

Research on the Impact of Green Credit on the Financial Performance of Commercial Banks

Xie Wanting

School of Accounting, Anhui University of Finance and Economics, Anhui Bengbu, 233000

Abstract: From the perspective of green credit, the theoretical analysis of the impact of green credit on the financial performance of commercial banks. Based on the panel data of 15 commercial banks from 2012 to 2018, the impact mechanism is empirically analyzed. The results show that in the short-term, green credit has a negative impact on the financial performance of commercial banks, and the adverse impact faced by small and medium-sized commercial banks is significantly higher than that of large commercial banks, showing a heterogeneous effect. This also reveals the effect of commercial banks in implementing green credit. Reasons for low initiative and enthusiasm. In view of this, it puts forward specific policy recommendations for different types of commercial banks, and believes that they should effectively promote green credit business in terms of differentiated policy guidelines and increasing the training of interdisciplinary talents.

Keywords: Green Credit; Financial Performance; Heterogeneous Influence

1. Introduction

My country's green financial policies and concepts based on green credit are being widely promoted and implemented throughout the country, with the goal of achieving sustainable economic and social development. In my country's financial system, the assets of banking financial institutions accounted for 91.54% of the total financial assets, and the credit business accounted for 49.50% of the assets of the banking industry^[1]. In the process of financial resource allocation, green credit has played a core role in promoting green finance.

Green credit means that commercial banks actively guide the flow of funds through credit means, reduce loans to industries and projects with "high pollution, high pollution, and overcapacity", while increasing credit support for low-emission and low-polluting industries and projects, and gradually changing the "extensive" business "Business model to promote the development of local green economy. From the data of 21 major banks in my country at the end of June 2019, it can be seen that although the total amount of green credit has reached more than 10 trillion yuan, it is showing a situation of "high growth rate and low proportion", with an annual growth rate of 12.8%, And the proportion is only maintained at about 6.5%^[2]. Green credit has a certain impact on the competitiveness of commercial banks and environmental risk management. Commercial banks need to combine their own resources and positioning to make a trade-off between benefits and costs. Therefore, studying the impact of commercial banks on their financial performance after implementing green credit policies will facilitate different types of commercial banks to recognize the situation, better implement green credit policies, and promote the sound development of green

credit.

In view of this, by combining existing theoretical research and using empirical methods to further explore the impact of green credit on the financial performance of commercial banks, the commercial banks are further grouped according to their scale characteristics, and the characteristics of the grouped samples prove that green credit has produced them. On this basis, it comprehensively evaluates the economic benefits of green credit, and puts forward relevant opinions and suggestions on improving green credit policies, so as to fully mobilize the enthusiasm of different types of commercial banks and achieve the goal of ecological civilization.

2. Literature Review

In recent years, scholars have conducted a lot of theoretical and empirical analysis on the issue of green credit affecting the financial performance of commercial banks. Wang Xiaolu proposed that environmental governance investment will increase with the increase in the quality of bank assets^[1]; Lazzatoni et al. believe that the development of green finance will have a significant impact on the financial performance of commercial banks^[2]; Campiglio proposed that commercial banks should avoid the status quo of its own operations may have adverse effects, and may refuse to lend to low-carbon businesses and environmentally friendly companies^[3]; Zhang Changjiang and others discussed the relationship between green credit and commercial bank performance based on the intermediary effect of green reputation, and believed that despite the implementation of green credit policies, Commercial banks will still cause adverse effects, but green credit lending behavior will produce green reputation effects, which can play a positive role in improving the financial performance of commercial banks^[4]; Yan Tingfeng et al. proceeded from the perspective of systems, technology, and institutions, It is believed that the short-term effect of green credit on the financial performance of commercial banks is weak, but the long-term effect is more obvious, because the status quo of low income and high cost of green credit in the short term is difficult to improve quickly, which affects their operating profits, but in the long term Helps to improve its profitability^[5].

Although the relevant literature has elaborated and analyzed the problem, different scholars have different entry points. Therefore, the discussion of this problem has not yet formed a unified conclusion, which can be roughly divided into the following two types of views.

