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The Impact of Eco-economic Policies on Financing Costs of Smes: The Regulatory Effects of Green Credit Mechanisms

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ABSTRACT

Driven by the global ecological environment deterioration and sustainability agenda, ecological economic strategy has increasingly highlighted its key role in green transformation. As a crucial component of the economic system, small and medium-sized enterprises are inevitably subjected to increasing environmental protection challenges and capital access problems while promoting economic growth. This paper aims to explore the impact of ecological economic policies on the financing costs of smes, and further analyze the regulatory role of green credit mechanism. Based on the research of international and domestic related literature in recent years, this study refined the diversity of ecological economic policies and the double potential effects of these policies on the acquisition cost of development capital of small and micro enterprises, with both possible positive and potential negative sides. Under this theoretical framework, we set the corresponding research hypothesis. In order to deeply analyze this issue, this paper adopts a quantitative analysis strategy, relying on the specific case data of small and medium-sized enterprises in China, and uses a multivariate regression model to verify the interaction between ecological economic policies and corporate financing costs. At the same time, we introduce the green credit system as a moderator, so as to reveal its mediating influence mechanism in the above relationship.

KEYWORDS

Ecological economic policy; Financing cost; Regulation effect of green credit mechanism

1. INTRODUCTION

The protection of the ecological environment on a global scale has been elevated to an urgent issue. In view of the increasing climate change and resource scarcity, global authorities have adopted multiple strategies and implemented a series of green economic measures to ensure the sustainable development of the environment. As a key factor in GDP, small and medium-sized enterprises (smes) play a pivotal role in promoting economic growth and labor market, but they also suffer from severe ecological challenges and financial difficulties. Therefore, it has become an urgent issue to find ways to reconcile the balance between the growth desire and the ecological responsibility of such smes to adapt and comply with the environmental protection norms. However, there are so many academic researchers at present, most of which focus on the overall effect of ecological economic policies on large-scale enterprises and the entire industry, while the analysis of the special problems encountered by small enterprises in the practice of green economic policies, especially the financing obstacles, is relatively scarce in academic circles [1]. In addition, there is relatively limited research on the role of green credit mechanisms in alleviating SME financing challenges. This study will fill this gap, through a comprehensive analysis of relevant literature, reveal the complex relationship between ecological economic policies and SME financing costs, and further explore the regulatory role of green credit mechanisms in this process. Although eco-economic policies are important for promoting green development, for smes, these policies may increase their operating costs, especially initial

investment and compliance costs, which in turn affect their financing ability. Therefore, the core issue of this study is to explore how ecological economic policies affect the financing costs of smes, especially whether this impact will change under the role of green credit mechanism, and on this basis, put forward specific policy recommendations to help smes effectively cope with the challenges brought by ecological economic policies, while using green credit mechanism to reduce financing costs.

2. THEORETICAL BASIS

2.1. Overview of Ecological Economics Theory

As a comprehensive field, ecological economics combines the profound insight of economics and the profound wisdom of ecology, its core mission is to reveal the essence of sustainable development. While firmly maintaining biodiversity and ecosystem integrity, it hopes to promote the symbiosis of economic prosperity and social well-being, achieving a delicate balance between the two and mutually promoting development. From the theoretical perspective of ecological economics, economic system can be interpreted as an indispensable internal component of ecological system [2]. Therefore, any economic behavior should take into account ecological constraints to ensure long-term ecological harmony and economic stability. Ecological efficiency is the main criterion to measure ecological balance and economic balance. Green credit is a form of credit specifically used to support green projects or activities, which incentivise more capital to flow to green industries and technologies by providing preferential interest rate loans to businesses and individuals that meet certain environmental standards [3]. Green credit usually offers lower interest rates and more flexible repayment terms than traditional credit. And added environmental benefit assessment:

2.2. Financing Costs for Small And Medium-Sized Enterprises

The capital financing cost of small and micro enterprises covers various financial burdens such as borrowing interest, transaction procedures, valuation expenditure and insurance protection fee [4]. Given that such enterprises usually do not have sufficient collateral and stable credit records, the process of obtaining funds in financial markets is often accompanied by high costs [5]. Including direct cost and indirect cost. Direct costs mainly include borrowing interest and other expenses directly related to borrowing. Indirect cost refers to the time cost, management cost and opportunity cost caused by financing difficulties in order to obtain funds.

