# The Impact of City Commercial Banks' Green Credit on Operational Performance—Evidence from Commercial Banks in Guangxi

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**Abstract**

In order to study the correlation between the operation performance of city commercial banks in Guangxi and the green credit business, the paper organizes the seven-year data of Guilin Bank, Liuzhou Bank and Guangxi Beibu Gulf Bank to establish panel data, through F test and Hausman test regression analysis Determine and select a random effect model to study the impact of Guangxi city commercial banks' business performance, and find that the development of green credit in Guangxi city commercial banks will have a negative impact in the short term, and a positive impact in the long-term development process.

***Keywords:*** *Business performance; Green credit; Random Effects Model*

## 1.INTRODUCTION

In September 2020, China announced to the world at the United Nations General Assembly the "Dual-Carbon Goal", which is an important direction for China to firmly develop the green economy. In recent years, in response to the national call, various commercial banks in Guangxi have launched green credit related business.

Taking the local city commercial banks in Guangxi, namely Guilin Bank, Liuzhou Bank and Guangxi Beibu Gulf Bank as examples, this paper studies the impact of green credit business on bank operating performance, and finds out the existing problems in the development of green credit business by three local city commercial banks in Guangxi. problems and make rationalization suggestions for the problems found.

## 2.LITERATURE REVIEW

When examining the relationship between green reputation and profitability, Platonova et al (2016) found that the adoption of the Equator Principles will bring a reputation premium to financial institutions to a certain extent, which will promote the improvement of the profitability of commercial banks to a certain extent [1]. Miroshnychenko et al. (2017) selected listed banks from 58 countries around the world as research samples to examine the impact of green credit on banks' financial performance [2]. The results show that listed banks also fulfill their environmental responsibilities when implementing green loans, but under certain conditions, they have a certain degree of negative impact on their business performance. In their research, Pan et al. (2021) proposed that under the background of China's overall economic and social development transitioning to green, small and medium-sized banks should adhere to the new concept of green development, and actively plan the development of green finance in terms of systems, mechanisms, products, and services [3]. A blueprint for development and contribute to the low-carbon development of the economy. Shao et al (2020) conducted a survey of panel data of 60 domestic commercial banks from 2005 to 2017, showing that there is a contradiction between environmental policies and commercial banks' avoidance of financial risks in the short term, but in the long run, the development of green lending by banks is conducive to promoting the green transformation of enterprises [4]. He et al. (2018) based on the empirical research results of nine listed banks carrying out green credit business on their business performance from 2008 to 2016, show that the green credit business of commercial banks can generally improve their competitiveness [5]. Gao et al (2018) found that there is a positive correlation between the development of green credit business and the competitiveness of commercial banks [6]. In conclusion,


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this paper selects green credit as an explanatory variable to analyze its impact on the ability of Guangxi local city commercial banks to improve sustainable development and bank competitiveness. The random effect model was finally selected through F test and Hausman test, and the relationship between green loan business, operating performance and profitability of three local city commercial banks in Guangxi was analyzed through the random effect model.

## 3.RESEARCH DESIGN

### *3.1. Variable selection*

Liu (2019) selected total asset return and non-performing loan ratio as explained variables to explain the impact of green credit on the operating performance of commercial banks [7]. Xiong (2021) selected total asset return as explained variables to explain the impact of green credit on the operating performance of commercial banks [8]. Explain the impact of green credit on the operating performance of commercial banks [9]. Wang et al. (2019) selected the return on assets and non-performing loan ratios of 12 banks from 2010 to 2017 as indicators of operating performance to study the impact of green credit on the performance of commercial banks. The impact of commercial bank operating performance. Most scholars choose to use the return on total assets and the ratio of non-performing loans to explain and evaluate the operating performance of commercial banks. From the perspective of usability and accuracy, the paper selects the following variables for research:

#### *3.1.1. Explained variable*

Return on total assets (ROE). Because the main profit of commercial banks mainly comes from the interest rate difference between deposits and loans, it is more convincing to use the return on total assets to measure the profitability of commercial banks [10].

#### *3.1.2. Explanatory variable*

Green Credit Ratio (GLR). Since the loan scale of banks varies each year, in order to make the empirical results more convincing, the paper selects the green credit ratio, that is, the ratio of the green credit balance of each bank to the total loan amount, as an explanatory variable, which can reflect green credit more objectively. The scale of development in commercial banks [11].