The first type of view: Green credit brings positive results to the financial performance of commercial banks. Zhang Lin et al. analyzed the data of 29 commercial banks in China from 2007 to 2017 and believed that the increase in the green credit ratio has brought about an increase in the net interest margin of commercial banks, especially for small capital scales and high liquidity risks. For commercial banks, the improvement effect is more obvious^[6]; He Lingyun et al. analyzed the data of 9 listed banks and found that green credit can significantly increase the return on total assets^[7]; Sun Guanglin et al. analyzed 2008-2016 The quarterly data of the five major state-owned commercial banks found that the non-performing loan ratio, which is one of the risk supervision indicators of commercial banks, is greatly affected by the green credit ratio. The green credit ratio increases and the credit risk decreases, but its net profit and non-interest income are Increased by^[8].

The second type of view: Green credit brings negative results to the financial performance of commercial banks. By collecting panel data from 12 commercial banks from 2010 to 2017, Wang Jianqiong and others found that green credit has no significant impact on the profitability of small and medium commercial banks, but it will reduce the profitability of large commercial banks^[9]; Analysis of the sample data of commercial banks from 2009 to 2014 found that developing green credit business in the short term is not conducive to financial performance, which is mainly reflected in the increase in operating costs^[10].

In summary, although the existing literature can lay a certain foundation for the study of this problem, the sample size of the existing literature is quite different, and the conclusions drawn are not consistent, and it is integrated from the micro characteristics of the bank and the macroeconomic factors. There are few empirical studies considering the impact of green credit on the financial performance of commercial banks. Therefore, this article began in 2012, the first year of my country's full-scale implementation of the green credit policy, centered on the representative group of listed commercial banks, collected panel data of 15 listed commercial banks from 2012 to 2018, and comprehensively considered the internal factors of the bank and the external economy. The role of factors is to analyze the effectiveness of green credit policies implemented at the micro level of banks, and further group sample data to explore the differential impact of green credit on their financial performance for different types of commercial banks.

3. Theoretical Analysis

The impact of green credit on the financial performance of commercial banks can theoretically be considered from two aspects.

(1) From the perspective of cost-benefit, green credit has the dual constraints of high short-term opportunity cost and limited revenue. Most of the green credits have long periods and limited initial returns. At the same time, before the long-term loan has recovered the principal and interest, commercial banks have made it difficult to invest funds in other short-term and high-return projects due to green credit, so there is a greater opportunity cost in the use of funds. The green credit business started late, and commercial banks lack corresponding technical and experience support for project screening and evaluation, which is not conducive to commercial banks to improve their financial performance. Specifically, large commercial banks are relatively easy to realize the profitability of green credit business due to the more complete risk control mechanism, while small and medium commercial banks are restricted by their own resources and cannot fully implement the environmental risk control mechanism. Therefore, it is relatively difficult to carry out green credit business. Large credit risk and opportunity cost.

(2) From the perspective of potential benefits, green credit business will bring long-term potential benefits to commercial banks. Through prudent pre-assessment, commercial banks grant loans to environmental protection companies with technological innovation, low pollution and low energy consumption, which will help optimize the loan structure and provide borrowing companies with long-term stable funding sources. This win-win cooperation will help. In order to reduce the default risk of green credit, it will bring positive returns to the financial performance of commercial banks in a longer period of time. It is also a manifestation of commercial banks' active environmental responsibility and social reputation, which will help further enhance the bank's own green reputation and core competition. force.

4. Variables and Data

4.1 Variable Selection

4.1.1 Interpreted Variables

From the combing and analysis of empirical articles, it is found that domestic scholars do not agree on which financial indicators should be used to measure the financial performance of commercial banks. If you consider from the perspective of ignoring the risks related to financial leverage, you can choose the return on equity (ROE); if you consider from the perspective of comprehensively measuring the profitability of all aspects of commercial banks' assets, you can

choose). This article starts from the perspective of comprehensive income, so the latter is selected.