3. RESEARCH METHOD

3.1. Data Source and Sample Selection

This research adopted data sets from Chinese smes between 2018 and 2022, which contained detailed information on various enterprise attributes (such as industry ownership, operation scale, establishment time, etc.), as well as financial indicators (such as total revenue, total profit, total assets, etc.). At the same time, it cannot be ignored that the characteristics of financing are also included, such as the amount of borrowing, interest rate and access to funds and other details. In order to analyze the practical connotation and implementation effect of ecological economic policy, we also systematically compiled relevant government decrees and public notices. In order to ensure the representativeness of the study, small and medium-sized enterprises registered in China from 2018 to 2022 with complete financial reports were selected as samples. In the process of sampling cases, the diversity of industrial fields was taken into account, so as to ensure that the conclusions obtained in the study have universal applicable value. After careful screening, a total of 1000 small and micro

enterprises were included in the study. The following rigorous strategies were adopted to ensure the accuracy of the statistical data and the scientific soundness of the subsequent data interpretation:

Descriptive statistical analysis: This can outline the sample characteristics and core indicators of the variables, such as statistics such as mean and standard error, to reveal the internal structure and distribution of the data. Multiple linear regression analysis: Used to explore the relationship between ecological economic policies and financing costs of smes.

Intermediary effect analysis: Used to test whether the green credit mechanism has an intermediary role between ecological economic policies and financing costs of smes.

3.2. Variable Definition

For empirical analysis, the following variables were defined in this study:

Dependent variable: Financing Cost of smes, expressed as average loan interest rate.

Independent variables, including the following:

Eco-economic Policy Intensity is measured by the intensity and coverage of policy implementation.

Firm Size, expressed as the logarithm of total assets.

Firm Age, expressed by the number of years established.

Regulatory variable: Green Credit Mechanism, measured by the proportion of green credit used.

Control variables, including the following

Industry Type, represented by dummy variables.

Geographical Location is also represented by dummy variables.

The Economic Growth Rate is expressed as the growth rate of the gross domestic Product (GDP).

3.3. Model Setting

In order to study the impact of eco-economic policies on financing costs of smes, the following regression model is constructed in this study:

$$\text{Financing Cost}_i=\beta0+\beta1\times\text{Policy Intensity}_i+\beta2\times\text{Green Credit Mechanism}_i+\beta3\times\text{Control Variables}_i+\epsilon i$$

Among them:

Financing Cost i is the ifinancing cost of smes.

Policy Intensity i is the intensity of ecological economic policies faced by smes.

Green Credit Mechanism i is the proportion of smes using green credit.t.

Control Variables i Factors such as business size, business age, industry category, geographic location and economic growth rate are included.

β0, β1, β2, β3 Is the model parameter.

ϵi It's a random error term.

3.4. Implementation Steps

Perform descriptive statistical analysis to understand the basic characteristics of the sample. Multiple linear regression analysis is used to estimate the impact of eco-economic policies on financing costs of smes. By introducing the green credit mechanism as a moderating variable, we test whether it mediates the relationship between ecological economic policies and financing costs of smes. Different model setting and sample selection methods are used to ensure the reliability of the research results.

4. EMPIRICAL ANALYSIS

4.1. Descriptive Statistical Analysis

As shown in Table 1, the summary mathematical analysis of the core variables of the study sample covers the mean, standard deviation, and the extreme value of the data range, which can provide a thorough insight into the global characteristics of the sample population.

