The Asian Institute of Research
Economics and Business Quarterly Reviews
Vol.7, No.4, 2024: 75-89
ISSN 2775-9237

DOI: 10.31014/aior.1992.07.04.621

The Influence of Green Credit on the Operating Performance of Commercial Banks in China

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Abstract
Using panel data from 35 listed banks' annual reports and corporate social responsibility reports from 2009 to 2022 as a sample, this study empirically examines the impact of green credit on the performance of commercial banks and takes China Merchants Bank as the case analysis object. Based on the theory of green finance, this paper discusses the function mechanism of the effect of green credit on commercial banks by empirical method, heterogeneity analysis and robustness test. Then, using the specific business data of China Merchants Bank in the field of green credit and its business performance data, the paper further reveals the specific impact of green credit on the business performance of the bank. The research shows that commercial banks have improved their asset income ability through green credit, significantly enhanced their operating efficiency in social responsibility and risk control, and positively impacted the overall operating effect. Finally, this paper suggests that green credit can positively promote commercial banks' performance and point out a new path for the sustainable development and social responsibility of commercial banks. This research has not only contributed to theory but also provided important reference for practice.

Keywords: Green Credit, Commercial Bank, Business Performance, Impact Analysis

1. Introduction and Background

With the rapid development of China's economy, ecological, and environmental issues have gradually become the focus of widespread social attention. The excessive consumption of resources and the continuous deterioration of the ecological environment have become important factors restricting the sustained and healthy development of China's economy. In response to this challenge, the state actively promotes the development of a green economy and the construction of a green financial system, to guide the flow of funds to environmental protection and green industries through financial means, thereby promoting sustainable development. Since the country successively launched the "Green Credit Guidelines," "Energy Efficiency Credit Guidelines", and "Guiding Opinions on Building a Green Financial System", my country's green credit business has shown a rapid growth trend. According to social responsibility reports disclosed by various commercial banks, as of the end of 2023, the green credit balance of 21 significant banks reached 27.2 trillion yuan, a year-on-year increase of 31.7%.

However, as a financial product with both public welfare and commercial nature, the promotion and application of green credit not only brings a positive impact on society and the environment but also exerts a certain pressure on the operating performance of commercial banks. In the short term, since green credit projects tend to have low profitability, this is undoubtedly a squeeze on the profit margins of commercial banks pursuing profit maximization. However, from a long-term perspective, green credit can help guide funds to the fields of environmental protection and energy conservation, improve the quality of bank assets, reduce the ratio of non-performing loans, and thus positively impact banks in terms of risk management and brand reputation.

The economic transformation and the construction of a green development model that China is experiencing require the active participation and support of financial institutions, especially commercial banks. Optimising the green credit business can not only promote the sustainable development of banks themselves but also contribute to solving environmental problems and promoting the green transformation of the economy. The research in this paper aims to explore the relationship between green credit and the operating performance of commercial banks, to find a balance between the two and promote commercial banks to fulfil their social responsibilities better while realizing their value (Wang Shuo et al., 2023).

Finally, this research is also profoundly significant for promoting the improvement and implementation of green credit policies. Empirical research on the impact of green credit on the operating performance of commercial banks can provide data support and policy suggestions for the government to formulate and improve green credit policies and promote the widespread promotion and application of green credit in China.

From the perspective of theoretical value, the research deepens the understanding of green finance theory. As an essential part of green finance, green credit, its operation mechanism, influence path, differences and connections with traditional credit models, etc., are all issues that need to be deeply discussed in green finance theory. Through the research on the impact of green credit on the operating performance of commercial banks, we can further enrich and improve the theoretical system of green finance, and provide new perspectives and ideas for the research in the field of green finance. Secondly, the research helps reveal the internal relationship between green credit and commercial banks' operating performance. Through an in-depth analysis of the impact of green credit on commercial banks' asset structure, risk management, business innovation, etc., we can reveal the mechanism of green credit in improving commercial banks' operating performance and provide a theoretical basis for commercial banks to formulate green credit policies.

From the perspective of practical value, first, this research helps promote commercial banks' green transformation. With the increasingly severe global climate change and environmental problems, green credit has become an important direction for the transformation and development of commercial banks. An in-depth study of the impact of green credit on commercial banks' operating performance provides practical guidance for commercial banks to formulate green credit development strategies. It promotes them to develop in a more sustainable direction. Secondly, this research helps improve the risk management level of commercial banks. Green credit pays attention to environmental protection and sustainable development. Commercial banks must strengthen the assessment and monitoring of environmental risks in loan approval and management. Studying the impact of green credit on the risk management of commercial banks can provide a reference for commercial banks to improve the level of environmental risk management.

2. Research methods

This study uses empirical analysis and selects China Merchants Bank as a case to comprehensively evaluate the impact of green credit on commercial bank operating performance from the dimensions of profitability, scale and liquidity, and conduct an in-depth analysis of the relationship between green credit and commercial bank operating performance. Conduct in-depth analysis and put forward targeted policy recommendations.

