Research on the Impact of Green Finance on the Performance of Small, Medium and Micro Enterprises

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Abstract. The development of green finance is one of the paths to realize the sustainable development of contemporary society, and the flourishing development of green finance also promotes the progress of China's micro and small economies. In this chapter, we construct a combination of green finance index of each province and city and China's micro, small and medium-sized companies survey (CMES) to explore the effect of China's green finance development on the performance of micro, small and medium-sized companies. The study concludes that: green finance can expand the investment channels of small and medium-sized firms to improve their performance; green finance has a more significant effect on the performance improvement of enterprises entering industrial parks compared to those not entering the parks; and when the development of green finance is greater than a certain level, the promotional effect of finance on the performance of micro and small firms is significantly enhanced.

Keywords: Green finance; Micro and Small enterprises; Business performance

1 Introduction

Currently MSMEs, as an important part of the economic system, play a key role in market adaptation, job creation and local economic development with their flexibility and innovation. They usually demonstrate a high degree of specialization and personalized services in their respective fields, despite the many challenges they face in the context of financing, market competition and the impact of globalization. Supportive policies from the government and the community, such as tax incentives, loan assistance and training programs, are essential to promote the steady growth and innovative capacity of these enterprises.

Green finance provides financial support for environmental protection and low-carbon projects mainly through diversified financial instruments such as green credit and green bonds, it supports the green transformation of the economy. Regarding empowering the real economy, green finance injects vitality into the sustainable development of small and micro-enterprises through the provision of financial support, risk management, incentives for technological innovation, access to policy preferences, transparency enhancement, expansion of international cooperation, participation in the carbon

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market, green ratings and certification, as well as supply-chain financing, etc., and helps them to realize the two objectives of environmental preservation and social responsibility while lowering costs, improving efficiency, and enhancing competitiveness, promoting economic development, and promoting the green transformation of the economy. It assists them in achieving the twin objectives of social responsibility and environmental preservation while lowering expenses, increasing productivity, and boosting competitiveness. It also encourages the peaceful coexistence of the economy and ecological.

2 Literature Review and Research Hypoyhesis

The intersection of green finance and MSME performance has garnered increasing scholarly attention. Zhang and Cheung (2025)[1] provide critical insights into China's green finance reform pilot zones, revealing that green finance and inclusive finance act as complementary forces in enhancing MSME performance through resource allocation optimization and environmental risk mitigation. This aligns with Khan et al. (2025)[2], who emphasize technology-driven pathways, demonstrating how AI applications in blockchain and closed-loop supply chains facilitate sustainable transitions for MSMEs. Meanwhile, Paweehirunkrai and Pankham's (2025)[3] integrated analysis of Thai SMEs identifies organizational resilience as a performance determinant, suggesting green financing could strengthen such resilience through eco-innovation investments. Cross-regional studies further enrich this discourse: Zaidi et al. (2025)[4] highlight the mediating role of Industry 4.0 adoption in Brunei's MSMEs, implying synergies between green finance and digital transformation. Conversely, Novillo-Villegas et al. (2025)[5] present nuanced findings from Ecuador's industrial sector, where innovation-performance linkages exhibit contextual variability, underscoring the need for tailored green finance instruments. Collectively, these studies reveal multi-dimensional mechanisms—technological integration, institutional innovation, and adaptive financing models—through which green finance empowers MSMEs, while also highlighting regional disparities in implementation efficacy.

For small and micro-enterprises, Wen Hongxing (2021)[6] believes that it is different from other real economy, and it is more difficult to obtain funds in banks and other financial institutions, which is mainly due to the scale of small and micro-enterprises, the speed of capital flow, low fault-tolerance and other aspects of the unfavorable factors. The green credit policy and green bond policy included in green finance can empower the development of enterprises through easing their financing restrictions and concentrating on lowering the cost of debt. Based on this, this paper puts forward the following hypothesis:

H1: Green finance has a significant positive promotional effect on the performance of MSMEs.

Industrial parks are specific areas set up by governments or enterprises to promote industrial development, and they demarcate a specific area through various strategies, such as administrative guidance or market mechanisms. These zones will formulate detailed long-term and short-term development plans and policies to build and optimize

an environment suitable for enterprises to move in and grow. Li Shuo (2022)[7] shows that in the current domestic carbon peak carbon neutral context, it is an inevitable trend for all types of parks to move towards low carbon development. We consider that the direct effect of green finance on the performance improvement of enterprises in the zones may be more significant. In light of this, the following hypothesis is proposed in this paper:

H2: Green finance improves the performance of firms entering industrial parks more significantly than firms not entering the parks