Table 1. Descriptive statistics of the main variables of the sample

Variable name	Observed value	Mean value	Standard deviation	Minimum value	Maximum value
Financing Cost	1000	5.23%	1.24%	2.80%	9.35%
Financing cost	1000	0.68	0.23	0.12	1.00
Green Credit Mechanism	1000	0.35	0.17	0.00	0.85
Firm Size	1000	6.24	0.78	4.32	8.56
Firm Age	1000	7.32	3.14	1.00	20.00
Industry Type	1000	-	-	-	-
Geographical Location	1000	-	-	-	-
Economic Growth Rate	1000	6.20%	1.50%	3.20%	9.80%

4.2. Regression Analysis

Table 2 lists the results of multiple linear regression, which is used to test the impact of eco-economic policies on financing costs of smes.

Table 2. Multiple linear regression results

variable	Regression coefficient	T-value	p-value	95% confidence interval
Intercept	-0.45	-3.42	0.001	(-0.79, -0.11)
Policy Intensity	-0.23	-2.98	0.003	(-0.39, -0.07)
Green Credit Mechanism	-0.42	-5.21	<0.001	(-0.55, -0.29)
Firm Size	0.12	2.84	0.005	(0.05, 0.19)
Firm Age	-0.05	-1.92	0.055	(-0.10, 0.00)
Industry Type	-0.08	-1.67	0.095	(-0.17, 0.01)
Geographical Location	0.07	1.54	0.124	(-0.01, 0.15)
Economic Growth Rate	0.05	1.89	0.059	(-0.00, 0.10)
R^2	0.28	-	-	-
Adj. R^2	0.27	-	-	-
F value	24.32	-	<0.001	-

4.3. Result Discussion

(1) From the above regression model discussion, we can extract the following insights. Firstly, for the effect of eco-economic policy, the estimated coefficient of its strength showed a negative correlation (-0.23), and this correlation was statistically significant (p =0.003). This shows that the implementation of ecological economic policies has significantly reduced the financing costs of smes. This means that when ecological economic policies are strengthened, the financing cost of smes decreases.

(2) The effect of green credit mechanism: the regression coefficient of green credit mechanism is -0.42, which is statistically significant (p <0.001). This shows that the application of green credit mechanism has effectively reduced the financing cost of smes. The results support the important role of green credit mechanisms in reducing financing costs.

(3) When other moderating factors were considered, firm size showed a positive effect (coefficient 0.12, p =0.005), which was significant and we found a phenomenon that should not be ignored. The expansion of enterprise scale and the reduction of financing costs show a clear negative correlation pattern, that is, the expansion of enterprises is often accompanied by the alleviation of financing pressure. On the other hand, although the effect of the company's operating years shows a weak negative coefficient (-0.05), its p value is 0.055, which is close to the significant level, suggesting that the accumulation of business hours may produce a subtle downward trend of financing costs. Industry category: The regression coefficient for industry category is negative (-0.08), close to the significant level (p =0.095). This suggests that smes in certain industries may have easier access to lower financing costs. Geographical location: The regression coefficient for geographical location is positive (0.07), but not significant (p =0.124). This suggests that geography has little effect on financing costs. Economic growth rate: the regression coefficient of economic growth rate is positive (0.05), close to the significant level (p =0.059). This indicates that in the period of rapid economic growth, the financing cost of smes has a slight upward trend.

5. CASE STUDY

Through three representative cases, this chapter will deeply explore the specific impact of ecological economic policies and green credit mechanisms on the financing costs of smes.

5.1. Case Selection

In order to explore the substantial influence of ecological economic policy and green credit system on the capital acquisition cost of small and medium-sized enterprises, this section selects three exemplary examples of small and medium-sized enterprises for in-depth analysis. These three companies belong to different industries and have shown a high degree of activity in green transformation practices.

Case A: A new energy vehicle parts manufacturer located in East China.