#### *3.1.3. Control variables*

Non-performing loan ratio (NPLR). That is, the ratio of non-performing loans to total loans, which is used to measure the asset quality and credit risk of commercial banks, and is often used to reflect the asset status of commercial banks [12]. Using the non-performing loan ratio to measure the credit risk of commercial banks has typical theoretical and practical significance, and can reflect the bank's loan management level.

Capital Adequacy Ratio (CAR). It refers to whether a commercial bank can make up and control the loss of risk assets in a timely manner, and reflects the solvency and risk-resistance ability of a commercial bank.

Bank size (SIZE). In a narrow sense, bank assets mainly refer to the total amount of bank loans and other investments. It not only reflects the economic strength and comprehensive business capacity of a bank, but also serves as the basis for commercial banks to carry out various businesses. Therefore, the scale of bank assets can generally be reflected by total assets [13].

### *3.2. Sample and data*

The paper selects the panel data of Guilin Bank, Liuzhou Bank and Guangxi Beibu Gulf Bank from 2014 to 2020. In order to ensure the integrity of the data, the paper adopts the linear interpolation method to fill in the missing data. The data of the paper comes from the social responsibility reports, annual reports and Wind database of the three local city commercial banks in Guangxi.

#### *3.2.1. Explained variable*

The paper conducts descriptive statistics on the selected samples, and the results are shown in Table 1.

**Table 1:** Results of Descriptive Statistics

| Variables | Mean | Standard deviation | Maximum value | Minimum value |
|---|---|---|---|---|
| ROE | 0.0057 | 0.0030 | 0.0154 | 0.0007 |
| GLR | 0.0213 | 0.0099 | 0.0384 | 0.0004 |
| NPLR | 0.0185 | 0.0054 | 0.0287 | 0.0080 |
| CAR | 0.1278 | 0.0151 | 0.1610 | 0.1100 |
| SIZE | 11.1510 | 0.3237 | 11.5800 | 10.0200 |

Data source：Organized according to stata16.0 and eviews8

As can be seen from the table, for the return on total assets of the explanatory variables, the smallest return on total assets in the selected sample banks is 0.0007, the largest is 0.0154, and the average value is 0.0057, indicating that the return on total assets of commercial banks is relatively high. low, and the gap between the maximum and minimum values is large. This means that there is a large gap between the returns on total assets of the explained variables, and there are obvious differences in the operating conditions of the three local city commercial banks in Guangxi.

For the explanatory variable green credit ratio, the minimum value is 0.0004, the maximum value is 0.0384, and the average value is 0.0213, indicating that there is a

certain gap in the green credit ratio of Guangxi local city commercial banks, and the average value is relatively small, which indicates that Guangxi local city commercial banks The low green credit ratio indicates that the three banks are not doing enough to deal with the green credit business.

For the control variables, the minimum, maximum and average NPL ratios of the selected local city commercial banks in Guangxi are 0.0080, 0.287 and 0.0185, respectively, indicating that the selected three local city banks have good asset quality and no serious credit risk. . The minimum value of the capital adequacy ratio of the sample banks is 0.1100, the maximum value is 0.1610, and the average value is 0.1264. It can be seen that the capital adequacy ratios of the three selected Guangxi Tucheng local commercial banks are in line with the provisions of the Basel Agreement on Bank Capital Adequacy Ratios, indicating that Guangxi local city commercial banks have strong anti-risk capabilities and solvency; the sample The minimum value of bank scale is 10.0200, the maximum value is 11.5800, and the average value is 11.1510, indicating that there is a certain gap in the scale of local commercial banks in Tucheng, Guangxi, but the gap is not very large.

### *3.2.2. Hypothesis and Econometric modeling*

According to the relevant research of domestic and foreign scholars, the impact of the return on assets (ROE) as a measure of the green credit operation performance of local city commercial banks in Guangxi mainly has the following two aspects:

One is the cost effect. Due to the relatively late development of green finance business in Guangxi and lack of practical experience, the three city commercial banks in Guangxi selected in this paper will increase the cost of trial and error; in addition, the three city commercial banks in Guangxi have given up on the "two high and one capital" enterprises due to green loan business. A large number of loans, that is, abandoning a large number of loans for "high-energy-consuming enterprises, high-polluting enterprises and resource-based product enterprises", which damages their profit margins. From the perspective of cost effect, commercial banks' green loan business has greatly increased business. The operating cost of the bank is not conducive to the improvement of the operating performance of commercial banks.