There is a notable moderating influence of green finance on firm performance. However, this moderating effect is not static, but is impacted by the degree of progress in green finance. Specifically, while green finance development is still in its infant stages, the supportive effect of finance on enterprise performance is relatively limited. At this time, the coverage, efficiency and quality of financial services are limited to a certain extent, and it is difficult to meet the needs of the growing development within the enterprise. At the same time, owing to the various levels of economic development, industrial structure and the impact of environmental pollution on the development of green finance, the level of green finance development in the eastern region and the central and western regions shows obvious differences. Accordingly, this study proposes the following hypothesis:

H3: When the development of green finance is greater than a certain level, the promotional effect of finance on the performance of MSMEs is significantly stronger

To summarize, the research on green finance to empower the development of micro and small enterprises to promote their performance improvement has not been perfected, this paper will talk about the research from several perspectives and give the corresponding suggestions and countermeasures.

3 Research Design

3.1 Sample Sources

The green finance indicators of provinces and cities in 2014 were calculated by referring to the article of Zhou Chenying (2022)[8], as shown in Table 1. Among them, the MSME data are selected from the 2015 China Micro and Small Enterprises Survey (CMES) data provided by the China Household Finance Survey and Research Center of Southwestern University of Finance and Economics (SWUFE), which selects the basic information of 1,861 sample enterprises out of 5,497 MSMEs in 2014, and at the same time matches them with the green finance-related variables of 28 provinces and municipal areas (except Qinghai, Tibet, Xinjiang, Hong Kong, Macao, and Taiwan).

3.2 Selection of Variables

Explained variable: performance of MSMEs (y), referring to the practice of Yang Qijing et al. (2022)[9], the data of China Micro and Small Enterprises Survey (CMES) of Southwestern University of Finance and Economics were used to calculate the perfor-

mance of enterprises. Explanatory variables: green finance indicators (x) were calculated by entropy weight method for each province and city, and the indicators included in this indicator construction are shown in Table 1. Control variables include: enterprise size (using current total enterprise assets) (a), gender of the main owner (b), education of the main owner (c), industry dummy variable (m), regional dummy variable (n). Mediating variable: cost of R&D investment (d). Instrumental variable: whether the firm's geographical location is in an industrial park (h). The definitions of the main explanatory variables are shown in Table 2.

Table 1. Indicators involved in the construction of green finance indicators.

Level 1 indicators	Secondary indicators	Tertiary indicators	Definition of indicators	Indicator properties
Level of green finance development	green credit	Percentage of interest in energy-intensive industries	Interest on energy-intensive industrial estates/industrial estates	-
	Green Securities	Share of market capitalization of energy-intensive industries	Value of the six most energy-intensive A-shares/total A-share market capitalization	-
	green investment	Percentage of investment in environmental pollution	Investment in pollution control/GDP	+
	green insurance	Agricultural insurance is larger than	Agricultural insurance income/total agricultural market value	+
	carbon finance	carbon intensity	CO2 emissions/GDP	-

Table 2. Definition of main variables.

Variable type	variable name	variable symbol	variable measurement
explanatory variable	Corporate Performance	y	Logarithm of profit before tax/number of employees
explanatory variable	Green Finance Index	x	The entropy weight method calculates
control variable	Enterprise size	a	Logarithm of current assets of the enterprise
	Gender of main owner	b	Male = 1, Female = 0
	Main owner's academic qualifications	c	Never attended elementary school = 1, elementary school = 2, junior high school = 3, high school = 4, middle/vocational high school = 5, college/high school = 6, undergraduate degree = 7, master's degree = 8, doctoral degree = 9
	sector	m	18 ISIC and others
	shore	n	East = 1, Center = 2, West = 3

3.3 Modeling

To evaluate how green finance affects micro and small businesses' performance, the following model is constructed:

$$y_{s,q} = \alpha_0 + \alpha_1 x + \alpha_2 K_{s,q} + \varepsilon_{s,q} \quad (1)$$

(s) represents provinces, (q) represents individual micro and small enterprises, and (K) represents control variables. In the empirical test in order to test the impact of green finance on the performance of micro and small enterprises, the green finance province data are matched with individual micro and small enterprises. The empirical part of the article adopts OLS method for empirical test, if the regression coefficient is notably positive, the research hypothesis H1 is correct, that is, green finance improves the performance of micro and small enterprises.

4 Empirical Analysis

4.1 Descriptive Statistics of Key Variables

Due to some incomplete data, we extracted 1861 sample firms for data analysis. The digital finance index was matched to individual MSMEs through provinces. Table 3 displays descriptive statistics for the primary variables.

