

5.5 Robustness Test

5.5.1 Instrumental Variable Test.

In order to minimize the endogeneity problem caused by bidirectional causality between ESG performance and enterprise performance, this paper, on the one hand, measures the variables except the explained variables by one lag (LESG), and the regression results are shown in columns (1) and (2) of Table 4 below, which are consistent with the above, that is, good ESG performance can improve enterprise performance; On the other hand, the instrumental variable method is adopted, referring to the research of Gao et al.[38], and the mean ESG performance (ESG3) of all listed companies in the same year in the city where they are registered is used as the instrumental variable for 2SLS test. The relevant regression results are shown in columns (3) and (4) of Table 4 below. The coefficient of ESG2 is 0.877, which is significant at the level of 1% and consistent with the benchmark regression results, indicating that the research conclusion has certain robustness.

Table 4. Endogeneity test

Variables	(1)	(2)	(3)	(4)
	first	second	first	second
	ESG2	ROE	ESG2	ROE
LESG	0.599 * * *			
	(10.295)			
ESG2		0.431 * * *		0.877 * * *
		(4.853)		(3.489)
ESG3			0.249 * * *	
			(-3.893)	
_cons	-0.0812	-0.0293	0.00574	0.00320
	(-1.510)	(-0.597)	(0.102)	(0.058)
Controls	Control	Control	Control	Control
Observations	238	238	272	272
R^2	0.381	0.468	0.146	0.171

Note: ***p<0.01, **p<0.05, *p<0.10.

5.5.2 Substitution Variable Test.

In order to verify the reliability of the research conclusions and avoid the influence of the selection of specific variables, this paper will replace the key variables to ensure the stability of the conclusions and provide more accurate decision-making basis for policy makers and enterprises.

(1) The explanatory variables are replaced. ESG performance is divided into nine levels according to China Securities ESG rating from high to low: AAA, AA, A, BBB, BB, B, CCC, CC and C. This paper assigns 9 to 1 points respectively to quantify ESG performance, and the higher the score is, the better the enterprise's ESG performance is. The regression results are shown in Column (1) of Table 5. The results show that the overall ESG performance of the enterprise is significantly positively correlated with the

financial performance of the enterprise. Then, the moderating effect and mediating effect are tested according to the above method, and the results are shown in columns (2) and (3) of Table 5, and the results are still significant. It shows that ownership concentration has a moderating effect on the relationship between ESG performance and corporate performance, and corporate credit is the mediating variable between ESG and corporate financial performance, which supports the previous research conclusions.

(2) Changing the explained variable. Return on assets (ROA) is taken as the explained variable. Firstly, the relationship between corporate ESG performance and corporate financial performance is tested. The regression results are shown in Column (4) of Table 5 below. The results show that the coefficient of ESG2 is 0.119, which is positive at the level of 1%. Secondly, the robustness of the moderating effect of ownership concentration is verified, and the results in Column (5) of Table 5 below show that the coefficient of the first-order interaction term is significantly negative at the level of 1%, indicating that ownership concentration still has moderating effect. Finally, the mediating effect of corporate credit level is tested, and the results are shown in Column (6) of Table 5, which is still positive and significant, namely, corporate credit level positively affects corporate financial performance.

Table 5. Changes the variable test

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	ROE	ROE	LC	ROA	ROA	ROA
ESG1	0.101 * *	0.093 * *	0.028 *			
	(2.146)	(2.000)	(1.831)			
TOP1		0.158			-0.020	
		(1.195)			(-0.190)	
TOP1*eESG2		-0.128 * *			-0.087 * *	
		(2.547)			(2.202)	
ESG2				0.119 * * *	0.113 * * *	
				(3.115)	(2.971)	
LC						0.426 * * *
						(2.682)
Controls	Control	Control	Control	Control	Control	Control
_cons	0.005	-0.023	0.066 * * *	0.009	-0.010	-0.019
	(0.133)	(-0.633)	(5.929)	(0.327)	(-0.343)	(-0.651)
Effect of region	Yes	Yes	Yes	Yes	Yes	Yes
Individual effect	Yes	Yes	Yes	Yes	Yes	Yes
N	272	272	272	272	272	272
R^2	0.625	0.636	0.355	0.676	0.683	0.673
F	47.960	44.370	15.828	60.029	54.790	59.098

Note: ***p<0.01, **p<0.05, *p<0.10.

5.6 Heterogeneity Test

Table 6. Heterogeneity analysis

Variables	Non-state-owned enterprises	State-owned enterprises	Non-yangtze River Delta region	It is the Yangtze River Delta region
	ROE	ROE	ROE	ROE
ESG2	0.111	0.094 * *	0.130 *	0.021
	(0.710)	(2.019)	(1.942)	(0.319)
_cons	-0.633 *	0.000	0.162 * *	-0.020
	(-1.880)	(0.000)	(2.392)	(-0.252)
Region effect	Yes	Yes	No	No
Individual effect	Yes	Yes	Yes	Yes
N	56	216	144	128
R^2	0.682	0.658	0.725	0.532
F	11.003	43.446	38.953	14.799

Note: ***p<0.01, **p<0.05, *p<0.10.

As shown in Table 6, when analyzing the impact of ESG performance on financial performance of real estate enterprises, this paper finds that there is significant heterogeneity, which is closely related to the nature of the enterprise and the geographical location.