2.1. Research status at home and abroad

2.1.1. Foreign research

In the international financial community, environmental, social, and governance (ESG) standards are becoming important in measuring the social responsibility of financial institutions. Especially for the banking industry, the interaction between green credit and ESG performance has received widespread attention as a critical way to fulfil its social responsibilities. The data shows a positive correlation between the ESG performance of banks and the green credit business. This shows that excellent ESG performance can encourage banks to conduct more green credit business. Furthermore, these studies also explore the impact of green credit on bank performance. For example, Weber et al. (2010) found that incorporating sustainability indicators into credit risk management can improve the accuracy of bank credit rating systems, and Bose et al. (2021) believed that bank green performance is positively correlated with financial performance. Zhou (2021) pointed out that sustainable finance may hurt bank financial performance in the short term. Compared with foreign research on sustainable finance and Equator Principles, China's green credit research focuses more on its impact on commercial banks' business structure and risk management.

2.1.2. Domestic research

Domestic research shows differences in the influence of green credit on the operating performance of commercial banks. Lin Zhang and Yonghui Lian (2019) and Wenwei Guo and Yingdi Liu (2019) show that green credit has different effects on the financial performance of different types of banks, while Jianqiong Wang and Ke Dong (2019) believe that green credit may reduce profitability in state-owned commercial banks. The research of Zhang Chen and Dong Xiaojun (2018) proposed an inverted U-shaped relationship; that is, the impact of green credit on bank performance varies with the proportion. These research results show that domestic and foreign scholars' understanding of the impact of green credit on the operating performance of commercial banks is still deepening and enriching. As more and more banks begin to carry out green credit business, improving relevant data will help conduct a more comprehensive discussion in this field. These research results reveal that the cognition of green credit's impact on commercial banks' operating performance is deepening and enriching at home and abroad. Especially as more and more banks carry out green credit business, the improvement of relevant data will help to explore this more comprehensively. field. Therefore, this paper profoundly studies the impact mechanism of green credit on the operating performance of commercial banks, and focuses on the green credit business of China Merchants Bank, providing a new case analysis and perspective for strengthening the cognition of the impact of green credit.

2.1.3. Innovations and shortcomings of this article

The innovation of this study lies in adopting the empirical analysis method and taking China Merchants Banks' green credit business as a case; it deeply studies the influence mechanism of green credit on commercial banks operating performance. Through empirical analysis and case analysis, this paper deeply excavates the positive impact of green credit on the overall operating performance of banks in terms of asset profitability, brand image and customer relationship, which provides a new perspective and empirical case for research in related fields. However, this study still has some shortcomings. First, this study lacks research on the quantitative relationship between green credit and business performance. Secondly, the specific characteristics of China Merchants Bank may not be universal, so the research results need to be cautious when extending to other commercial banks. Finally, there is relatively little research on the impact of other external factors on green credit, leaving room for further improving the research conclusions.

2.2. Related concepts and theoretical basis

2.2.1. Definition of green credit

Green credit policy is a series of credit measures adopted by the banking industry in response to the national environmental protection policy. It aims to reduce financial support for environmentally unfriendly enterprises and, at the same time, encourage the flow of funds to green environmental protection projects. It also supports these projects by providing more favourable loan conditions. In China, such credit activities mainly focus on green projects such as clean energy, and the beneficiaries are primarily large state-owned and central enterprises. In contrast, small and micro enterprises still face challenges obtaining green credit. Currently, to promote the construction of ecological civilisation and green economic transformation, the Chinese government and regulatory agencies have launched numerous policies and measures to support green credit. In this context, commercial banks have become a key force in implementing green credit policies and supporting environmentally friendly projects.

Green credit is not only the way banks support environmental protection projects, but also significantly affects banks' business operations and management strategies. By introducing the concept of environmental protection into credit activities, the loan standards for certain enterprise groups have been improved. At the same time, financial support has been provided for environmental protection projects, which has promoted the development of clean energy and other fields.

2.2.2. The development history and current situation of green credit

1. A preliminary study and boundary period of green credit (2007-2010)
At this stage, as an emerging concept, green credit began to enter the vision of scholars and financial practitioners. There are two primary schools of discussion on the definition of green credit: On the one hand, some people believe that green credit mainly refers to financial institutions paying more attention to environmental protection and effective allocation of resources in their business activities, emphasising loan approval, capital investment, etc. Consider environmental factors and impose stricter loan conditions on enterprises with heavy pollution. On the other hand, some scholars believe that green credit should guide capital to environmentally friendly projects and industries through financial means under the guidance of national policies and promote the green transformation of the economic structure. In addition, the financial community has also formed several consensuses on the development of green credit, including the need to establish the concept of green development, improve the incentive and restraint mechanism of green credit, and continuously promote the innovation of financial products and services to meet the dual requirements of economic development and environmental protection.

2. The precipitation and system construction period of green credit (2011-2015)
This stage of research began to analyze the challenges and problems faced by the development of green credit deeply and tried to build a more systematic green credit system. In terms of external factors, the research points out that the public's insufficient awareness of green credit, poor information exchange mechanism and imperfect green credit policy system are the main obstacles. Internal factors include insufficient theoretical and technical support for green credit, limited innovation ability for financial products and services, and incomplete green credit market systems. To solve these problems, a series of solutions are put forward, including strengthening public education and awareness raising, improving information exchange mechanisms, establishing and improving green credit policies and legal frameworks, promoting innovation of financial products and technologies, etc., to provide a more solid foundation for the development of green credit.

