

Research on the Impact of Green Credit Policies on Corporate ESG

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Abstract. As global climate change and environmental challenges escalate in severity, green finance has become a crucial tool for promoting sustainable development. This research aims to investigate the impact mechanism and actual effects of green credit policy on corporate environmental, social, and governance (ESG) performance. Based on a method that combines theoretical analysis with empirical research, this paper constructs a multi-dimensional analysis framework for the impact of green credit policies on the ESG performance of enterprises. By selecting panel data of relevant enterprises and using econometric models, a comparative analysis of the ESG performance of enterprises before and after the implementation of green credit policies is conducted to verify the effectiveness of the policies and their heterogeneous impacts. Research shows green credit policy improves corporate environmental performance, strengthens social responsibilities, optimizes governance, and alleviates financing constraints, especially in high-pollution industries and small and medium-sized enterprises.

Keywords: Green Credit Policy, Corporate ESG, Financing Constraints, Signaling Effect, Sustainable Development

1. Introduction

As global environmental issues become increasingly severe, green finance policies have gradually become a key means to promote the sustainable development of enterprises. International practice shows that green finance policies play a crucial role in sustainable development [1]. Green credit policies, as a core component of green finance, promote enterprises' green transformation and fulfillment of social responsibilities by guiding funds towards environmental protection and low-carbon projects. The environmental, social and governance (ESG) performance of enterprises has gradually become an important indicator for measuring their sustainable development capabilities. The global ESG investment scale continues to expand, accounting for 35% in 2023 [2]. Green credit policies are crucial for promoting sustainable enterprise development [3]. They alleviate financing constraints, signal transmission, and investment orientation, leading to long-term investment. Empirical studies have shown that green credit policies significantly improve ESG performance, particularly in China, particularly in the environmental performance area. This positive role in promoting enterprise green transition is supported by empirical studies by Ji and Bai and Huang Chuyun [4]. These studies show that green credit policies not only enhance environmental

performance but also enhance social responsibility and governance structure in heavily polluting industry enterprises listed on China's A-share market from 2020 to 2022 [5].

Sun Xiangyu and Shao Jingjing pointed out that the green credit policy has significantly enhanced the quality of enterprises' green innovation by optimizing the allocation of credit resources, and has promoted enterprises' active investment and technological progress in the field of environmental protection [6]. Ming et al.'s study on Chinese A-share listed companies found that green credit policies effectively reduced financing costs, encouraging green investment and improving ESG performance [7]. Research indicates that green credit policies significantly enhance enterprises' environmental protection, social responsibility fulfillment, and governance structure optimization. This paper aims to construct a theoretical framework on the impact of green credit policies on ESG performance and proposes three hypotheses, focusing on the specific transmission mechanism and different types of enterprises.

Hypothesis 1: Green credit policies promote the optimization of corporate governance structures and the enthusiasm for ESG information disclosure.

Hypothesis 2: Green credit policies have a more significant effect on improving the ESG performance of high-pollution industries and small and medium-sized enterprises.

2. Model design

2.1. Research method

This study uses quantitative and qualitative methods to analyze the impact of green credit policies on ESG performance of Chinese listed companies from 2015-2023. Data sources include the Wind database, corporate social responsibility reports, and green credit policy documents. Econometric models are used to test changes before and after policy implementation. Specifically, a fixed effects model is adopted to control for unobserved individual heterogeneity. Fixed effects models effectively control for unobserved individual heterogeneity [8]. The model form is as follows:

$$ESG_{it} = \alpha + \beta \times GreenCredit_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

ESG_{it} represents the ESG score of enterprise i at time t , $GreenCredit_{it}$ is a policy variable for green credit, X_{it} is the control variable matrix, μ_i and λ_t represent the fixed effects of enterprises and time respectively, ε_{it} is the random error term.