4.1.2 Core Explanatory Variables

Regarding how to evaluate the extent of a commercial bank's green credit business, some domestic scholars advocate the use of green credit ratio (that is, the proportion of green credit balance to the total loan amount) as a measure, but the time and depth of green credit business development is limited, resulting in green credit The ratio is low and it is difficult to conduct objective evaluation. Therefore, this paper uses green credit balance (GL) as the core explanatory variable, and takes the natural logarithm to reduce data fluctuations. The larger the value, the larger the scale of green credit and the more green funds invested by commercial banks.

4.1.3 Other Control Variables

(1) Bank characteristic variables. Comprehensive consideration of various factors, the control variables to measure the financial performance of commercial banks can generally use indicators representing the adequacy of loan loss reserves of commercial banks, such as provision coverage ratio (BBFGL), and the non-performing loan ratio (BLDKL) and the capital adequacy ratio (CAR) of the ability to withstand risks can also be analyzed with the aid of the commercial bank asset scale (SIZE) indicator. Generally speaking, commercial banks with larger total assets are more capable of using economies of scale to reduce costs and increase profits. In empirical analysis, logarithmic transformations of corresponding variables are used to reduce data fluctuations.

(2) Macroeconomic variables. Indicators to measure the level of macroeconomic development, including indicators related to economic development and the overall level of prices. This article chooses gross domestic product (GDP), broad money supply (M2) and consumer price index (CPI) to measure the impact of changes in the external economy on commercial banks from a macro perspective.

In summary, the final model variables selected in this paper are shown in Table 1.

Table 1 Model variables

Variable Category	Variable Name	Symbol
Explained Variable	Return on total assets	ROA
Explanatory Variables	Green credit balance	GL
Control Variable	Provision coverage	BBFGL
	Bad debt ratio	BLDKL
	Capital adequacy ratio	CAR
	Bank size	SIZE
	Gross domestic product	GDP
	Consumer Price Index	CPI
	Currency supply	M2

4.2 Data Description

In 2012, the "Green Credit Guidelines" issued by the China Banking Regulatory Commission clarified the detailed rules that should be implemented to guide commercial banks to develop green credit business, and comprehensively guided commercial banks to adopt a series of measures to strengthen management of their credit business. It also issued the "Performance of Banking Financial Institutions" The "Guidelines for Evaluation and Supervision"³ are used to build a sustainable development evaluation system. The issuance of these programmatic documents

indicates that China has entered the stage of comprehensively building a green credit policy framework. In order to make the data more available and continuous, we selected the green credit data disclosed by various commercial banks in their social responsibility reports since 2012, and selected the data of 15 listed commercial banks from 2012 to 2018 for analysis. The impact of credit on the financial performance of commercial banks, and an in-depth discussion of the heterogeneous impact of green credit on different types of commercial banks, and classify all sample data for further research and analysis.

Based on the size of banks' total assets and market share, the entire sample is divided into two categories: First, systemically important banks (large commercial banks controlled by the state), namely Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of Communications and China Construction Bank The second is a large number of small and medium commercial banks, namely Shanghai Pudong Development Bank, Minsheng Bank, China Merchants Bank, Ping An Bank, Bank of Shanghai, Bank of Tianjin, Bank of Jiangsu, Industrial Bank, Bank of Ningbo, Bank of Harbin, and China CITIC Bank. The large banks were not selected because of the relatively high proportion of overseas business of Bank of China. At the same time, small and medium banks choose a large number of samples, which is convenient for revealing the impact of green credit on the financial performance of small and medium banks. The green credit data used in this article is obtained after post-processing. The original data comes from the "Social Responsibility Report" that each commercial bank discloses to the public every year; the financial indicator data such as ROA and non-performing loan rate comes from the annual report of commercial banks and Oriental Fortune.com; External economic indicators such as CPI and M2 come from China Statistical Yearbook and Wind database.

5. Empirical Analysis

5.1 Variable Stationarity Test

During the research process, it is necessary to ensure that the "false regression" results caused by the instability of the time series are avoided, so as to ensure the accuracy of the empirical analysis. For this reason, this article adopts LLC inspection method to inspect the following variables in turn. The final test results are shown in Table 2. The test results of each variable are all without unit roots, indicating that they are all stable time series, and the next analysis can be continued.