3. The mature development and strategy implementation period of green credit (2016-present)
During this period, the research and practice of green credit have achieved remarkable results. The focus has shifted from concept definition and system construction to how to implement green credit policies and measures effectively. Scholars have proposed strengthening fiscal and taxation policy incentives, legal and institutional support to prevent green credit from not living up to its name; At the same time, it is suggested to promote environmental protection and sustainable economic development by adjusting environmental tax rate and strengthening credit restraint mechanism. In addition, green credit is considered to be a key tool to achieve the national "dual carbon" strategic goal, and it is necessary to construct an effective incentive mechanism, improve the legal and policy system, and rely on the guidance and support of the government to promote the in-depth development and wide application of the green credit system (Hongyan Zeng and Xunjiao Zhao, 2024).

The development history of green credit shows the process from initial exploration, gradual precipitation to mature development, which not only reflects the gradual enhancement of the financial industry's responsibility for environmental protection, but also reflects the important role of green financial instruments in promoting the transformation of the green economy. In this process, the concept, practice and policy of green credit have been continuously deepened and improved, providing important financial support for promoting the dual goals of economic development and environmental protection. As the global economy continues to transform into green and low-carbon, green credit, as an important part of financial innovation, will continue to play its key role in promoting sustainable development.

2.2.3. Policy background and supporting measures of green credit

1. Policy background of green credit
The policy background of green credit is mainly based on the environmental problems faced by the world and China, the transformation needs of economic development models, and the increasing emphasis on sustainable development by financial institutions, governments, enterprises and other parties. First of all, problems such as global warming, air pollution, resource scarcity and population expansion are gradually threatening the living environment of human beings. In China, despite the rapid economic development, the extensive economic development mode has not been fundamentally changed, resulting in excessive cost of resources and environment in the process of economic growth. These problems have aroused great concern from all walks of life to environmental protection and sustainable development. Second, financial institutions are beginning to realize the importance of environmental and social issues to their businesses, and hope to incorporate these factors into the consideration of loan business. Many governments have introduced a series of policies and measures to promote the development of green credit, including tax incentives, loan subsidies, and strengthening the approval and supervision of green credit projects. In China, the government has also responded positively to this global trend. For example, the "Guiding Opinions on Green Credit Policies" was released in 2023, which clearly requires banks and financial institutions to introduce green finance concepts into credit business, focusing on supporting green industries and environmentally friendly projects. The document also proposes a series of concrete measures, such as the establishment of a green letter classification guidelines for loan business, establishment of a dedicated green credit team, strengthening the review and supervision of green projects, and promoting the development of green credit products (Qiao Dong et al., 2024).

The content and significance of green credit policy also reflect its policy background. Green credit policy encourages more enterprises and individuals to participate in investment in the green economy through preferential loan interest rates, special credit products, green assessment and monitoring, and incentive mechanisms, and promotes the popularization and implementation of the concept of sustainable development.

The policy background of green credit comes from the environmental challenges faced by China and the world, the transformation needs of economic development models, and the increasing emphasis on sustainable development. Both the government and financial institutions hope that through this policy, funds will be guided to green industries and the harmonious development of economy, environment and society will be promoted.

2. Support measures for green credit
China's support for green credit is mainly manifested in policy guidance, mechanism construction, incentive mechanisms and international cooperation. From the perspective of policy guidance, the Chinese government has issued a series of policy documents to determine the development direction and support priorities of green credit. These policies have prompted financial institutions to increase financial support in clean energy, green manufacturing and green buildings to promote the industry’s transformation to high-speed development. Not only that, governments around the world have also introduced green financial standards to clearly guide and regulate financial institutions. In terms of mechanism construction, my country actively promotes financial institutions to establish green franchise institutions or green business departments to specifically undertake green credit business. These organizations are highly professional and flexible in loan approval, risk management and product innovation, and can better adapt to the investment and financing needs of green projects. The government has also promoted the development of green credit statistical system and information sharing mechanism, enabling it to better monitor and evaluate the effectiveness of green credit implementation. As shown in Figure 1, the balance of local and foreign currency green loans of my country’s financial institutions has increased year by year in recent years, and their contribution has increased year by year. From the perspective of incentive mechanism, the Chinese

government encourages financial institutions to actively participate in the development of green credit business by providing tax incentives and loan subsidies. In addition, the government has set up a green credit fund to fund the development and progress of green credit projects. These measures are helping to reduce the cost and risk of green credit supply for financial institutions. At the same time, it has enhanced the enthusiasm of financial institutions to participate in green credit. At the same time, in international cooperation, the Chinese government actively cooperates with other countries, regions and international organizations around the world to exchange green credit experiences and practices, and work together to promote global sustainable development. By participating in the establishment of international green finance standards and rules, China's green credit business has been further standardized and developed