Table 3. Descriptive statistics of main variables.

variant	sample size	average value	statistics	Min value	Max value
y	1861	9.88	1.59	0.51	15.39
x	1861	0.27	0.15	0.16	0.68
a	1861	14.47	2.23	0	21.51
b	1861	1.16	0.37	1	2
c	1861	4.99	1.70	1	9
d	521	11.39	1.86	5.56	18.42
m	1861	7.72	6.86	1	19
n	1861	1.70	0.83	1	3
h	1861	1.75	0.43	1	2

4.2 Benchmark Regression

Analyzing the data according to the constructed model, the regression results in Table 4 test the impact of green finance on the performance of micro and small enterprises. The results show that green finance has a significant positive impact on the performance of micro and small enterprises, proving that hypothesis H1 is correct. Green finance optimizes the business model of micro and small enterprises to a certain extent, provides more green financial services including new financing channels, provides a sustainable development path for the operation of micro and small enterprises, and is conducive to improving enterprise performance.

Table 4. Benchmark regression results.

	(1)	(2)	(3)	(4)
x	1.139***	1.070***	1.067***	1.104***
	(0.152)	(0.116)	(0.116)	(0.117)
a		0.118***	0.117***	0.126***
		(0.045)	(0.005)	(0.008)
b			-0.146	-0.143
			(0.099)	(0.103)
c				-0.059**
				(0.024)
_cons	9.381***	7.565***	7.753***	7.873***
	(0.110)	(0.036)	(0.111)	(0.091)
Obs.	1861	1861	1861	1861
R-squared	0.055	0.078	0.079	0.083

Note: *** p<0.01, ** p<0.05, and *p<0.1, (Same below)

4.3 Robustness Tests

Table 5. Robustness test results.

	(1)	(2)
	one period behind	Substitution of explanatory variables
x1	0.997***	
	(0.119)	
x		0.698***
		(0.117)
a	0.126***	0.403***
	(0.007)	(0.012)
b	-0.143	-0.289***
	(0.101)	(0.090)
c	-0.058**	0.045
	(0.024)	(0.051)
_cons	7.861***	6.815***
	(0.108)	(0.038)
Obs.	1861	1861
R-squared	0.082	0.323

To further test the robustness of the analytical results of the benchmark model, the following robustness tests are conducted: first, lagging the core explanatory variables by one period. The results are shown in column (1) of Table 5; second, the explanatory variables are replaced, here replacing performance with the logarithm of corporate pre-tax profits. The results are shown in column (2) of Table 5. The results of all the above robustness tests show that the regression coefficient of the level of green finance devel-

opment on enterprise development is significantly positive. The results are still consistent with the main hypothesis under multiple robustness tests, again verifying that hypothesis H1 is valid.

4.4 Heterogeneity Analysis

This paper is based on whether the micro and small enterprises are located in industrial parks for the analysis of heterogeneity, as shown in Table 6, here defined as located in industrial parks value of 1, not located in industrial parks value of 2, the enterprise performance and whether it is located in industrial parks were regressed, resulting in the coefficient of the explanatory variables were 1.355, 1.031, the coefficients are all positive and are significant at the level of 1%. By comparing the size, the coefficient of enterprises located in industrial parks is larger, which means that the green finance promotion performance of MSMEs located in industrial parks is more significant. Generally speaking, generally speaking, there are certain constraints on the financing of micro and small enterprises, and the enterprises that have not entered the industrial parks have more stringent conditions for obtaining financing, and the corresponding time lag for green financial policies is longer. Therefore, hypothesis H2 holds.

Table 6. Heterogeneity test results.

	(1) industrial park	(2) Not in industrial parks
x	1.355***	1.031***
	(0.141)	(0.174)
a	0.248***	0.098***
	(0.012)	(0.006)
b	0.030	-0.200*
	(0.072)	(0.111)
c	0.010	-0.087**
	(0.050)	(0.042)
_cons	5.306***	8.472***
	(0.306)	(0.150)
Obs.	458	1403
R-squared	0.181	0.075

4.5 Threshold Effect Test

In order to verify whether there is a threshold for the promotional effect of the green finance development level on enterprise performance, this paper considers a threshold test for this cross-sectional data. This test takes the green financial index as the threshold variable without adding control variables, and the test results are shown in Table 7, with a regression coefficient of 1.130 and significant at the 95% level. Through the threshold test (Figure 1), it is concluded that there exists a threshold value of 0.228, and it is known that the maximum value of the green financial index (x) is 0.68, and the

minimum value is 0.16. According to the results of the threshold regression, when the green financial index is smaller than the threshold value, the regression result is significantly negative, with an impact coefficient of -3.627. When the green financial index is larger than the threshold value, the impact of green finance on the performance of micro and small enterprises is significantly positive. The regression coefficient is 0.444. The coefficient of green financial development is negative when it does not reach the threshold value, and the coefficient is significantly positive when it reaches the threshold value, which indicates that when the level of green financial development breaks through the threshold of 0.228, the green financial development has a more significant facilitating effect on the promotion of micro and small enterprises' performance, i.e., the hypothesis H3 is proved.