Table 2 Variable unit root test results

Variable	LLC Test	Test Result
ROA	-4.58***	Steady
GL	-5.87***	Steady
BBFGL	-3.84***	Steady
BLDKL	-6.95***	Steady
CAR	-53.21***	Steady
SIZE	-2.90***	Steady
LNGDP	-3.51***	Steady
CPI	-3.51***	Steady
M2	-6.72***	Steady

5.2 Model Setting

The Husman test is used. The null hypothesis of the test is that the individual influence in the

random effects model is not related to the explanatory variables. According to the final test results, the samples can reject the null hypothesis. Therefore, when establishing the static panel model, the random effects model is abandoned and the fixed effects model is selected. The benchmark model is:

$$ROA_{it} = \delta_i + \beta_1 GL_{it} + \beta \chi_{it} + \varepsilon_{it} \quad (1)$$

Divide the sample into three groups, and perform stepwise regression on each sample group. Only the core explanatory variables are added to Model 2, and the micro characteristics and macroeconomic variables of banks are added to Model 3 and Model 4.

$$ROA_{it} = \alpha_i + \beta_1 GL_{it} + \varepsilon_{it} \quad (2)$$

$$ROA_{it} = \alpha_i + \beta_1 GL_{it} + \beta_2 BBFGL_{it} + \beta_3 BBDKL_{it} + \beta_4 CAR + \beta_5 SIZE_{it} + \varepsilon_{it} \quad (3)$$

$$ROA_{it} = \alpha_i + \beta_1 GL_{it} + \beta_2 BBFGL_{it} + \beta_3 BLDKL_{it} + \beta_4 CAR + \beta_5 SIZE_{it} + \beta_6 GDP_{it} + \beta_7 CPI_{it} + \beta_8 M_{2it} + \varepsilon_{it} \quad (4)$$

Among them, i and t represent each bank and year respectively, ROA_{it} represents the financial performance of bank i in year t , GL_{it} represents the green credit balance of bank i in year t , ε_{it} represents the random disturbance item, and χ_{it} represents the control variable. According to the previous relevant literature, the internal influencing factors $BBFGL_{it}$, $BBDKL_{it}$, CAR_{it} and $SIZE_{it}$ representing the characteristics of the bank, as well as the external factors GDP_{it} , CPI_{it} and M_{2it} representing the macroeconomics, were selected and included in Model 2, Model 3, and Model 4, respectively. Estimate in.

5.3 Regression Analysis

All samples, samples of large commercial banks, and samples of small and medium commercial banks were included in the control variables according to the model for stepwise regression. The regression results of the model are shown in Table 3, Table 4 and Table 5.

Table 3 Regression results of all samples

Variable	Model 1	Model2	Model3
LNGL	-0.1522*** (0.0000)	0.0081 (0.4608)	0.0064 (0.6922)
LNBBFGL		0.1613*** (0.0000)	0.1382*** (0.0005)
LNBLDKL		-0.1502*** (0.0000)	-0.1398*** (0.0000)
LNCAR		-0.1724** (0.0249)	-0.0199 (0.8519)
LNSIZE		-0.3907*** (0.0000)	-0.1559* (0.0798)
LNGDP			-0.0330 (0.9052)
LNCPI			-2.7243** (0.0289)
LN M2			-0.3878* (0.0576)
Constant	1.95***		16.02**

term	(0.0000)		(0.0113)
\bar{R}^2	0.82	0.94	0.95

Note: * indicates the significance level of 10%, ** indicates the significance level of 5%, and *** indicates the significance level of 1%.