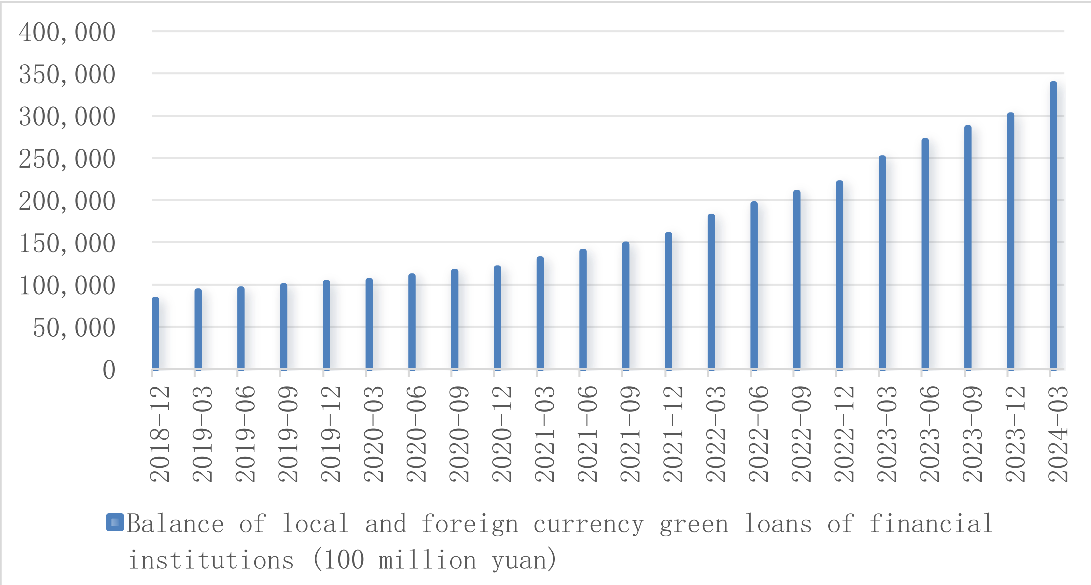

Figure 1: Incremental contribution of green loans (financial institution caliber)

Source: Statistics of the Peoples Bank of China

On the whole, China's green credit support measures involve policy guidance, mechanism construction, incentive mechanism and international cooperation, which jointly promote the rapid development of China's green credit business.

2.2.4. The impact mechanism of green credit on the operating performance of commercial banks

1. Research samples

This study selects the panel data from the annual reports and corporate social responsibility reports of 35 listed banks from 2009 to 2022 as the research sample. This paper discusses how the balance of green credit of banks affects the operating performance of banks, and analyzes the actual effect of the implementation of green credit policies on improving the operating performance of commercial banks. The green credit balance data is obtained from the corporate social responsibility report, while the information about bank performance and other control variables is obtained from the Guotaian database.

3. Analytical methods

3.1. Theoretical analysis and assumptions

As an important business tool for commercial banks to promote sustainable development and assume environmental responsibility, green credit has a huge impact on banking business structure. By providing loan support for environmental protection projects and green enterprises, banks can not only promote the development of green economy, but also adjust and optimize their own profit structure to a certain extent to achieve green and diversified business.

First of all, green credit promotes the transformation of banks' profitable businesses into green, low-carbon, and environmentally friendly fields. With the increasingly serious global climate change and environmental problems, the development of green economy, low-carbon economy, circular economy and other fields has attracted more and more attention. Banks support the development of green industries by increasing credit for green projects (as shown in Figure 2 and Figure 3), thereby promoting the optimization and upgrading of their own profit structure.

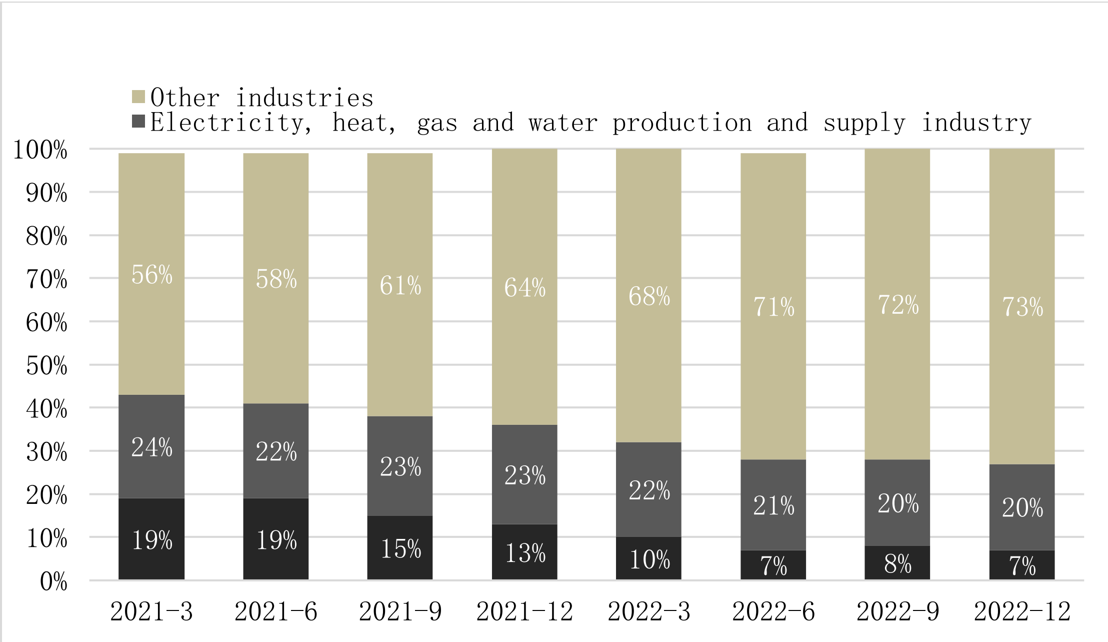

Figure 2: My country's green loan investment (by purpose, incremental TTM)