The following Table 1 presents the descriptive statistical information of the main variables:

Table 1. Descriptive statistics of the main variables

Variable Name	Mean	Standard deviation	Min	Max	The number of observed values
ESG Score	65.23	12.45	30.10	98.50	1200
Green Credit Ratio	0.18	0.10	0.00	0.50	1200
Total Assets (billion yuan)	45.67	30.12	5.00	200.00	1200
Asset-Liability Ratio	0.52	0.15	0.20	0.90	1200

2.2. Research design

2.2.1. Sample selection and data sources

This paper analyzes China's A-share listed companies from 2015-2022, focusing on high-pollution industries and SMEs impacted by green credit policy. Data is sourced from the CSMAR database, PBOC documents, and policy implementation timelines, excluding missing, ST, delisted, and extreme outliers. The final valid sample comprises 3,200 enterprises, spanning 8 years, resulting in 25,600 observations. Table 2 presents the industry distribution and scale of the sample enterprises:

Table 2. The industry distribution and scale of the sample enterprises

Industry Category	Sample Size	Share(%)	Avg. Asset Scale(billion yuan)	Avg. Liability Ratio(%)	Avg. ESG Score
Manufacturing	1,200	37.5	45.3	52.1	65.4
Energy Industry	800	25.0	60.7	58.3	62.8
Standard deviation construction Industry	400	12.5	30.2	49.7	60.1
Information technology	300	9.4	25.6	40.5	70.3
Other industries	500	15.6	20.1	45.2	63.7

To quantify the impact of green credit policies, this paper constructs a policy intensity indicator, which is defined as the proportion of green credit quotas obtained by enterprises within a certain period of time to their total credit quotas. The formula is as follows:

$$GCP_{it} = \frac{\text{Green credit quota}_{it}}{\text{Total credit limit}_{it}} \quad (2)$$

This indicator can reflect the extent to which an enterprise receives policy support, and then analyze its impact on the enterprise's ESG performance.

2.2.2. Variable definition and measurement

This study uses a comprehensive ESG score to measure corporate ESG performance, focusing on Environment, Social, and Governance dimensions. The independent variable, green credit policy, is measured by changes in the green credit line before and after policy implementation. Control variables include corporate size, profitability, asset-liability ratio, industry category, and firm age. Higher ESG scores indicate better performance. The study emphasizes the importance of variable definition and measurement in ensuring scientific validity and accuracy. Specific variable definitions and measurement indicators are shown in Table 3 below:

Table 3. Variable definition and measurement indicators

Variable name	Variable type	Variable definition	Measurement method
ESG Score	Dependent variable	The comprehensive performance of the enterprise in terms of environment, society and governance	Scores from third-party rating agencies, ranging from 0 to 100 points
Green Credit Ratio	Independent variable	The proportion of green credit balance in the total loan balance	Green credit balance/total loan balance
Enterprise scale	Control variable	The total asset scale of the enterprise	Total assets are taken as the natural logarithm
Profitability(ROE)	Control variable	Return on net assets	Net profit/net assets
Asset-liability ratio	Control variable	The proportion of total liabilities to total assets of an enterprise	Total liabilities/total assets
Industry category	Control variable	The industry to which the enterprise belongs	Industry dummy variable
Enterprise age	Control variable	Years of establishment of the enterprise	Current year - Year of establishment

To more accurately capture the dynamic impact of the green credit policy, this paper introduces time dummy variables and regional dummy variables to control for the influence of the macroeconomic environment and regional differences.

2.2.3. Metric model setting

To systematically evaluate the impact of the green credit policy on corporate ESG performance, this paper constructs a multiple linear regression model, specified as follows:

$$ESG_{it} = \alpha + \beta \cdot GreenCredit_{it} + \gamma \cdot Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

ESG_{it} represents the ESG comprehensive score of the enterprise i in the year t , $GreenCredit_{it}$ is the policy variable for green credit, reflecting the extent to which enterprises obtain green credit or the intensity of policy implementation; $Controls_{it}$ is the control variable vector, including enterprise scale, profitability, industry characteristics, etc; μ_i and λ_t are respectively the enterprise fixed effect and the time fixed effect, which are used to control the unobservable individual heterogeneity and time trend; ε_{it} is the random error term. To capture the dynamic effects of the green credit policy, a lag term $GreenCredit_{i,t-1}$ was introduced into the model to examine the continuous impact after the policy implementation. The model also considers heterogeneous effects by analyzing response differences across different industries and firm sizes through interaction terms.