Table 3 shows the results of stepwise regression of control variables included in all samples. In the model regression result 1, the coefficient of the green credit balance is -0.1522, which has passed the significance test at the 1% level, indicating that the green credit balance has a negative impact on the profitability of commercial banks. This can be explained as the fact that my country has not implemented a green financial policy based on green credit for a long time. It was only after the introduction of the Green Credit Guidelines in 2012 that green credit has received the attention of commercial banks. Therefore, on the one hand, the green credit balance accounts for a limited proportion of the bank's total assets, and it is difficult to have a large impact on its profitability; on the other hand, the cost of pre-assessment, process tracking and other links in the green credit distribution process of commercial banks is relatively low. High, and generally use preferential interest rates, so it will reduce the return on total assets of commercial banks to a certain extent. In model regression results 2 and model regression results 3, the green credit balance coefficient is positive, but it fails the significance test. The coefficients of the provision coverage ratio are 0.1613 and 0.1382, respectively, which pass the significance at the 1% confidence level. The test shows that the increase in the provision coverage ratio promotes the profitability of banks; the coefficients of the non-performing loan ratio are -0.1502 and -0.1398 respectively, which are significantly negative at the 1% confidence level, indicating that the increase in the non-performing loan ratio will weaken commercial banks Profitability. For example, the non-performing loan ratio shown in the model regression result 2 increases by 1 percentage point, the return on total assets will decrease by about 0.15 percentage points; the macro control variables have a negative impact on the return on total assets, but it is not significant.

Table 4 Regression results of large commercial banks

Variable	Model4	Model4	Model6
LNGL	-0.1338*** (0.0002)	0.0537*** (0.0084)	0.0403** (0.0397)
LNBBFGL		0.0680 (0.3574)	-0.010 (0.8844)
LNBLDKL		0.0098 (0.8830)	-0.0102 (0.8890)
LNCAR		-0.2057 (0.2184)	-0.3727** (0.0461)
LNSIZE		-0.6634*** (0.0000)	-1.1903*** (0.0042)
LNGDP			0.6011 (0.1228)
LNCPI			-1.2764 (0.3669)
LNM2			-0.0151 (0.9762)
Constant term	2.23*** (0.0000)	2.64*** (0.0000)	8.56 (0.2317)
\bar{R}^2	0.72	0.96	0.97

Table 5 Regression results of small and medium commercial banks

Variable	Model7	Model8	Model9
LNGL	-0.1555*** (0.0000)	-0.0322 (0.1317)	-0.0588** (0.0193)
LNBBFGL		0.0043 (0.7097)	0.0012 (0.9089)
LNBLDKL		-0.1177*** (-0.0000)	-0.1540*** (0.0029)
LNCAR		0.0415 (0.6228)	-0.0523 (0.5978)
LNSIZE		-0.1937*** (0.0002)	-0.2767** (0.0428)
LNGDP			0.1458 (0.6159)
LNCPI			-0.6785 (0.5955)
LNLM2			0.1134 (0.7903)
Constant term	1.81*** (0.0000)	1.19*** (0.0000)	3.65 (0.5634)
R2	0.83	0.89	0.89

It can be seen from Table 3, Table 4, and Table 5 that the coefficient of green credit balance in model regression result 1, model regression result 4 and model regression result 7 is always negative, and the coefficient of green credit balance of large commercial banks is -0.13376. The coefficient of green credit balance of small and medium commercial banks is -0.1555, which all pass the significance test at the 1% confidence level, indicating that green credit policies have a differential impact on the profitability of different types of commercial banks. Comparing model regression results 6 and model regression results 9, we can also find that the coefficient of green credit balance of large commercial banks is significantly positive at the 5% confidence level, indicating that the green credit balance of large commercial banks has a certain positive effect on the financial performance of commercial banks. However, the coefficient of green credit balance of small and medium commercial banks is significantly negative at the 5% confidence level. This is because large commercial banks have economies of scale, so the marginal cost of implementing green credit is lower. As far as commercial banks are concerned, the implementation of green credit business will have a greater crowding-out effect on other businesses with higher short-term yields. Therefore, green credit policies have different effects on different types of commercial banks, that is, they show the characteristics of heterogeneous influence.

6. Conclusions and Policy Recommendations

The introduction of green credit will have a negative impact on the financial performance of

commercial banks to a certain extent, and shows heterogeneity among different types of commercial banks. The main reasons for the above results are as follows: First, in the short term, the proportion of green credit issued by commercial banks to the total loan balance is low, and the time for implementing green credit policies is relatively short, and the system and regulations are not sound, so it is difficult to show green credit. The second is that large commercial banks accelerate the training of green finance-related talents and reduce the marginal cost of green credit. At the same time, due to the information and supervision in place, they can recover the green credits they have invested in the early stage to a certain extent and obtain the success of income. The rate is higher than that of small and medium commercial banks. Based on the above research conclusions, the following suggestions are made:

First, for large commercial banks, the economies of scale advantage of green credit should be realized. In recent years, although large commercial banks have taken measures to favor green credit, the proportion of green credit balance is still low, and it is difficult to make a significant contribution to the financial performance of commercial banks. Therefore, large commercial banks need to further expand the scale of green credit, and continuously strengthen the innovation and risk management of green credit business; they need to make full use of their own advantages of large asset scale and high market share to continuously tap the huge market potential in the field of green credit. So as to achieve the goal of improving its financial performance by using a sound green credit release mechanism.