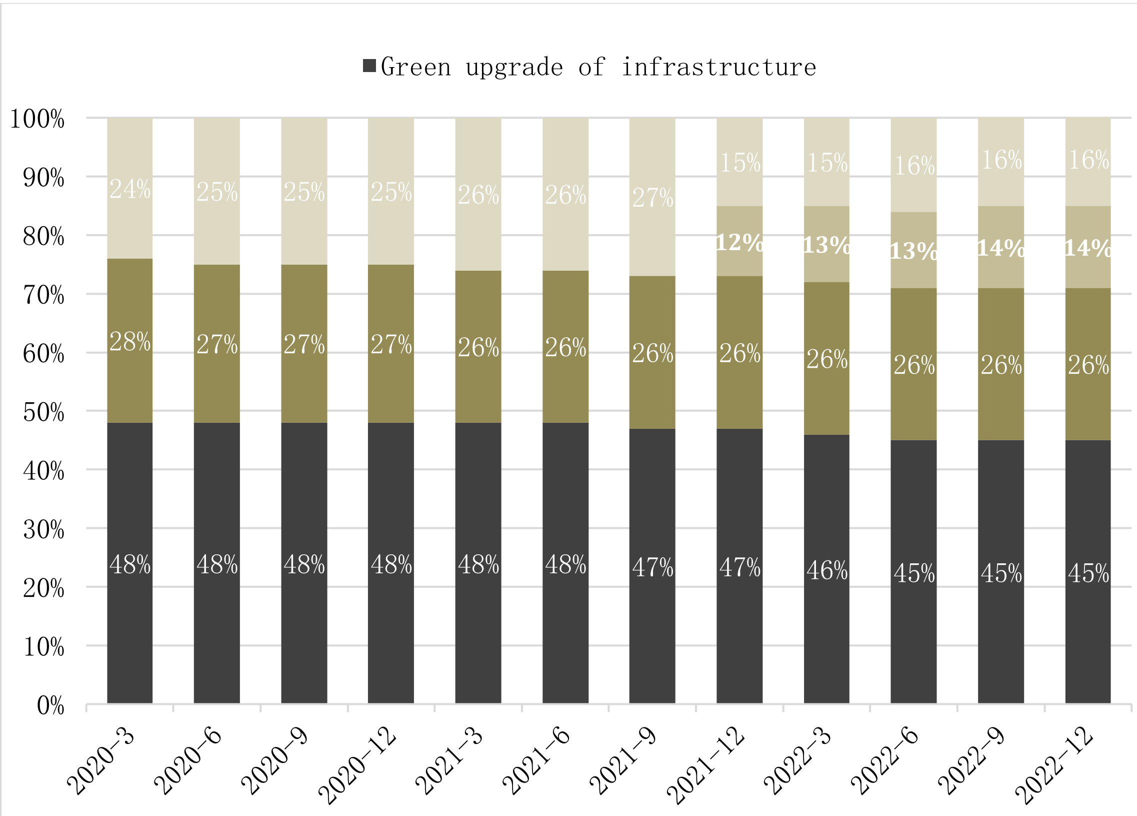

Figure 3: My country's green loan investment (by purpose, stock caliber)

Data source: Ping An Securities Industry Report Green Finance Series (8): "Seizing New Opportunities for Transformational Financial Development under the G20 Consensus"

Not only that, but green credit has also promoted innovation in banking business. In the process of promoting green credit, banks need to constantly explore new business models, products and services to meet the financing needs of green industries and projects. This helps to promote the innovation and development of banking business, thereby enhancing the profitability and market competitiveness of banks (Kou Fangfang and Cai Yuping, 2023).

Based on the above theoretical analysis, this paper makes the following assumptions:

H1: Green credit promotes the improvement of commercial banks operating performance.

H2: Compared with other types of banks, green credit of joint-stock commercial banks has a greater effect on improving operating performance.

3.2. Model setting and variable definition

In order to study the impact of green credit on bank performance, the following regression model is established:

$$Roe = \beta_0 + \beta_1 GC + \beta_2 Size + \beta_3 Lev + \beta_4 Growth + \beta_5 Top1 + \varepsilon_1 \quad (3.1)$$

Profitability is the core of business performance of commercial banks. Among them, net profit is the key indicator of the profitability of the banking industry, which directly reflects the operating results of banks in a certain period of time. In addition, return on total assets, return on equity (ROE), Indicators such as net interest margin are also important parameters to measure bank profitability (Ye Huiying, 2024). In this paper, R OE indicator is used to measure the performance of banks. The higher the return on net assets, the better the performance of banks is. In order to reflect the impact of green credit on bank performance more effectively and correctly, green credit balance (GC) is selected as a proxy variable for regression. Among the control variables considered, Size (bank Size) is evaluated by the logarithm of the banks' total assets, which reveals the Size of the bank to some extent; Lev (asset-liability ratio) indicates the debt level of the bank, and the reduction of the debt ratio means the improvement of the banks solvency, which is beneficial to improving the overall performance of the bank; The rise in Growth (revenue Growth rate) reflects the improvement of bank profitability; Top1 (the shareholding ratio of the largest shareholder) shows the high concentration of equity of listed commercial banks. The higher the equity concentration, the higher the equity concentration of the bank.

4. Empirical results and analysis

4.1. Variable descriptive statistics

Table 1 shows the descriptive statistical results of variables. The average ROE of 35 listed banks is 14.120%, indicating that Chinas commercial banks have a good net asset return ability. The average value of bank green credit (GC) is 6.261, the minimum value is 0.000, and the maximum value is 9.897, indicating that the implementation of green credit policies by banks is quite different.