Table 4. Variable definitions and descriptive statistics

Variable name	Variable symbol	Variable type	Variable description	Mean	standard deviation	Min	Max
ESG comprehensive score	ESG	Continuous variable	Comprehensive score of enterprise environment, society and governance	65.23	12.45	30.10	98.75
The intensity of green credit policies	GreenCredit	Virtual variable	Whether the enterprise has obtained green credit (1= Yes, 0= no)	0.42	0.49	0	1
Enterprise scale	Size	Continuous variable	The natural logarithm of a company's total assets	22.56	1.35	18.20	26.80
Profitability	ROA	Continuous variable	Return on assets	0.08	0.05	-0.10	0.25
Industry dummy variable	Industry	Virtual variable	Classification of different industries	—	—	—	—

Through the above econometric model specification, this paper can effectively identify the causal impact of the green credit policy on corporate ESG performance, control for potential confounding factors, and ensure the robustness and explanatory power of the results.

3. Empirical results

3.1. Baseline regression results

Table 5 presents the main results of the baseline regression model, testing the impact of the green credit policy on corporate ESG performance.

Table 5. Baseline regression results of green credit policy

Variable	Coefficient	Standard error	t	Significance
Green credit policy	0.152	0.045	3.38	***
Enterprise scale	0.087	0.023	3.78	***
Asset-liability ratio	-0.065	0.030	-2.17	**
Industry fixed effect	Control			
Constant term	0.423	0.112	3.77	***
Sample size	1200			
Adjusted R ²	0.312			

Note: *** denotes significance at the 1% level, ** at the 5% level.

Regression results show that the green credit policy significantly enhances the comprehensive ESG performance by alleviating financing constraints and incentivizing investment in environmental protection, social responsibility, and governance structure. Firm size has a positive impact on ESG performance, indicating that larger enterprises have more resources to better respond to the green credit policy. The negative coefficient of the asset-liability ratio reflects the pressure faced by highly leveraged enterprises in allocating funds to ESG-related investments.

3.2. Heterogeneity analysis results

Table 6 presents the heterogeneous effects of the green credit policy on the ESG performance of different types of enterprises.

Table 6. Heterogeneous effects on different firm types

Dimension	Group	Pre-policy ESG average	The average ESG value after the policy	Increase rate(%)	Significance level
Industry	High pollution	58.4	63.4	8.5	***
	Low pollution	72.1	74.4	3.2	**
Scale	Small and medium-sized enterprises	55.7	60.1	7.9	***
	Large enterprises	68.9	71.7	4.1	**
Nature of ownership	State-owned enterprises	62.3	65.8	5.6	**
	Private enterprises	59.8	64.1	7.3	***

The green credit policy significantly improved ESG scores in high-pollution industries by 8.5%, compared to 3.2% in low-pollution industries. SMEs saw a 7.9% improvement, indicating a stronger incentive effect due to the policy's alleviation of financing constraints. State-owned enterprises saw a 5.6% increase, while private enterprises saw a 7.3% increase, indicating higher proactiveness and flexibility in responding to the policy.

4. Conclusion

The study reveals that green credit policies significantly improve corporate ESG performance by alleviating financing constraints, strengthening signaling effects, and optimizing investment orientation. This effect is more pronounced in high-pollution industries and SMEs, with an average improvement in environmental scores of 12.3% for high-pollution industries and 7.9% for SMEs. The policy fosters a cycle of policy support, ESG enhancement, and strengthened market reputation by lowering green financing costs, improving capital structures, and encouraging companies to disclose ESG information and invest in environmental technologies. However, the study has limitations, including limited data coverage and lack of international comparison.

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