Second, for small and medium commercial banks, they should find key green credit areas and directions that suit their own advantages. On the one hand, give full play to the advantages of small and medium commercial banks as local banks, center on the strategic layout of the green transformation and development of local governments, and give full play to the guiding, restraining and financing functions of green credit for industrial development. On the other hand, it is necessary to further strengthen the reserve of talents in the field of green finance, tap personnel with financial literacy, environmental protection and pollution discharge related experience and awareness, change the disadvantages of talents, and give full play to professional talents in project evaluation, investment and risk control of green credit business. The effective support of this aspect will help to improve the financial performance of small and medium commercial banks in the long run.

Third, relevant institutions such as the China Banking and Insurance Regulatory Commission, the Ministry of Ecology and Environment, and the People's Bank of China should cooperate fully and perform their duties. While actively guiding commercial banks to implement green credit policies, they should also provide differentiated guidance to different types of commercial banks. For example, measures such as differentiated interest rates and targeted RRR cuts have enabled different types of commercial banks to receive more precise policy guidance. Relevant departments within commercial banks should continue to improve green credit management mechanisms, such as using big data platforms to establish and improve corporate green credit risk evaluation systems, improve the security of green credit assets, and continuously improve green credit release review procedures, management and supervision mechanisms, etc. This will have a positive incentive effect on the financial performance of commercial banks in the long term, and ultimately achieve a win-win situation for commercial banks to increase their profits and improve the ecological environment.

References

- [1] Wang Xiaolu. *Environmental governance investment and bank asset quality: analysis based on the perspective of green credit*[J]. *Financial Forum*, 2016(11):12-19.
- [2] Simone Lazzaroni, Davide Ravelli, Stefano Protti, et al. *Photochemical synthesis: Using light to build C-C bonds*

- under mild conditions*[J]. *Comptes Rendus Chimie*, 2017,20(3):261-271.
- [3] Emanuele Campiglio. *Beyond carbon pricing: The role of banking and monetary policy in financing the transition to a low-carbon economy*[J]. *Ecological Economics*,2016(6):121.
- [4] Zhang Changjiang, Zhang Yue. *Can green credit improve the performance of commercial banks?: Intermediary effect based on green reputation*[J]. *Financial Development Research*, 2019(7): 70-76.
- [5] Yan Tingfeng, Xu Xuchu, Ren Senchun. *Green Credit and Bank Financial Performance: Based on the Perspective of Institutions, Technology and Institutions*[J]. *Jiangxi Social Sciences*, 2019,39(7):63-72.
- [6] Zhang Lin, Lian Yonghui. *Green credit, bank heterogeneity and bank financial performance*[J]. *Financial Supervision Research*, 2019(2): 43-61.
- [7] He Lingyun, Wu Chen, Zhong Zhangqi, etc. *Green credit, internal and external policies and the competitiveness of commercial banks: an empirical study based on 9 listed commercial banks* [J]. *Financial Economics Research*, 2018, 33(1):91-103.
- [8] Sun Guanglin, Wang Ying, Li Qinghai. *The impact of green credit on the credit risk of commercial banks*[J]. *Financial Forum*, 2017(10): 31-40.
- [9] Wang Jianqiong, Dong Ke. *The impact of green credit on the operating performance of commercial banks: an empirical analysis based on Chinese commercial banks*[J]. *Journal of Nanjing Audit University*, 2019(4): 52-60.
- [10] Hu Rongcai, Zhang Wenqiong. *Will the development of green credit affect the profitability of commercial banks?* [J]. *Financial Supervision Research*, 2016(7):92-110.