Journal of Global Information Management
Volume 31 • Issue 1

How Does Green Credit Policy Affect Sustainable Development Capacity of Enterprises in China?

Liangliang Han, Liaoning University, China
Shangshu Liu, Liaoning University, China*

ABSTRACT

The green credit policy has been one of the most important policies for solving resource and environmental problems and promoting sustainable economic and social development in China in recent years. Based on the mediating effect of green innovation input and the moderating effect of government subsidies, in this study the authors investigate the influence of the green credit policy on the sustainable development capacity of enterprises. The research shows that the green credit policy does not improve the sustainable development capacity of enterprises. The green credit policy promotes enterprises' green innovation input, and green innovation input plays an intermediary role between green credit policy and sustainable development capacity of enterprises. Government subsidies play a regulating role in the green credit policy, green innovation input, and sustainable development capacity of enterprises. Based on these findings, the authors suggest that the government, banks, and enterprises make joint efforts to improve the sustainable development capacity of enterprises as soon as possible.

KEYWORDS

Green Credit Policy, Government Subsidies, Green Credit Restriction Industries, Green Innovation Input, Sustainable Development Capacity of Enterprises

INTRODUCTION

With the continuous progress of China's industrialization, environmental pollution has attracted much attention. In order to effectively control environmental pollution, China has engaged in a series of policies and regulations to promote ecological and environmental protection. The green credit policy (GCP) has been one of the important policies promoting green development in China. In order to curb the blind expansion of industries with high energy consumption and high levels of pollution, the former State Environmental Protection Administration, the People's Bank of China, and the former China Banking Regulatory Commission (CBRC) jointly put forward a new credit policy in July 2007—namely, the Opinions on Implementing Environmental Protection Policies and Regulations to Prevent Credit Risks. This marked the green credit as a financial means to enter a major battlefield of pollution reduction in China. In order to further promote the development of green credit by banking financial institutions, the former CBRC issued the Green Credit Guidelines

DOI: 10.4018/jgim.320487 *Corresponding Author

(GCG) in February 2012, in accordance with the Banking Regulatory Law of the People's Republic of China, the Commercial Banking Law of the People's Republic of China, and other laws and regulations. The introduction of the GCG has formed a strong credit constraint on enterprises. In June 2022, the Banking and Insurance Regulatory Commission issued the Green Finance Guidelines for the Banking and Insurance Industries, which is another upgrade of the GCG issued in 2012, and an important milestone in the development of green finance in China. Green credit is regarded as an important policy tool to achieve this goal. Therefore, it is of historical and practical significance to study the impact of the GCP on the sustainable development capacity of Chinese enterprises.

LITERATURE REVIEW

In recent years, scholars have conducted research on green finance, the GCP, green innovation, and sustainable development capacity—and have achieved relatively fruitful research results. The relevant main literature can be roughly subdivided into four areas:

The first area includes the theoretical research on green finance and its impact on carbon emissions. Nedopil et al. (2021) studied the nature, evolution, and differences of green finance standards. Deng et al. (2022) explored the construction and measurement of green finance development indicator systems of commercial banks. Xu et al. (2022) studied how environmental regulations affect the development of green finance. Hu and Tu (2022) explored the effect of green finance on high-quality development of enterprises. Ba and Peng (2022) reviewed the practice of green finance in the UK to provide reference for the development of green finance in China. Wu (2021) found that green finance plays an important catalytic, supporting, and boosting role in accelerating the green and low-carbon development of the economy, and promoting the comprehensive green transformation of economic and social development. A. Zhang et al. (2022) showed that green credit policies have a greater impact on industrial carbon emission intensity for countries with a low state-owned capital ratio, a high total-factor productivity, and a high capital dependence. Hu and Zheng (2021) found that green credit has a significant inhibitory effect on carbon emissions.

The second area of the literature covers the impact of the GCP on enterprise investment and financing. J. Zhang et al. (2022) found that the GCP can improve the efficiency of enterprises' overseas investment, especially for state-owned enterprises and enterprises in regions with fewer environmental laws and regulations. Xu and Li (2020) found that the GCP can increase the debt financing cost and reduce the debt financing term of enterprises with high pollution and emission levels, but reduce the debt financing cost of green enterprises. Su and Lian (2018) showed that green credit had significant financing penalty effects and investment inhibitory effects.

The third area of the literature is related to the GCP on green innovation and corporate performance. Hu et al. (2021) found that the proposal of the GCP has a positive and significant impact on the output of green patents of highly polluting enterprises, and the GCP can stimulate the green innovation of highly polluting enterprises by imposing credit constraints, so as to realize the green transformation of emerging economies. Yao et al. (2021) found that the GCP reduced the corporate performance of highly polluting industries. From the perspective of corporate social responsibility and environmental risk management, green credit will have an important impact on corporate performance, and actively undertaking corporate social responsibility will promote the improvement of corporate performance (He et al., 2019).

The fourth and last area of the literature addresses the influence of the GCP and sustainable development capacity. Few studies in this field exist in China; Fan and Zhang's (2021) work is representative. Their research shows that the establishment of green finance reform and innovation zones can improve the technological innovation ability of low-carbon enterprises, encourage enterprises to actively fulfill their environmental responsibilities, improve their operating capacity and profitability, and thus exert a positive impact on the sustainable development capacity of low-

carbon enterprises. Some scholars have studied the relationship between sustainable development capacity and social responsibility, enterprise innovation ability, and banks.

In China, few scholars have studied the impact of green credit policies on the sustainable development capacity of enterprises. This paper makes up for the deficiency of the existing literature in two ways. First, the authors establish the introduction of the GCG in 2012 as the time entry point, with the Green Credit Restriction Industries (GCRI) defined in the Guidelines as the experimental group, and the Non-Green Credit Restriction Industries (NGCRI) as the control group. The aim of this research is to study the impact of the GCP on the sustainable development capacity of enterprises. Second, based on the mediating effect of green innovation input and the moderating effect of government subsidies, the authors analyze the mechanism between the GCP, green innovation, and sustainable development capacity of enterprises, and try to deconstruct the internal logic of the influence of the GCP on sustainable development capacity of enterprises. This paper provides a theoretical basis for evaluating the implementation effect of the Guidelines, and promoting green innovation, transformation, and upgrading of enterprises.

THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

The Green Credit Policy and Sustainable Development Capacity of Enterprises

Sustainable development of enterprises refers to the continuous expansion of enterprise scale and steady growth of profits by utilizing effective resources based on the premise of respecting nature (Liu, 1999). The sustainable development capacity of enterprises is the potential of coordinated, sustainable, and stable development and completion of predetermined goals within a specified time—namely, the sustainable operation capability (Cao & Gao, 2014). In general, an important way for enterprises to achieve sustainable development is innovation, and the key to sustainable development of enterprises is to balance the contradictions between economic growth, social development, and environmental protection.