Table 1: Variable description statistics

Symbols	Definition	Observations	Average	Standard deviation	Minimum Value	Maximum value
ROE	Amount of profit/net assets * 100	320	14.120	4.515	6.449	24.604
GC	Logarithm of green loan balance	320	6.261	3.242	0.000	9.897
Size	Logarithm of asset size	320	28.481	1.514	25.418	31.155

Lev	Total liabilities/Total assets * 100	320	92.846	1.182	90.588	95.804
Growth	Revenue growth rate * 100	320	12.103	13.032	-13.894	50.769
Top1	Shareholding ratio of the largest shareholder * 100	320	26.715	17.926	4.309	67.546

4.2. Empirical results analysis of the impact of green credit on commercial bank performance

4.2.1. Model effect setting and regression results

The model showed that the F statistic was significantly 16.32 (P = 0.0000) at the 1% level through Wald test, so the fixed effect was selected between mixed effect and fixed effect, and the Hausman test method was used to select the fixed effect and random effect, and the result was significantly 25.93 (P = 0.0001) at the 1% level. Therefore, the fixed effects model should be selected for this model (see Table 2).

Table 2: Model Testing

F test	Hausman test
16.32	25.93
0.0000	0.0001

4.2.2. Empirical results analysis of the impact of green credit on bank performance

The base regression is performed on the model, and the results are as follows:

Table 3: Green Credit and Bank Performance Basic Regression

	ROE
GC	0.112*** (0.042)
Size	-1.856*** (0.341)
Lev	2.294*** (0.138)
Growth	0.057*** (0.009)
Top1	0.008 (0.029)
Constant	-147.582*** (20.238)
R2 _ w	0.793
N	320.000

Note: Standard errors are in parentheses, and * * *, * * and * indicate that they are significant at the levels of 1%, 5% and 10% respectively.

From the results of the model in Table 3, the regression coefficient of green credit (GC) is 0.112, which is significant at the level of 1%. The regression coefficient of green credit is positive, indicating that green credit can improve the performance of banks. There is a positive correlation between the two. The green credit of banks is conducive to improving their performance. H1 is verified.

From the in-depth analysis of the above conclusions, we can clearly observe that green credit does have a positive impact on the performance of banks, but overall, this effect is relatively small. Therefore, it is strongly recommended that commercial banks actively promote the implementation of green credit policies, so as to fully tap the potential advantages of green credit and promote the sustainable growth of banks.

4.3. Heterogeneity test

In order to further explore the individual differences in the impact of green credit on the operating performance of commercial banks, this study divides the sample banks into two categories: joint-stock commercial banks and non-joint-stock commercial banks, covering 9 joint-stock commercial banks and 26 non-joint-stock commercial banks. In the whole sample, joint-stock commercial banks provided 114 data, while non-joint-stock commercial banks provided 206 data, totaling 320 data, and the data of joint-stock commercial banks accounted for 35.63%.

Table 4: Heterogeneity analysis

	Shareholding system	Non-shareholding system
GC	0.224***	0.032
	(0.083)	(0.044)
Size	-3.146***	-1.606***
	(0.929)	(0.325)
Lev	1.844***	2.261***
	(0.348)	(0.151)
Growth	0.064***	0.044***
	(0.018)	(0.011)
Top1	0.006	0.157*
	(0.038)	(0.089)
Constant	-68.359	-155.200***
	(56.501)	(19.460)
R2 _ w	0.825	0.768
N	114.000	206.000

Note: Standard errors are in parentheses, and * * *, * * and * indicate that they are significant at the levels of 1%, 5% and 10% respectively.

As can be seen from Table 4, the green credit (GC) of joint-stock commercial banks The regression coefficient of is 0.224, which is significant at the 1% level, and the regression coefficient of green credit is positive. However, the regression coefficient of green credit of non-joint-stock banks is 0.032, which fails to pass the significance test. It shows that joint-stock commercial banks show a relatively significant positive effect in improving operating performance through green credit, but the positive effect of non-joint-stock commercial banks in this respect is not obvious, so H2 is verified.

4.4. Robustness test

In order to verify whether the robustness of the model is good, this paper chooses two methods to test it. First, replace the ROE in the model with ROA (return on assets) for regression analysis, because ROA reflects the profitability of the bank, and the higher its value, the stronger the profitability of the bank; Second, due to the abnormal impact of the 2020 epidemic on data, this article chooses to exclude the 2020 data samples from the analysis. Through these adjusted analysis results, as shown in Table 5, it can be seen that the model shows good robustness.

Table 5: Robustness analysis

	Replace the explained variable ROA	Excluding 2020 data
GC	0.006**	0.119***
	(0.003)	(0.043)
Size	-0.114***	-1.671***
	(0.023)	(0.355)
Lev	0.016*	2.249***
	(0.009)	(0.146)
Growth	0.003***	0.062***
	(0.001)	(0.010)
Top1	0.003*	0.004
	(0.002)	(0.029)
_ cons	2.530*	-148.345***
	(1.370)	(21.082)
R2 _ w	0.384	0.789
N	320.000	285.000

Note: Standard errors are in parentheses, and * * *, * * and * indicate that they are significant at the levels of 1%, 5% and 10% respectively.