First of all, from the perspective of enterprise nature, the impact of ESG performance on financial performance of non-state-owned real estate enterprises is not significant, and the coefficient is 0.111. This may be due to the relative disadvantage of non-soes in resource acquisition and policy support. In order to survive in market competition, non-soes may pay more attention to short-term interests and ignore the importance of ESG. In addition, non-soes have flexible governance structures and insufficient supervision and constraints on ESG, which leads to the insignificant impact of ESG on financial performance.

However, the impact of ESG on financial performance of state-owned real estate enterprises is significant, with a coefficient of 0.094, reaching the significance level of 5%. This may be because state-owned enterprises undertake more social responsibilities and are subject to more government and social supervision. Under the policy and market environment, soes are more active in ESG, which has a positive impact on financial performance. In addition, state-owned enterprises have a standardized governance structure and strict supervision and constraints on ESG, which helps to improve ESG performance and, in turn, financial performance.

Secondly, from the perspective of geographical location, the ESG performance of real estate enterprises in non-Yangtze River Delta region has a significant impact on

financial performance, with a coefficient of 0.130, reaching the significance level of 10%. This may be due to the fact that non-Yangtze River Delta real estate enterprises have less competition and more resources to invest in ESG to improve financial performance. At the same time, the policy environment in the non-Yangtze River Delta region may be relaxed, and the ESG pressure of enterprises is low, which is conducive to independent investment in ESG and improve financial performance.

However, the impact of ESG performance on financial performance of real estate enterprises in the Yangtze River Delta region is not significant, and the coefficient is only 0.021. This may be related to the fierce market competition and enterprises' focus on short-term interests. Enterprises may devote more resources and energy to business expansion and market share competition, and neglect ESG input. At the same time, strict policy environment and high ESG pressure may also lead to insufficient ESG investment, thus affecting financial performance.

6 Research Conclusions and Implications

6.1 Research Conclusions

Based on the sample of listed real estate companies in China from 2016 to 2023, this paper studies the relationship between ESG performance and corporate performance of listed real estate companies, explores the moderating effect of ownership concentration on this relationship, and empirically analyzes the mediating effect of corporate credit level.

The study finds that good ESG performance of enterprises promotes the improvement of enterprise performance, and this promotion effect is persistent. Ownership concentration negatively moderates the relationship between enterprise ESG performance and enterprise performance, and enterprise credit level plays a positive mediating role between ESG performance and enterprise performance. Further research finds that under different ownership types, good ESG performance of state-owned real estate enterprises will significantly improve their financial performance; Under different regional characteristics, the good ESG performance of real estate enterprises in non-Yangtze River Delta region has a significant role in promoting the financial performance of enterprises.

6.2 Research implications

At the enterprise level, companies must acknowledge the positive impact of ESG performance on financial performance and develop strategic responses. This includes increasing ESG investments, improving management practices through clear ESG strategies, optimizing organizational structures, and enhancing information transparency. Furthermore, companies should recognize the negative influence of excessive ownership concentration on ESG adoption, striving for a balance that allows ESG to flourish. Finally, companies should leverage the positive mediating effect of credit level by improving their creditworthiness, thereby reducing financing costs and strengthening market competitiveness.

At the government level, policymakers have a crucial role to play in fostering the relationship between ESG and real estate performance. This involves strengthening ESG performance oversight, enacting and refining relevant laws and regulations, and guiding companies to prioritize ESG considerations. Furthermore, the government should regulate the real estate market, optimize the business environment, and ensure a level playing field. Government initiatives should also consider the specific impacts of different ownership structures and regional variations, promoting ESG improvement among state-owned enterprises and supporting non-Yangtze River Delta real estate companies, ultimately driving regional coordinated development.

At the societal level, all stakeholders must engage in promoting ESG performance within the real estate sector. Investors should adopt ESG investment principles, direct funds towards companies with strong ESG performance, and encourage overall improvement. Consumers should be aware of ESG performance and prioritize companies demonstrating social responsibility and sustainable practices, incentivizing ESG integration and product quality enhancement. Media and the public must play a vital role in holding companies accountable through public opinion oversight, encouraging better ESG management and elevating the social image of the real estate sector.

6.3 Research Limitations

In this paper, when analyzing the impact of ESG performance on corporate financial performance, my academic level is limited, and I am also affected by time, energy and some objective factors, so that the research perspective is not comprehensive enough.

(1) Limitations of research content. ESG construction is a long-term process, and the impact of the relationship between ESG performance and corporate financial performance can be studied from both long-term and short-term perspectives. This paper only studies the mediating effect of the credit level of real estate enterprises, and other influencing mechanisms between the ESG performance of real estate enterprises and the financial performance of enterprises can be further explored in the future.

(2) Limitation of variable selection. In the selection of explanatory variables, this paper mainly chooses the ESG comprehensive score index of Shanghai China Securities Index Information Service Co., LTD., mainly from the perspective of comprehensive performance, but does not divide it into environmental performance, social performance, corporate governance performance and other levels to explore its mechanism of action on real estate enterprises. In the future, we can study the influence mechanism of ESG on real estate enterprises from each dimension. In terms of the selection of explained variables, this paper mainly chooses ROE and ROA, and mainly measures the financial performance of real estate enterprises from the perspective of profit, while ignoring the impact of debt repayment, operation and growth on financial performance. In the future, entropy method and other comprehensive evaluation methods can be used to construct a multi-dimensional enterprise financial performance evaluation system based on the four key dimensions of earnings quality, debt paying ability, asset operation efficiency and business growth.

(3) Although there are many ESG rating agencies in China, the rating system is not unified, so the ESG scoring data used may not fully and accurately reflect the ESG performance of real estate enterprises.

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