Green credit refers to the decision the bank makes in the process of a loan, based on the relevant information of the project and its operating company (Thompson & Cowton, 2004). For banks, the GCP is conducive to avoiding risks; and it is conductive to green transformation and upgrading of enterprises, as well as sustainable economic development (Yao et al., 2021). The GCP is intended to make heavily polluting enterprises withdraw from projects that may cause major environmental problems; and through credit constraints, to encourage them to develop clean projects or make them reduce negative externalities to the environment through green technology innovation. The Guidelines encourage clean investment and restrict polluting investment through the allocation of credit resources, reduce environmental and social risks of enterprises, and improve environmental and social performance. Whether in order to meet the requirements of environmental governance or reduce the requirements of credit resource constraints, enterprises should carry out business activities aimed at reducing environmental pollution and energy consumption, and at improving energy efficiency. However, the introduction of the GCP has also raised the environmental access threshold for the credit financing of heavily polluting enterprises. After the implementation of the GCP, the debt financing difficulties and costs of heavily polluting enterprises have increased. Some projects with heavy pollution and high energy consumption contrary to the GCP standards will be restricted or withdrawn from the market even if they have rich economic benefits. This situation forces enterprises to transform and upgrade. The introduction of the GCP is a negative policy for the restricted industries with high levels of pollution and energy consumption.

Based on the above discussions, the authors developed the following research hypotheses:

Hypothesis One A (H1a): In the long run, the implementation of the GCP should be conducive to improving the sustainable development capacity of enterprises.

Hypothesis One B (H1b): At the present stage, the implementation of the GCP should have a negative impact on the sustainable development capacity of the GCRI.

The Mediating Effect of Green Innovation Input

The term "green innovation" originates from eco-innovation, which describes new products and processes that provide value to customers, and through which businesses can significantly reduce their environmental impact (Tseng et al., 2013). Rennings (2000) made a representative definition of green innovation, which is new ideas, new products, new services, new processes, or new management systems used to deal with environmental problems.

As an environmental economic policy, the impact of the GCP on enterprise innovation mainly focuses on the theoretical mechanism of "following cost" and "Porter hypothesis." The following-cost effect is reflected in that environmental regulations will increase the production cost and pollution-control cost of enterprises. This has a crowding-out effect on R&D investment activities and reduces the productivity of enterprises. Porter hypothesis focuses on the compensation effect of innovation (Z. Zhang et al., 2022). It holds that the strengthening of environmental regulations will increase the intensity of R&D and innovation. Porter hypothesis is an ideal state. It sustains that environmental policies can not only manage environmental problems, but also promote the improvement of enterprises' innovation ability, so as to enhance economic benefits (Porter & Van der Linde, 1995). Based on Porter hypothesis, the impact of the GCP on enterprises' green innovation input has two aspects. First, the GCP provides endogenous impetus for enterprises' innovation transformation by affecting the ratio of benefits to costs of technological innovation. The introduction of the GCP has increased the willingness of enterprises with high levels of pollution and energy consumption to make green transformation, has made them increase their investment in innovation, and has provided an internal impetus for the elimination of polluting production technologies. Second, if enterprises continue to maintain the original technology and production mode, corporate financing will be more binding and financing costs will be higher after the introduction of the GCP. Therefore, enterprises need to strengthen innovation and transformation, improve overall productivity level, and offset the negative impact of the GCP on corporate economic profits.

Green innovation has increasingly become an important driving force for enterprises to improve their competitive advantages, helping to speed up energy conservation and emission reduction, and promote green transformation. Under the guidance of the GCP, the increase of enterprises' green innovation input will help enterprises to generate new products, services, and technologies relating to environmental issues, which should naturally bring economic and social benefits to enterprises and society, and help enterprises to form new driving forces and profit growth points. Actively increasing green innovation input will produce a virtuous circle effect, especially for the NGCRI, which are the clean, energy-saving, and environmental-protection industries rewording supported by the state. Therefore, increasing green innovation input will be more conducive to the sustainable development capacity of enterprises. However, for restricted industries, they need to shut down the heavy pollution–generating projects and transfer to green projects, due to national policy restrictions. In addition, enterprise transformation needs a complex and slow process, which will lead to a decline in the sustainable development capacity of enterprises for a period of time, even if the green innovation input is increased and the enterprise transformation is carried out. Based on the above discussions, the authors developed the following research hypotheses:

Hypothesis Two A (H2a): The GCP is helpful to promoting green innovation input of enterprises.

Hypothesis Two B (H2b): At the present stage, green innovation input has a negative impact on the sustainable development capacity of the GCRI. The influence on the sustainable development capacity of unrestricted industries is positive.

Hypothesis Two C (H2c): Green innovation input should have an intermediary effect between the GCP and the sustainable development capacity of enterprises.

The Moderating Effect of Government Subsidies

Government subsidies are an important part of fiscal expenditure. They are the transfer of free funds, directly or indirectly provided by the government, to micro-economic entities for specific purposes according to the political and economic policies of a certain period (Jia et al., 2021). Under the GCP, government subsidies can help enterprises relieve the pressure of financing constraints and solve the problem of insufficient funds when enterprises are faced with strong financing constraints (Hou et al., 2021).

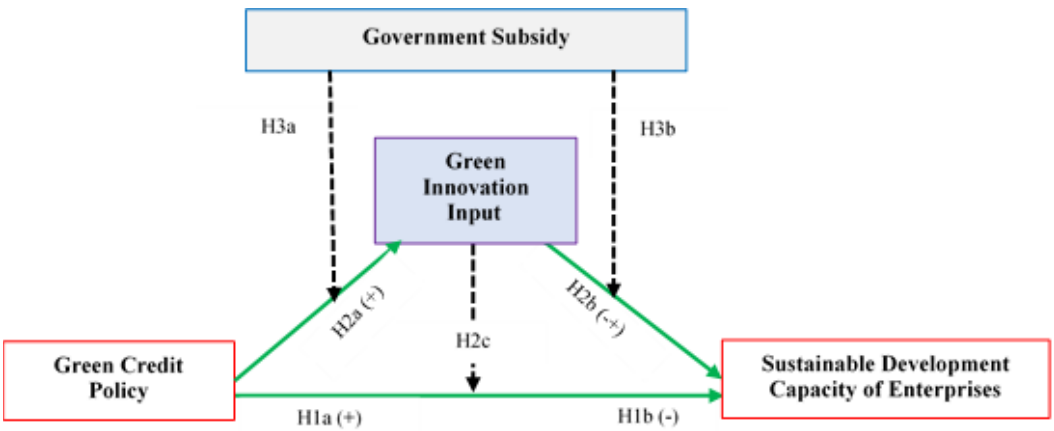
In the process of economic transformation, government subsidies are regarded as the most direct and easily observed mode of action of the "supporting hand" of the government. As free funds transferred by local governments to enterprises, government subsidies can encourage enterprises to increase green innovation input, directly enhance corporate earnings, and improve corporate financial constraints, thus easing the negative impact of GCP implementation on the financing of enterprises with high levels of pollution and energy consumption (Wu and Shang, 2021). The introduction of the GCP may make it difficult for enterprises with high levels of pollution and energy consumption to cross the capital threshold. In this case, the supply of government subsidies can help restricted enterprises with transformation intention to break through the capital threshold under the constraint of the green credit system, overcome the negative impact of the financial constraint effect of the GCP, and make use of government subsidies for green innovation input, so as to actively cope with the impact of the GCP. Based on the above discussions, the authors developed the following research hypotheses:

Hypothesis Three A (H3a): Government subsidies play a moderating role in the impact of the GCP on green innovation input.