5. Case analysis of China Merchants Banks green credit practice

5.1. The development motivation, history and current situation of China Merchants Banks green credit business

In the "China Merchants Bank Sustainable Finance Practice Report," China Merchants Bank made it clear that under the guidance of the "dual carbon" goal, the bank will actively respond to the development of the "new energy revolution" and "new electrification trends," along with the development of new energy-saving technologies Progress and the expansion of forest carbon sink construction are expected to stimulate investment opportunities of approximately 160 trillion yuan. The report further analyzes the future trends of green finance and outlines China Merchants Banks strategies and goals in promoting the development of green industries. By selecting China Merchants Bank as a case, this study conducts an in-depth analysis of the relationship between green credit and commercial banks' operating performance, and comprehensively evaluates the impact of green credit on commercial banks' operating performance from three aspects: green credit improves banks risk management ability and profitability, and enhances green reputation to indirectly enhance banks market competitiveness.

5.2. The impact of green credit on China Merchants Bank's operating performance

5.2.1. In terms of risk management

Green credit helps China Merchants Bank optimize its credit structure and reduce credit risks. Taking wind power generation projects as an example, China Merchants Bank provides green credit support to clean energy companies with advanced wind energy technology. Through in-depth research and rigorous evaluation of the company, China Merchants Bank confirmed that the company has performed well in terms of technology, operation and market prospects, and has low environmental risks and policy risks. For this reason, China Merchants Bank decided to provide the company with long-term and stable credit support to help it expand its production scale and enhance its market competitiveness. Through this green credit project, China Merchants Bank not only reduced its dependence on high-pollution and high-energy-consuming industries, but also optimized its credit structure and improved the quality of credit assets. Since wind power generation projects have low environmental risks and policy risks, China Merchants Bank has also reduced potential credit risks. On the other hand, China Merchants Bank has improved its own risk management capabilities by strengthening the risk assessment and management of green credit projects (Lu Xiaorong, 2023). China Merchants Bank conducted a strict review of the borrower's environmental protection and green status, project feasibility, etc., including evaluating the borrowers environmental management system, pollutant emissions, energy consumption, etc., as well as the technical feasibility and market prospects of the project. This strict wind. The risk assessment process helps China Merchants Bank better identify and control potential risks and ensure the safety of green credit. In addition, China Merchants Bank is also actively innovating risk management tools and methods to better adapt to the development needs of green credit business. For example, China Merchants Bank uses advanced technologies such as big data and artificial intelligence to monitor and warn green credit projects, and promptly discover and respond to potential risks. At the same time, China Merchants Bank has also strengthened external cooperation with the government, environmental protection agencies, etc. to jointly promote the development and improvement of green credit business (Xie, 2020).

5.2.2. In terms of profitability

Some scholars believe that green credit may have an adverse impact on the financial performance of banks. This is because the provision of green credit involves additional expenditures, such as staff training and project review spending, which affects the profitability of banks (Biswas, 2016). However, the data shows that green credit provides China Merchants Bank with new business growth points. As the society pays more and more attention to environmental protection and sustainable development, the demand for green credit markets is gradually expanding. By actively developing green credit businesses, China Merchants Bank can attract more green industry and project customers, thereby increasing the bank's loan interest income. In addition, China Merchants Bank can further broaden its sources of income by providing comprehensive financial services such as green bond issuance and green fund management. As of the end of June 2023, China Merchants Banks green loan balance reached 387.9 billion yuan, and the cumulative carbon emission reduction loans issued reached 32.1 billion yuan. China Merchants Bank takes advantage of its service advantages to provide customers with comprehensive financial solutions by integrating public and private sector resources, parent bank and subsidiary resources. By the end of June 2023, China Merchants Banks comprehensive business balance in the fields of green corporate financing, green retail and green investment will reach 803.8 billion yuan (Wang Kang, 2023). The following is the data of China Merchants Banks green credit balance from 2013 to 2023:

Table 6: Green Credit Balance of China Merchants Bank from 2013 to 2023

Year	Green credit balance unit: yuan	Year	Green credit balance unit: yuan
2013	116,372,000,000.0000	2019	176,773,000,000.0000
2014	150,947,000,000.0000	2020	207,133,000,000.0000
2015	156,503,000,000.0000	2021	263,842,000,000.0000
2016	143,664,000,000.0000	2022	355,357,000,000.0000
2017	157,103,000,000.0000	2023	447,765,000,000.0000
2018	166,033,000,000.0000		

Data source: 2013-2023 China Merchants Bank Annual Report

5.3. Enhancing green reputation

China Merchants Bank has demonstrated its firm commitment and practical actions to green environmental protection and sustainable development by actively developing green credit business. This positive social responsibility has enabled China Merchants Bank to establish a good green image in the hearts of the public and customers. When banks invest their funds in green industries and projects, it sends a message to the market that they actively fulfill their social responsibilities, which is conducive to enhancing the green reputation of banks (Chang Qianglong, 2023). Green credit business is also a manifestation of China Merchants Bank's professional capabilities. Banks need to have the ability to identify, assess and manage green credit risks, which shows their professionalism and leadership in green finance. This professional ability not only enhances the bank's market competitiveness, but also further enhances its green reputation. With the continuous development of green credit business, China Merchants Bank has gradually accumulated experience and cases in the field of green finance, forming a unique green financial service model and successful cases, such as issuing low-carbon credit cards and green deposit services, which not only meet the markets demand for green financial products but also effectively guide the public and corporate customers to participate in green consumption and investment. These measures play a key role in promoting the green transformation of society, and at the same time enhance China Merchants Banks' green reputation and brand influence. It also enhances China Merchants Banks' competition in the field of green finance