The reason for the existence of this threshold may be that in the early stage of green finance development, due to information asymmetry, insufficient product innovation and imperfect infrastructure, the promotion of financial development of high quality of micro and small enterprises is not significant, and even a lower level of green finance development may have a negative impact on enterprise performance, which can explain the results of the regression coefficients are negative. However, with the continuous development of green finance, improved information transparency, accelerated product and service innovation, as well as improved infrastructure and technical support, green financial empowerment of MSME performance gradually becomes significant. This indicates that the development level of green finance has an important impact on the relationship between finance and MSME performance, and that a high level of green finance can more effectively promote enterprise performance to achieve high-quality development.

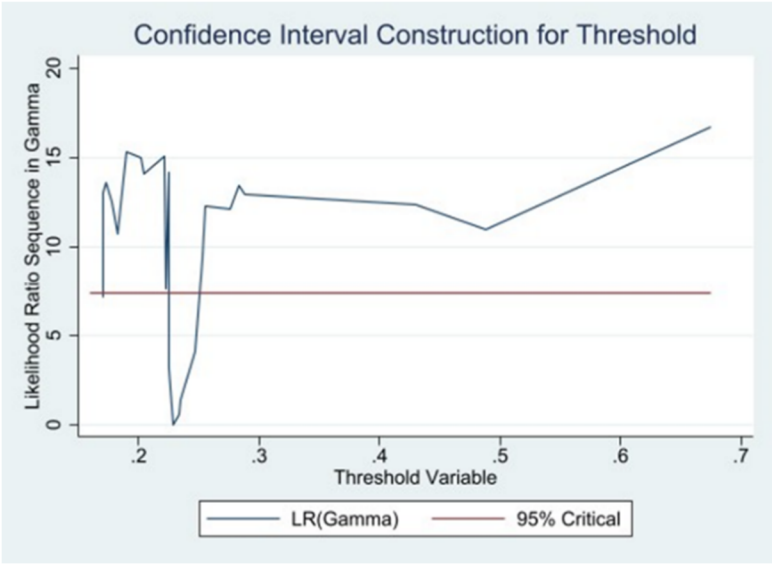

Figure 1. Schematic diagram of threshold test results (LR curve)

Table 7. Threshold presence test results.

Global OLS Estimation, Without Threshold	
x	1.130***
	(0.259)
Observations	1861
R-squared	0.011
Heteroskedasticity Test (p-value)	0.513
Threshold Estimation	
Threshold Estimate	0.228
95% Confidence Iterval	[0.170,0.246]
Joint R-Squared	0.022
Heteroskedasticity Test (p-value)	0.513

5 Conclusion

This paper examines the impact of the development of green finance on the performance of micro and small enterprises by combining the 2015 China Micro and Small Enterprises Survey (CMES) data with the green finance index of each province and city calculated by the entropy weight method. The study concludes that (1) The performance of MSMEs is considerably enhanced by green finance. This role is primarily to optimize the financing channels of micro and small businesses by offering green loan, green insurance, green investment, and other financial products, alleviating the problem of poor financing and difficult financing of micro and small enterprises. (2) Compared with the enterprises that have not entered the park, green finance has a more noticeable impact on the performance improvement of enterprises entering the industrial park. Enterprises that respond faster to green finance policies can develop themselves better, which is exactly the advantage of the environment in which the micro and small enterprises in industrial parks are located, so as to improve their performance faster. (3) When the development of green finance is greater than a certain level, the promotional effect of finance on the performance of MSMEs is significantly enhanced. Through empirical tests with the help of the green credit index, the empowering effect is more significant when the level of green financial development exceeds a certain threshold value. The following policy recommendations are given based on the findings of the study:

First, focus on the extension and promotion of green finance, give full play to the core role of green finance to broaden the financing channels of micro and small enterprises, keep a healthy amount of liquidity on available, establish a favorable financial and monetary climate for micro and small business funding, and increase how convenient it is to finance micro and small businesses.

Secondly, we should support the green and low-carbon development of micro-, small- and medium-sized enterprises (MSMEs), increase funding for the research and development of green and low-carbon technologies for MSMEs, and guide the vertical

development of green finance. Tax reductions and exemptions can be provided for innovation inputs by MSMEs to reduce non-essential R&D expenditures. Meanwhile, through the innovation of green financial products, more financing channels and preferential conditions are provided for small and micro enterprises.

Thirdly, green supply chain finance should be developed to include small and microenterprises in the supply chain in the scope of green financial policies, provide green credit support, and encourage core enterprises to establish a green supply chain system to realize the green transformation of the entire supply chain. First, banks and financial institutions are encouraged to provide preferential credit products for supply chain enterprises that meet green standards, such as lowering lending rates and providing green credit lines.

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