Hypothesis Three B (H3b): Government subsidies play a moderating role in the impact of green innovation input on sustainable development capacity of enterprises.

In sum, Figure 1 shows the effect path of the GCP on sustainable development capacity of enterprises.

Figure 1. Path Diagram Among Variables



RESEARCH DESIGN

Sample Selection and Data Sources

In this study, the authors have selected China's A-share listed companies from 2007 to 2020 as the original sample. The researchers have excluded companies according to the following criteria: The financial-and-insurance listed companies; the listed companies with a debt to asset ratio of less than 0 and greater than 1; the listed companies with abnormal trading, including special treatment (ST); and the listed companies with missing relevant data. Finally, the authors have obtained 12,950 observed values of 925 listed companies during 14 years. All the data form the panel data set. The authors have obtained the data from the China Stock Market Accounting Research database, and used STATA 15.1 for data statistics and analysis. Because part of the data in 2021 were not updated, the data went up to 2020.

Variable Selection and Model Specification

Variable Selection

Dependent Variable. The explained variable is the sustainable development capacity of enterprises (*Sus*). Following Li and Chen (2016), this index generally represents the development speed of enterprises, requiring enterprises to pay attention to the balance between business objectives, operating efficiency, and capital sources, and to appropriately control business development strategies according to the sustainable growth rate, to achieve sustainable development of enterprises. In this paper, the authors have adopted the static sustainable growth model of Higgins (1977) to measure the sustainable development capability of enterprises, because the data in this model are available, and the calculation method is simple and widely used by scholars. Table 1 shows the calculation formula. In the formula, P refers to the profit margin (profit scaled by total sales), A refers to the total asset turnover ratio (total sales scaled by total assets), T refers to the leverage factor (total assets scaled by beginning-of-period equity), and R refers to the retained return rate (retained earnings scaled by profit).

Independent Variable. In terms of independent variables, *Post* is a time-dummy variable. Taking the implementation of the Guidelines in 2012 as the exogenous impact point, *Post* equals 1 in 2012 and beyond; *Post* equals 0 before 2012. *Treat* is an industry-dummy variable. Following Zhang et al. (2019), the authors have identified the treatment companies and the control companies according to industry differences. According to the Key Evaluation Indicators for the Implementation of Green Credit issued by the CBRC, the authors have divided the listed companies into two groups, which belong to GCRI and NGCRI. When a company belongs to GCRI, which is group A—*Treat* equals 1—the authors have included it in the experimental group; otherwise, when the company belongs to NGCRI, which is group B—*Treat* equals 0—the authors have included it in the control group. Based on the dataset, there are 100 listed companies belonging to GCRI, and 825 listed companies belonging to NGCRI.

Mediating Variable. In this study, the authors have used green innovation input (*Rdinput*) as a mediating variable. Due to the limited availability of data on green innovation input of listed companies, most of the current data on green innovation input of enterprises comes from R&D input of enterprises. Therefore, following Shi et al.'s (2019) work, the authors have used R&D input scaled by operating income to measure the green innovation input of enterprises, considering the large gap between listed companies in terms of enterprise size and income level, in order to reduce the estimation bias caused by enterprise heterogeneity.

Moderating Variable. In this paper, the authors have used government subsidies (*Sub*) as a moderating variable. Considering the availability of data, the authors have followed Hou et al. (2021) to describe the scale of government subsidies, with the item "government subsidies" in the notes on the financial statements of listed companies. Therefore, the researchers have measured the scope of government subsidies by the ratio of government subsidies to operating income.

Table 1. Definitions of Variables

Variable symbol	Description	Obs	Mean	SD	Min	Max
Sus	P×A×T×R	12,950	0.057	0.188	-8.782	6.833
Post	If the sample year is 2012 or beyond, *Post* = 1. Otherwise, *Post* = 0.	12,950	0.643	0.479	0	1
Treat	If the listed company belongs to GCRI, *Treat* = 1. Otherwise, *Treat* = 0.	12,950	0.108	0.311	0	1
Rdinput	R&D / Operating Income	12,950	0.018	0.033	0	1.323
Sub	Government Subsidies / Operating Income	12,950	0.007	0.020	-0.002	1.079
Size	Ln (Ending Total Assets)	12,950	22.431	1.318	19.764	26.062
Age	Ln (Age of Establishment)	12,950	2.768	0.358	1.792	3.401
Lev	Asset-Liability Ratio	12,950	0.500	0.186	0.082	0.887
Cash	Operating Net Cash Flow / Operating Income	12,950	0.101	0.198	-0.706	0.796
Employee	Ln (Numbers of Employees)	12,950	7.933	1.325	4.205	10.986
Board	Number of Independent Directors / Number of Directors	12,950	0.365	0.058	0	0.571

Control Variable. The selection of control variables refers to Hu et al.'s (2021) study. It includes enterprise size (*Size*), age of establishment (*Age*), asset-liability ratio (*Lev*), cash from operating activities (*Cash*), number of employees (*Employee*), and board independence (*Board*). Table 1 shows the specific descriptions of variables.

Table 1 shows that from the index of sustainable development capacity of enterprises, *Sus* pole distance (i.e., the gap between the maximum value and the minimum value) is large. The pole distance between *Rdinput* and *Sub* is also large, indicating that enterprises attach great importance to green innovation input, and the degree of government subsidies also varies greatly.

Model Specification

The authors have constructed the following regression model to study the impact of the GCP on sustainable development capacity of enterprises:

$$Sus_{i,t} = \beta_0 + \beta_1 Post_t \times Treat_1 + \gamma X_{i,t-1} + \lambda_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

Model (1) reflects the impact of the GCP on the sustainable development capacity of enterprises, which the authors have used to verify H1a and H1b. The subscripts *i* and *t* of each variable in model (1) represent the i_{th} enterprise and the *t* year, respectively. $Post_t \times Treat_i$ is a differential variable. In order to overcome the endogeneity problem of the model, the authors have treated all control variables with one-stage lag. »$_i$ is the firm's individual fixed effect, ¼$_t$ is the year's fixed effect, and $\varepsilon_{i,t}$ is the residual term. In order to avoid multicollinearity, $Treat_i$ and $Post_t$ should not appear separately in the model when controlling both the individual and year fixed effects (Zhang & Lu, 2022). In order to obtain more robust regression results, the authors have adopted the dual cluster regression method, which controls firm fixed effect and time fixed effect (Wang & Wang, 2021).