6. Case enlightenment and reference

Through a case study of green credit implemented by China Merchants Bank and its impact on business performance, this study reveals the impact of green credit on China Merchants Bank's business performance. The analysis shows that China Merchants Bank improves the bank's risk management ability and profitability through green credit, and enhances its green reputation to indirectly enhance the bank market competitiveness, thus promoting the improvement of bank operating performance. The practical experience of China Merchants Bank shows that although the green credit business has made progress in promoting environmental protection goals and realizing social responsibilities, it also exposes many risks and challenges.

Green credit also poses new challenges to China Merchants Banks' risk management capabilities. Because projects involved in green credit usually have long investment cycles and high technical thresholds, China Merchants Bank needs to evaluate the feasibility and risks of projects more carefully. China Merchants Bank also needs to strengthen the supervision and internal control of green credit businesses to ensure compliance with business operations and the controllability of risks. How to ensure that funds are invested in projects that truly meet green standards, how to meet the growing demand for green finance in the market, how to strengthen the publicity and promotion of green credit business, and improve the public awareness and recognition of banks green credit business need to be further explored (Wang Bo, 2023).

7. Conclusions and Suggestions

Research analysis shows that by deeply cultivating green financial services, commercial banks have improved bank profitability and risk management capabilities through green credit, enhanced green reputation, and indirectly enhanced banks' market competitiveness, thereby promoting the improvement of banks operating performance. To sum up, the green credit business of commercial banks not only promotes sustainable development but also has a positive impact on their operating performance. Through the development of green finance business, China Merchants Bank has successfully combined social responsibility with economic benefits, achieving a win-win situation. Green credit business is of positive significance to improve the business performance of commercial banks. At the same time, China Merchants Banks' experience and shortcomings provide valuable reference and enlightenment for other commercial banks, that is, while promoting the development of green credit, it should focus on risk management, market demand and publicity of green credit, to achieve green credit business and A win-win situation for bank operating performance.

7.1. Policy recommendations

7.1.1. Suggestions to commercial banks

First of all, increasing investment in financial technology has become a critical link in promoting the innovative development of green credit. By applying advanced technologies such as big data and artificial intelligence more widely, banks can not only improve the efficiency and accuracy of loan approval, but also more accurately identify and predict environmental risks, provide more accurate and efficient financial services for green projects, and at the same time create new growth points for the entire banking industry. Secondly, to maintain a leading position in the highly competitive market, commercial banks need to regard green financial products and service innovation as a core strategy and devote themselves to developing and optimising various green loan products to meet the specific needs of different green projects. This effort needs to focus not only on the innovation of loan products but also on improving the efficiency of service processes and optimising customer experience by introducing and leveraging the latest financial technologies, such as big data analytics and artificial intelligence (AI). Through these technologies, commercial banks can significantly improve the approval speed and decision-making quality of green credit while effectively reducing potential default risks and further strengthening the sustainability and profitability of green credit businesses. Moreover, in order to continuously enhance the green reputation, commercial banks should first strengthen the risk management of green credit business and ensure that funds are invested in projects that truly meet green standards. The second is to increase the innovation of green financial products to meet the growing demand of green finance in the market; The third is to strengthen the publicity and promotion of green credit business and improve the publics awareness and recognition of banks green credit business. Through this comprehensive and balanced strategy, commercial banks can make more significant contributions to the sustainable development of society and the environment while ensuring continued business growth (Liang Jiachen and Li Shushu, 2024

7.1.2. Recommendations to Government Regulatory Authorities

First of all, it is necessary to improve the transparency and accessibility of environmental information. Relevant enterprises must regularly publish information related to environmental protection and integrate this information into a public database to facilitate inquiry and evaluation by banks and investors. At the same time, regular supervision and inspection are carried out to ensure the authenticity and integrity of the information. Secondly, the legal and policy systems related to green credit should be improved. The government must introduce more detailed and specific laws and regulations related to green credit to provide a clear legal framework and policy guidance for banks to carry out green credit business and ensure the green transformation of economic development. Moreover, provide policy incentives and support. The government can encourage commercial banks to carry out green credit business more actively through various means such as targeted reserve requirement ratio cuts, tax exemptions, and financial subsidies to reduce the costs and risks of banks developing green credit (Zhang Yinxue, 2024).

To sum up, commercial banks and government regulatory authorities should work together to promote the development of green credit businesses by strengthening financial technology investment, innovating green products and services, improving the transparency of environmental information, improving the legal and policy system, and providing policy incentives. Promote the green transformation and sustainable development of the economy and society.

Author Contributions: The author himself has collected, analysed and written the whole paper

Funding: No external or internal funding is associated with this paper. The research was conducted solely for academic purposes.

Conflicts of Interest: The authors declare no conflict of interest

Informed Consent Statement/Ethics approval: Ethical approval was granted from the university authority, and data was taken with approval

Data Availability Statement: Data will be available upon request

Acknowledgments: I acknowledge my supervisor for helping me to guide this research

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