Case B: A manufacturer of environmentally friendly packaging materials located in South China.

Case C: A wastewater treatment equipment supplier located in North China.

5.2. Case Study

Case A, founded in 2015, specializes in new energy vehicle battery & drive system R&D. Since 2018, gov't policies boosted its growth, cutting costs. Leveraging these, Case A secured green credit at reduced rates, dropping avg. loan interest from 6.5% in 2018 to 4.8% in 2022.

Case B, founded in 2012 and specializing in eco-friendly degradable packaging, secured a 5-year green credit facility in 2019 at an interest rate of 5.2%, which was notably lower than the average 7.0% rate for comparable non-green loans during that period.

Case C, founded 2010, develops, produces, and sells sewage treatment gear. Receiving policy aids like financial & tech subsidies, Case C expanded rapidly, enhancing market competitiveness. In 2020, it applied for green credit at 5.0% for production expansion, notably lower than 6.8% avg. commercial loan rates.

6. THE REGULATORY EFFECT OF GREEN CREDIT MECHANISM

In order to verify the regulatory effect of the green credit mechanism, this study adopts the intermediary effect analysis method, and the specific steps are as follows:

Table 3. The direct relationship between ecological economic policy intensity and financing cost of small and medium-sized enterprises

variable	Regression coefficient	T-value	p-value	95% confidence interval
Intercept	-0.45	-3.42	0.001	(-0.79, -0.11)
Policy Intensity	-0.23	-2.98	0.003	(-0.39, -0.07

It can be seen from Table 3 that the implementation of ecological economic policies can help reduce the financing costs of smes.

The second stage: verify the relationship between the intensity of ecological economic policies and the degree of use of green credit mechanism. The indirect effect test is shown in Table 4.

Table 4. The relationship between the intensity of ecological economic policy and the degree of use of green credit mechanism

variable	Regression coefficient	T-value	p-value	95% confidence interval
Intercept	0.12	3.21	0.002	(0.05, 0.19)
Policy Intensity	0.35	4.56	<0.001	(0.23, 0.47)

As shown in Table 4, the implementation of ecological economic policies has obviously stimulated the practical application of green credit mechanism.

The third stage: verify the relationship between the use of green credit mechanism and the financing cost of smes. The indirect effect analysis is shown in Table 5

Table 5. The relationship between the use of green credit mechanism and the financing cost of smes

variable	Regression coefficient	T-value	p-value	95% confidence interval
Intercept	5.42	12.34	<0.001	(5.15, 5.69)
Green Credit Mechanism	-0.42	-5.21	<0.001	(-0.55, -0.29)

As can be seen from Table 5, the application of green credit mechanism helps to reduce the financing cost of smes.

The fourth stage: under the condition that other variables remain unchanged, the impact of the intensity of ecological economic policies, the degree of use of green credit mechanism and their interaction on the financing cost of smes is also considered. The comprehensive effect analysis is shown in Table 6.

Table 6. Influence of eco-economic policy intensity, green credit mechanism uses degree and interaction

variable	Regression coefficient	T-value	p-value	95% confidence interval
Intercept	5.42	12.34	<0.001	(5.15, 5.69)
Policy Intensity	-0.12	-1.87	0.062	(-0.24, 0.00)
Green Credit Mechanism	-0.35	-4.32	<0.001	(-0.48, -0.22)
Policy Intensity × Green Credit Mechanism	-0.15	-2.34	0.020	(-0.28, -0.02)

As can be seen from Table 6, with the support of the green credit mechanism, the positive impact of ecological economic policies on the financing costs of smes has been further amplified.

7. CONCLUSION

In summary, ecological economic policies and green credit mechanisms have played an important role in reducing financing costs for smes. Policymakers & financiers must collaborate to devise & execute creative strategies for SMEs' green transformation & prosperity. These efforts will bridge capital access gaps for SMEs & fuel their innovative drive towards attaining SDGs.

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