In order to further study the mechanism of the GCP on sustainable development capacity of enterprises, the authors have introduced the intermediary variable (*Rdinput*), and referred to Wen and Ye's (2014) intermediary effect test model to build model (2), model (3), and model (4) to verify H2a, H2b, and H2c. Model (2) reflects the impact of the GCP on enterprises' green innovation input. Model (3) reflects the impact of green innovation input on enterprises' sustainable development capacity. Model (4) reflects the mediating role of green innovation input in the influence of the GCP on sustainable development capacity of enterprises.

$$Rdinput_{i,t} = \alpha_0 + \alpha_1 Post_t + \gamma X_{i,t\text{-}1} + \lambda_i + \mu_t + \varepsilon_{i,t} \tag{2}$$

$$Sus_{i,t} = \theta_0 + \theta_1 Rdinput_{i,t} + \gamma X_{i,t\text{-}1} + \lambda_i + \mu_t + \varepsilon_{i,t} \tag{3}$$

$$Sus_{i,t} = \eta_0 + \eta_1 Post_t + \eta_2 Rdinput_{i,t} + \gamma X_{i,t\text{-}1} + \lambda_i + \mu_t + \varepsilon_{i,t} \tag{4}$$

In order to verify the moderating effect of government subsidies (*Sub*), the authors have drawn on Jia et al.'s (2021) research and built model (5) and model (6) to verify H3a and H3b. Model (5) reflects the moderating effect of government subsidies on the impact of the GCP on green innovation input, and model (6) reflects the moderating effect of government subsidies on the impact of green innovation input on the sustainable development capacity of enterprises.

$$Rdinput_{i,t} = \rho_0 + \rho_1 Post_t \times Treat_i + \rho_2 Post_t \times Treat_i \times Sub_{i,t} + \rho_3 Sub_{i,t} + \gamma X_{i,t\text{-}1} + \lambda_i + \mu_t + \varepsilon_{i,t} \tag{5}$$

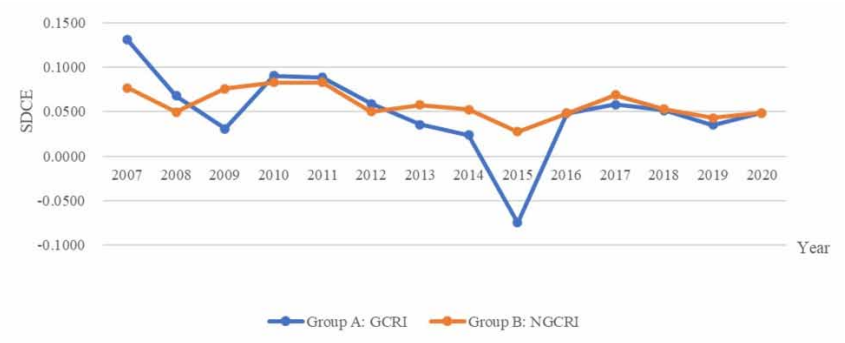
$$Sus_{i,t} = \delta_0 + \delta_1 Post_t \times Treat_i + \delta_2 Rdinput_{i,t} + \delta_3 Rdinput_{i,t} \times Sub_{i,t} + \delta_4 Sub_{i,t} + \gamma X_{i,t\text{-}1} + \lambda_i + \mu_t + \varepsilon_{i,t} \tag{6}$$

EMPIRICAL RESULTS AND ROBUSTNESS TEST

Parallel Trend Test

The results of the Differences-in-Differences (DID) model are valid on the premise that the parallel trend assumption of the treatment group and the control group is valid, and the policy time is deterministic (Bertrand et al., 2004). According to Figure 2, the sustainable development capacity of enterprises in Group A is generally lower than that of Group B. From 2012 to 2020, after the implementation of the Guidelines, sustainable development capacity of enterprises in Group A and B shows a downward oscillatory trend, and the amplitude of Group A is more obvious than that of Group B. In general, before and after the implementation of the Guidelines, the sustainable development capacity of enterprises in GCRI and NGCRI is basically consistent with the change trend over time, essentially meeting the parallel trend assumption. In other words, test results of model (1) constructed by Differences-in-Differences (DID) method are valid.

Figure 2. Sustainable Development Capacity of Enterprises in Group A and B Before and After the Implementation of the GCG
Note: **SDCE stands for sustainable development capacity of enterprises**



Multiple Regression Results and Analysis

Model (1) studies the direct impact of GCP on sustainable development capacity of enterprises. Table 2 shows the regression results of the full sample model. The regression coefficient of the interaction item *Post×Treat* in model (1) is -0.026 (insignificant), indicating that the implementation of the GCP

Table 2. Full Sample Model (1) to (6) Regression Results (925 Listed Companies, 12,950 Observations)

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Post		0.005 (1.08)		-0.036* (-1.87)		
Post×Treat	-0.026 (-1.43)				-0.011*** (-8.72)	-0.026 (-1.43)
Rdinput			-0.03 (-0.41)	-0.03 (-0.41)		-0.018 (-0.21)
Rdinput×Sub						-1.191 (-0.55)
Post×Treat×Sub					-0.052 (-1.04)	
Sub					0.075** (2.53)	-0.057 (-0.74)
Size	-0.005 (-0.66)	0 (-0.05)	-0.005 (-0.72)	-0.005 (-0.72)	0 (0.10)	-0.005 (-0.65)
Age	0.018 (0.50)	0.025*** (2.92)	0.019 (0.51)	0.019 (0.51)	0.025*** (2.99)	0.018 (0.51)
Lev	0.037 (1.29)	-0.011*** (-3.48)	0.036 (1.28)	0.036 (1.28)	-0.11*** (-3.57)	0.037 (1.28)
Cash	0.023*** (2.83)	-0.002 (-1.31)	0.022*** (2.82)	0.022*** (2.82)	-0.001 (-0.90)	0.022*** (2.73)
Employee	-0.003 (-0.81)	0.001 (1.51)	-0.003 (-0.84)	-0.003 (-0.84)	0.002* (1.70)	-0.003 (-0.82)
Board	-0.021 (-0.47)	-0.008 (-1.63)	-0.02 (-0.45)	-0.02 (-0.45)	-0.009* (-1.93)	-0.02 (-0.46)
F value	9.076	26.321	9.054	9.054	24.312	8.037
R-square	0.012	0.122	0.011	0.011	0.132	0.012

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. T statistic in parentheses.

has a non-significant negative impact on the overall sustainable development capacity of 925 sample enterprises; that is, H1a is not valid. Table 3 shows that the regression coefficient of *Post*×*Treat* for the GCRI (100 companies in the experimental group) in model (1) is -0.002 and not significant, so H1b is assumed to be valid. This shows that the implementation of the GCP has a negative but small impact on the sustainable development capacity of restricted enterprises. This also shows that, although the GCG require the banking sector to increase its support for the green economy and low-carbon economy, the banking sector lacks the willingness to take the initiative to carry out green credit, due to risk prevention and its own interests. As a result, enterprises cannot get the support of green credit funds and thus fail to improve their sustainable development capacity.

Table 3. Regression Results of Group A for Model (1) to (6)

	Group A (GCRI) (100 listed companies, 1,400 observations)					
Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Post		0.001 (0.23)		0.003 (0.05)		
Post× *Treat*	-0.002 (-0.03)				0.001 (0.19)	0.004 (0.06)
Rdinput			-6.366 (-1.38)	-6.366 (-1.38)		-6.44 (-1.41)
Rdinput×*Sub*						9.415 (0.25)
Post× *Treat*× *Sub*					0.014 (0.29)	
Sub					0.002 (0.11)	-0.456*** (-3.26)
Size	0.042 (1.28)	0.001 (0.70)	0.045 (1.34)	0.045 (1.34)	0.001 (0.71)	0.045 (1.36)
Age	-0.201* (-1.72)	0.01 (1.39)	-0.137 (-1.16)	-0.137 (-1.16)	0.01 (1.40)	-0.136 (-1.15)
Lev	-0.146 (-1.59)	-0.006 (-1.44)	-0.186* (-1.71)	-0.186* (-1.71)	-0.006 (-1.44)	-0.185* (-1.69)
Cash	-0.014 (-0.40)	0.001 (0.75)	-0.007 (-0.20)	-0.007 (-0.20)	0.001 (0.75)	-0.008 (-0.21)
Employee	0.016** (2.41)	0 (-0.03)	0.016** (2.08)	0.016** (2.08)	0 (-0.03)	0.016** (2.00)
Board	-0.116 (-0.74)	-0.004 (-0.73)	-0.14 (-0.95)	-0.14 (-0.95)	-0.004 (-0.74)	-0.139 (-0.95)
F value	3.150	4.358	2.304	2.304	4.109	3.056
R-square	0.035	0.167	0.052	0.052	0.167	0.052

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. T statistic in parentheses.

Model (2) reflects the impact of the GCP on enterprises' green innovation input. As the regression results of model (2) in Table 2 evidence, the regression coefficient of *Post* is 0.005 (insignificant). For model (2) in Table 3, the regression coefficient of *Post* is positive 0.001 (insignificant) and that in Table 4 is positive 0.005 (insignificant), indicating that the implementation of the GCG has a positive impact on enterprises' green innovation input. In other words, the GCP is helpful to promoting the green innovation input of enterprises, but its effect is weak, so H2a is assumed to be true.

Table 4. Regression Results of Group B for Model (1) to (6)

	Group B (NGCRI) (825 listed companies, 11,550 observations)					
Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
Post		0.005 (1.06)		-0.045** (-2.24)		
Post× *Treat*						
Rdinput			0.01 (0.17)	0.01 (0.17)		0.047 (0.74)
Rdinput×*Sub*						-1.82 (-0.96)
Post× *Treat*× *Sub*						
Sub					0.079** (2.45)	-0.021 (-0.29)
Size	-0.013** (-2.16)	0 (0.09)	-0.013** (-2.16)	-0.013** (-2.16)	0 (0.09)	-0.013** (-2.13)
Age	0.06 (1.63)	0.026*** (2.80)	0.06 (1.60)	0.06 (1.60)	0.026*** (2.85)	0.059 (1.58)
Lev	0.072*** (2.59)	-0.011*** (-3.24)	0.072*** (2.59)	0.072*** (2.59)	-0.012*** (-3.31)	0.073*** (2.60)
Cash	0.023*** (2.91)	-0.002 (-1.39)	0.023*** (2.91)	0.023*** (2.91)	-0.002 (-1.01)	0.023*** (2.83)
Employee	-0.009* (-1.90)	0.002 (1.57)	-0.009* (-1.90)	-0.009* (-1.90)	0.002 (1.65)	-0.009* (-1.93)
Board	-0.008 (-0.18)	-0.009* (-1.70)	-0.008 (-0.17)	-0.008 (-0.17)	-0.01* (-1.88)	-0.007 (-0.15)
F value	9.947	25.505	9.449	9.449	24.481	8.775
R-square	0.015	0.129	0.015	0.015	0.133	0.015

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. T statistic in parentheses.

Model (3) reflects the impact of green innovation input on sustainable development capacity of enterprises. As the regression results of model (3) in Table 2 evidence, the regression coefficient of *Rdinput* is -0.03 (insignificant); and that of model (3) in Table 3 is -6.366 (insignificant) for the experimental group, and positive 0.01 (insignificant) for the control group in Table 4. This indicates that, from the perspective of the samples as a whole, green innovation input does not improve the sustainable development capacity of enterprises. For restricted industries, green innovation input has a negative effect, but, for non-restricted industries, green innovation input has a positive effect, so H2b is established. According to the overall sample, the current green innovation input has a negative impact on the sustainable development capacity of enterprises, but its effect intensity is weak (not significant).

Model (4) reflects the mediating role of green innovation input in the influence of the GCP on sustainable development capacity of enterprises. The test results of model (4) of the full sample in Table 2 and the grouping sample in Table 3 and Table 4 show that at least one regression coefficient of *Post* and *Rdinput* is not significant. Therefore, the Bootstrap mediation test is required. Table 5 shows the test results of Bootstrap; they evidence that green innovation input plays an intermediary role between the GCP and sustainable development capacity of enterprises, so H2c is assumed to be valid.

Model (5) reflects the moderating effect of government subsidies on the influence of the GCP on green innovation input. The regression coefficient of *Post*×*Treat*×*Sub* in model (5) in Table 2

Table 6. Regression Results After Changing Proxy Variables

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Post		0.005 (1.08)		-0.051 (-1.22)		
Post×Treat	-0.01 (-0.81)				-0.011*** (-8.72)	-0.009 (-0.80)
Rdinput			0.009 (0.13)	0.009 (0.13)		0.02 (0.26)
Rdinput×sub						-0.638 (-0.31)
Post×Treat×Sub					-0.052 (-1.04)	
Sub					0.075** (2.53)	-0.066 (-0.60)
Size	-0.023*** (-2.78)	0 (-0.05)	-0.023*** (-2.80)	-0.023*** (-2.80)	0 (0.10)	-0.023*** (-2.76)
Age	0.05 (1.33)	0.025*** (2.92)	0.05 (1.32)	0.05 (1.32)	0.025*** (2.99)	0.05 (1.32)
Lev	0.11*** (2.64)	-0.011*** (-3.48)	0.11*** (2.64)	0.11*** (2.64)	-0.11*** (-3.57)	0.111*** (2.64)
Cash	0.056*** (3.68)	-0.002 (-1.31)	0.056*** (3.69)	0.056*** (3.69)	-0.001 (-0.90)	0.056*** (3.72)
Employee	-0.001 (-0.33)	0.001 (1.51)	-0.001 (-0.34)	-0.001 (-0.34)	0.002* (1.70)	-0.001 (-0.35)
Board	-0.044 (-0.63)	-0.008 (-1.63)	-0.044 (-0.62)	-0.044 (-0.62)	-0.009* (-1.93)	-0.043 (-0.62)
F value	11.903	26.321	11.897	11.897	24.312	10.416
R-square	0.014	0.122	0.014	0.014	0.132	0.014

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. T statistic in parentheses.

is the same as that of *Post×Treat*, indicating that government subsidies strengthen the influence of the GCP on green innovation input and play a moderating role, so H3a is assumed to be true. The regression coefficient of *Sub* in model (5) in Table 2 is 0.075, and the regression coefficient of *Sub* in model (5) in Table 3 and Table 4 is also positive (0.002 and 0.079, respectively), which proves that government subsidies are positively correlated with green innovation input; that is, government subsidies will increase enterprises' green innovation input.

Table 5. Bootstrap Mediation Effect Text for Model (4)

		Observed	Bootstrap	z	P>|z|	Normal-based	
		coef.	std. errs.			[95% Conf.	Interval]
Full sample	_bs_1	0.0020464	0.0008263	2.48	0.013	0.0004269	0.003666
	_bs_2	-0.0325712	0.0044311	-7.35	0	-0.041256	-0.0238863
GCRI	_bs_1	-0.0154648	0.013279	-1.16	0.244	-0.0414913	0.0105616
	_bs_2	-0.0412453	0.0171969	-2.40	0.016	-0.0749505	-0.0075401
NGCRI	_bs_1	0.0026657	0.0008185	3.26	0.001	0.0010614	0.0042699
	_bs_2	-0.030332	0.0038108	-7.96	0.000	-0.037801	-0.0228629

Model (6) reflects the moderating effect of government subsidies on the impact of green innovation input on sustainable development capacity of enterprises. The regression coefficient of *Rdinput*×*Sub* in model (6) in Table 2 is the same as that of *Post*×*Treat*, indicating that government subsidies strengthen the influence of green innovation input on enterprises' sustainable development capacity and play a moderating role, so hypothesis H3b is valid.

Robustness Test

Higgins' static sustainable growth model is based on a stable capital structure and dividend policy, so it has some shortcomings. In order to further test the sustainability of enterprises, the authors have used the calculation P×A×T×R/(1-P×A×T×R) to replace the original calculation method of explained variable by referring to the measurement method of sustainable development capability proposed by Huang et al. (2019). After the replacement of the explained variable, the regression results in each model are basically consistent with those of the original explained variables (Table 6), and the research conclusions are still valid, indicating that the research conclusions are reliable.

Summary of Research Hypotheses and Empirical Results

Table 7. Summary of Research Hypotheses and Empirical Results

Model	Hypothesis	Brief introduction to the research hypothesis	Empirical results	Conclusion
Model 1	H1a (+)	In the long run, the implementation of the GCP should be conducive to improving the sustainable development capacity of enterprises.	¯ Not significant	Not valid
	H1b (-)	At the present stage, the implementation of the GCP should have a negative impact on the sustainable development capacity of GCRI.	¯ Not significant	Valid
Model 2	H2a (+)	GCP is helpful to promoting green innovation input of enterprises.	Not significant	Valid
Model 3	H2b (-/+)	At the present stage, green innovation input has a negative impact on the sustainable development capacity of GCRI. The influence on the sustainable development capacity of unrestricted industries is positive.	¯ Not significant Not significant	Valid
Model 4	H2c	Green innovation input should have an intermediary effect between the GCP and sustainable development capacity of enterprises.	Mediation effect	Valid
Model 5	H3a	Government subsidies play a moderating role in the influence of the GCP on green innovation input.	Moderation effect	Valid
Model 6	H3b	Government subsidies play a moderating role in the influence of green innovation input on the sustainable development capacity of enterprises.	Moderation effect	Valid

Note: Collation by author: + means positive correlation, - means negative correlation.

CONCLUSION AND SUGGESTIONS

The GCP aims to encourage enterprises to reduce energy consumption, save resources, and promote the virtuous cycle and sustainable development of finance, enterprises, and ecology. In this research, the authors have studied the influence of the GCP on sustainable development capacity of enterprises, deconstructed its influence mechanism and internal logic through the mediating effect of green

innovation input and the moderating effect of government subsidies, and enriched and complemented the deficiencies of the existing literature. This paper provides a theoretical basis for evaluating the implementation effect of the Guidelines issued in 2012 and the further implementation of the upgraded Green Finance Guidelines for the Banking and Insurance Industries in 2022. Through this empirical research, the authors have drawn the following conclusions and suggestions.

Conclusions

First, the implementation of the GCP does not improve the sustainable development capacity of enterprises and has a negative impact on the sustainable development capacity of enterprises, which is restricted by heavy pollution. The reasons are roughly divided into two categories. One is that financial institutions such as the banking industry did not respond positively to the introduction of the GCP, due to considerations of cost and risk prevention; in addition, enterprises cannot get required funds in time, which affects their business performance and sustainable development capacity. The second reason is that the enterprises of GCRI are busy rationalizing, facing the situation of survival, transformation, and upgrading. Transformation and upgrading are an extremely complicated and long process for enterprises, even if companies get funds from the government and the banks under the GCP. This combined with changes to the domestic and foreign economic environment in recent years, and the impact of various factors such as the COVID-19 pandemic, means that the business performance of enterprises will be affected. Therefore, the implementation of the GCP has no significant effect on the sustainable development capacity of Chinese enterprises.

Second, the GCP promotes enterprises' green innovation input, and green innovation input improves the sustainable development capacity of unrestricted enterprises, but reduces the sustainable development capacity of restricted enterprises. In other words, green innovation input plays a negative intermediary effect between the GCP and sustainable development capacity of enterprises in restricted industries, and plays a positive intermediary effect between the GCP and sustainable development capacity of enterprises in unrestricted industries. This indicates that the implementation of the GCP is more conducive to the sustainable development of unrestricted enterprises, and restricts the development of restricted enterprises to a certain extent, thus proving that the implementation of the GCP plays a certain regulatory role.

Third, government subsidies not only strengthen the influence of the GCP on green innovation input, but also strengthen the influence of green innovation input on the sustainable development capacity of enterprises. In other words, government subsidies play a moderating role between the GCP, green innovation input, and sustainable development capacity of enterprises. This shows that government subsidies are the most direct and effective way toward, and play an indispensable role in, the sustainable development of enterprises.

Suggestions

Empirical research shows that the GCP is not ideal in improving the sustainable development capacity of enterprises, which requires the joint efforts of the government, banks, and enterprises.

Suggestions for the Government

The authors offer three suggestions for the government: First, the government should unswervingly promote the GCP and issue a series of laws and regulations or implementation rules in line with the GCP. It should constantly improve the green credit standards, evaluation system, and reward system, so as to achieve a virtuous cycle of banks having the motivation to respond and enterprises having the ability to upgrade.

Second, the government should continue to increase the dynamics and scope of government subsidies for green innovation, and adopt supporting financial, economic, and tax reduction policies to help enterprises that have the potential and ability to achieve green transformation and upgrading.

Third, the government should establish an information-sharing platform and use digital technology to connect the basic database of enterprise environmental information and financial credit information, so as to provide an environmental assessment basis for banks and other financial institutions to make green credit decisions.

Suggestions for Banks

Banks, as operators, have autonomy and decision-making power on how to operate funds, how to prevent risks, and how to obtain benefits. The GCP is introduced by the government, and the banks are the specific locus of implementation and the promoters. Therefore, the authors suggest that banks should take the following three actions:

First, banks should change their business philosophy and strengthen their confidence in green innovation. The Chinese government's introduction of the GCP in 2012 has changed the business philosophy and behavior of banks, forcing banks to fulfill their social responsibilities, pay attention to environmental protection, balance the relationship between economic and social benefits, and achieve results. Although the implementation effect of the GCP is not ideal at present, it is only a matter of time. Most Chinese enterprises, especially restricted industries, are currently in the process of transformation and upgrading. The authors believe that the sustainable development capacity of enterprises will be improved after the success of green innovation input, and transformation and upgrading.

Second, banks should positively respond to and implement the GCP, make full use of the information-sharing platform established by the government, optimize the selection of green enterprises or heavily polluting enterprises capable of transformation and upgrading, support the green innovation and sustainable development of enterprises, and finally, realize the win-win virtuous circle between banks and enterprises.

Third, banks should actively innovate financial products; accelerate product innovation in green bonds, green insurance, and green funds; and improve service efficiency.

Suggestions for Managers of Enterprises

Enterprises are the beneficiaries of the GCP. The following are three suggestions for their managers:

First, managers should have the courage to burn the rubber-brush and the spirit to work hard. In particular, highly polluting enterprises restricted by green credit policies will face a life-or-death situation. Managers need clear strategic positioning and appropriate measures to overcome this situation. Managers should increase investment in green innovation and accelerate the progress of green transformation and upgrading, so that the government and banks can see the potential of sustainable development of enterprises.

Second, managers should take advantage of the GCP to raise funds actively. In addition to their own funds, they should make full use of preferential government policies and subsidies, as well as the support of green credit funds from banks, to provide financial guarantee for green innovation and transformation of enterprises.

Third, enterprises should achieve the output of green innovation as soon as possible through effective operation and management means, so that they have the vitality of green innovation and the ability of green transformation to truly realize the ultimate goal of government-bank-enterprise collaborative efforts—namely, the sustainable development of enterprises.

RESEARCH DEFICIENCIES AND FUTURE RESEARCH DIRECTIONS

Research Deficiencies

The impact of the GCP on the sustainable development capacity of enterprises is a very extensive research topic. This paper offers only preliminary and exploratory research on it. As well, due to the

limitations of the authors' research ability, their research means and methods, and their data and data sources, some views and conclusions in this paper may not be perfect and may have some deficiencies. The first limitation is in regards to the measurement of sustainable development capability. The authors have used Higgins' static sustainable growth model, which is widely recognized by scholars. Although the data in this model are available and easy to calculate, it has some limitations because it is designed based on stable capital structure and dividend policy. The second limitation concerns the measurement of green innovation input. Since there is no independent green innovation input index in the data published by listed companies, using R&D input scaled operating income to measure the green innovation input of enterprises can only be a substitute variable, which may have a certain deviation from the reality.

Future Research Directions

A first potential area of future research is the measurement of sustainable development capacity. In this paper, the authors have discussed the definition of sustainable development capacity of enterprises; that is, the potential of coordinated, sustained, and stable development of enterprises within a specified time and the completion of predetermined goals—in other words, sustainable business ability, whose key is to balance the contradiction between economic growth, social development, and environmental protection. Which indicators, including financial indicators and non-financial indicators, should be used to measure sustainability needs further research and discussion.

A second area of future research is the implementation effect of the GCP. At present, the overall sample is not significant. In addition to some indicators the authors have mentioned in this paper, there may be interference from political, economic, environmental, and other factors in the process of model design. It is also necessary to analyze these interference factors. In addition, green innovation and green transformation of enterprises are lengthy processes, so the implementation effect of the GCP needs to be verified for a longer timeline.

A third area of future research is case studies. Based on large samples, in this paper the authors have investigated the impact of green credit policies on the sustainable development capacity of Chinese enterprises as a whole. In the future, research should focus on successful cases of green innovation and green transformation in heavily polluting industries, in order to promote the development of heavy polluting enterprises in China.

AUTHOR NOTE

The authors declare that there are no conflicts of interest.

This research was supported by the National Social Science Foundation of China [grant number 21BGL110].

REFERENCES

Ba, S., & Peng, W. (2022). 英国绿色金融实践:演变历程与比较研究 [Green finance practices in the UK: Evolution and comparative study]. *Reform of Administration*, *152*(4), 106–116.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, *119*(1), 249–275. doi:10.1162/003355304772839588

Cao, X., & Gao, B. (2014). 基于区域差异系数的中小企业可持续发展能力评价 [Evaluation of sustainable development ability of small and medium-sized enterprises based on regional difference coefficient]. *Journal of Commercial Economics*, *643*(24), 102–104.

Deng, X., Wu, Y., Wang, J., & Wang, P. (2022). 商业银行绿色金融发展指标体系构建及测度 [The construction and measure of the green financial development index system of commercial banks]. *Statistics and Decision Making*, *38*(9), 138–142.

Fan, D., & Zhang, X. (2021). 绿色金融改革创新对低碳企业可持续发展能力的影响研究 [Study on the impact of green finance reform and innovation on the sustainable development ability of low-carbon enterprises]. *Scientific Management Research*, *39*(3), 78–83.

He, L., Wu, C., Yang, X., & Liu, J. (2019). Corporate social responsibility, green credit, and corporate performance: An empirical analysis based on the mining, power, and steel industries of China. *Natural Hazards*, *95*(1–2), 73–89. doi:10.1007/s11069-018-3440-7

Higgins, R. C. (1977). How much growth can a firm afford? *Financial Management*, *6*(3), 7–16. doi:10.2307/3665251

Hou, P., Zhou, M., Xu, J., & Liu, Y. (2021). Financialization, government subsidies, and manufacturing R&D investment: Evidence from listed companies in China. *Sustainability*, *13*(22), 12633. doi:10.3390/su132212633

Hu, G., Wang, X., & Wang, Y. (2021). Can the green credit policy stimulate green innovation in heavily polluting enterprises? Evidence from a quasi-natural experiment in China. *Energy Economics*, *98*, 105134. doi:10.1016/j.eneco.2021.105134

Hu, T., & Tu, Z. (2022). 绿色金融与企业高质量发展:激励效应与抑制效应［Green finance and high-quality enterprise development: Incentive and disincentive effects]. *Finance and Economics*, *409*(4), 133–148.

Hu, Y., & Zheng, J. (2021). Is green credit a good tool to achieve "double carbon" goal? Based on coupling coordination model and PVAR model. *Sustainability*, *13*(24), 14074. doi:10.3390/su132414074

Huang, L., Ying, Q., Yang, S., & Hassan, H. (2019). Trade credit financing and sustainable growth of firms: Empirical evidence from China. *Sustainability*, *11*(4), 1032. doi:10.3390/su11041032

Jia, L., Nam, E., & Chun, D. (2021). Impact of Chinese government subsidies on enterprise innovation: Based on a three-dimensional perspective. *Sustainability*, *13*(3), 1288. doi:10.3390/su13031288

Li, P., & Chen, X. M. (2016). 国民企业薪酬与政策变量:一个分析框架 [State-owned enterprises compensation and policy variables: An analytical framework]. *Reform*, *268*(6), 120–132.

Liu, L. G. (1999). 企业可持续发展理论研究—21世纪企业发展的主题 [Study on the theory of enterprise sustainable development: The theme of enterprise development in the 21st century]. *Journal of Liaoning University*, *4*, 1–4.

Nedopil, C., Dordi, T., & Weber, O. (2021). The nature of global green finance standards: Evolution, differences, and three models. *Sustainability*, *13*(7), 3723. doi:10.3390/su13073723

Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *The Journal of Economic Perspectives*, *9*(4), 97–118. doi:10.1257/jep.9.4.97

Rennings, K. (2000). Redefining innovation— Eco-innovation research and the contribution from ecological economics. *Ecological Economics*, *32*(2), 319–332. doi:10.1016/S0921-8009(99)00112-3

Shi, J., Lu, Z., & Chen, B. (2019). 府补助、市场势力与企业创新 [Government subsidies, market power, and enterprise innovation]. *Soft Science*, *33*(11), 53–58.

Su, D., & Lian, L. (2018). 绿色信贷是否影响重污染企业的投融资行为? [Whether green credit affects the investment and financing behavior of heavily polluting enterprises?]. *Finance Research*, *462*(12), 123–137.

Thompson, P., & Cowton, C. J. (2004). Bringing the environment into bank lending: Implications for environmental reporting. *The British Accounting Review*, *36*(2), 197–218. doi:10.1016/j.bar.2003.11.005

Tseng, M. L., Wang, R., Chiu, A. S., Geng, Y., & Lin, Y. H. (2013). Improving performance of green innovation practices under uncertainty. *Journal of Cleaner Production*, *40*, 71–82. doi:10.1016/j.jclepro.2011.10.009

Wang, X., & Wang, Y. (2021). 绿色信贷政策增进绿色创新研究 [Research on green credit policy to promote green innovation]. *Management World, 37*(6), 173–188+11.

Wen, Z., & Ye, B. (2014). 中介效应分析:方法和模型发展 [Analysis of mediating effects: Development of methods and models]. *Xinli Kexue Jinzhan*, *22*(5), 731–745. doi:10.3724/SP.J.1042.2014.00731

Wu, J., & Shang, J. (2021). Green credit financing equilibrium under government subsidy and supply uncertainty. *Sustainability*, *13*(22), 12917. doi:10.3390/su132212917

Wu, X. (2021). 碳中和目标与绿色金融发展 [Carbon neutrality goal and green finance development]. *China Finance*, *943*(1), 72–74.

Xu, X., & Li, J. (2020). Asymmetric impacts of the policy and development of green credit on the debt financing cost and maturity of different types of enterprises in China. *Journal of Cleaner Production*, *264*, 121574. doi:10.1016/j.jclepro.2020.121574

Xu, Y., Li, S., Zhou, X., Shahzad, U., & Zhao, X. (2022). How environmental regulations affect the development of green finance: Recent evidence from polluting firms in China. *Renewable Energy*, *189*, 917–926. doi:10.1016/j.renene.2022.03.020

Yao, S., Pan, Y., Sensoy, A., Uddin, G. S., & Cheng, F. (2021). Green credit policy and firm performance: What we learn from China. *Energy Economics*, *101*, 105415. doi:10.1016/j.eneco.2021.105415

Zhang, A., Deng, R., & Wu, Y. (2022). Does the green credit policy reduce the carbon emission intensity of heavily polluting industries? Evidence from China's industrial sectors. *Journal of Environmental Management*, *311*, 114815. doi:10.1016/j.jenvman.2022.114815 PMID:35247760

Zhang, G., Fang, C., Zhang, W., Wang, Q., & Hu, D. (2019). How does the implementation of the new environmental protection law affect the stock price of heavily polluting enterprises? Evidence from China's capital market. *Emerging Markets Finance & Trade*, *55*(15), 3513–3538. doi:10.1080/1540496X.2019.1648250

Zhang, J., & Lu, S. (2022). 绿色信贷政策对企业创新绩效的影响 [The impact of green credit policies on enterprise innovation performance]. *Statistics & Decisions*, *38*(7), 179–183.

Zhang, J., Luo, Y., & Ding, X. (2022). Can green credit policy improve the overseas investment efficiency of enterprises in China? *Journal of Cleaner Production*, *340*, 130785. doi:10.1016/j.jclepro.2022.130785

Zhang, Z., Duan, H., Shan, S., Liu, Q., & Geng, W. (2022). The impact of green credit on the green innovation level of heavy-polluting enterprises: Evidence from China. *International Journal of Environmental Research and Public Health*, *19*(2), 650. doi:10.3390/ijerph19020650 PMID:35055471

Liangliang Han is a professor in the department of business administration at the Business School of Liaoning University; a doctor of management, doctoral supervisor, and postdoctoral co-supervisor; and the vice dean for the department of business administration. He is the executive vice president of China Enterprise Reform and Development Institute. He is one of the Liaoning province thousands of talents (thousands of levels). His research interests include corporate governance and corporate finance. He has presided over two projects for the National Social Science Foundation, five projects for the Humanities and Social Science Foundation of the Ministry of Education, and other key provincial projects. He has published more than twenty papers in journals such as Accounting Research, Nankai Management Review, Management Review, Management Science, Sustainable Development, Environmental Science, and Pollution Research. These research achievements have won nine second and third prizes for outstanding achievements in philosophy and social sciences in Liaoning Province.

Shangshu Liu is a PhD candidate in accounting at the Business School of Liaoning University. She received a bachelor's degree in management (accounting) and a bachelor's degree in English literature from Shenyang Ligong University in 2013. She received her master's degree in management (business administration) from the University of Illinois Chicago in 2014. She primarily engages in accounting, corporate governance, and humanities and social science research work. In recent years, she has presided over and participated in five provincial and municipal scientific research projects, and participated in compiling three sets of teaching materials. She has published three academic papers in journals including Business Research.