Another aspect is economic efficiency. The financing needs of the new environmental protection industry are huge and difficult. The green loan business of the three major city commercial banks in Guangxi can promote the balance of supply and demand to a certain extent, thereby improving their operating performance to a certain extent; green credit has positive effects on the market and the natural environment. It has a positive externality to banks, which not only improves the economic benefits of commercial banks, but also improves the social benefits of commercial banks.

To sum up, the green loan business of the three local city commercial banks in Guangxi has different impacts on their development. The paper makes the following assumptions:

Hypothesis 1: The development of green credit business has a positive effect on the operating performance of local city commercial banks in Guangxi in the long run.

Hypothesis 2: The development of green credit business has a negative effect on the operating performance of local city commercial banks in Guangxi in the short term.

The paper organizes the data of three local city commercial banks in Guangxi from 2014 to 2020, and finds that the data is typical panel data. According to the analysis of the factors affecting the operating ability of local city commercial banks in Guangxi, the model is constructed as follows [14].

$$ROE_{it} = c + \beta_1 GLR_{it} + \beta_2 NPLR_{it} + \beta_3 CAR_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} \quad (1)$$

In the model, ROE is the explained variable, representing the return on total assets. The explanatory variable used to measure the long-term profitability of local city commercial banks in Guangxi is GLR (green credit ratio), and the control variables are NPLR (non-performing loan ratio), CAR ( Capital adequacy ratio), SIZE (bank size), C is the intercept term, $\varepsilon$ is the error term, $\beta_1$、$\beta_2$、$\beta_3$、$\beta_4$ representing the coefficient of the explanatory variable and the coefficient of the control variable, respectively, the subscript i represents the three local city commercial banks in Guangxi, and t represents the year.

## 4.RESULTS

### *4.1. Results of the F test*

The result of the F test is F=2.68. By checking the F test critical table, we can see that F(2,14)=3.74. The calculated F statistic is less than the value of the F critical table, which means that the null hypothesis is accepted, and the mixed estimation model is selected.

### *4.2. Results of the Hausman test*

In order to further select a model that is more suitable for the selected data among the random effect model and the mixed estimation model, the paper uses the Hausman test to test this set of data to ensure that the model is better. The P value calculated in the Hausman test was 0.1094, which was greater than 0.05, so the null hypothesis was rejected, and the random effects model

was selected among the random effects model and the mixed estimation model.

### *4.3. Results of Random effects model regression*

Through the F test and Hausman test, it is determined that the paper should establish a Random Effect Model to measure the impact of green credit business on the profitability of the three local city commercial banks in Guangxi. The results are shown in Table 2:

**Table 2:** Results of Random effects model regression

| Variable | Random Effect Model |
|---|---|
| GLR | -0.1220***<br>(-2.87) |
| NPLR | -0.4834***<br>(-6.18) |
| CAR | 0.0368<br>(1.36) |
| SIZE | -0.0024*<br>(-1.78) |
| Cons | 0.0396**<br>(2.51) |
| $R^2$ | 0.7786 |
| F/Wald chi2 | 53.44*** |
| Hausman | 4.43 |

[Data source] Organized according to stata16.0 and eviews8. [Note] *, **, *** indicate significant at the 10%, 5%, and 1% levels, respectively, and the z-statistic values are in brackets.

It can be seen from the regression results that the value of the F statistic is 53.44, which is significant at the 1% significance level, indicating that the GLR (green credit ratio) is significant under the random effect regression model, and the model fit is 0.7786, indicating that the constructed regression model can well explain the relationship between independent variables and dependent variables.

From the coefficient of explanatory variables, the GLR coefficient is 0.1220, which is significant at the 1% significance level. The GLR and random effects models have been established, and there is a significant negative correlation between the two and a relatively large impact, which also confirms that we Previous research concluded that the three local city commercial banks in Guangxi had large investments, low profits and long payback periods in the early stages of green credit development, and could not achieve high returns in the short term. Long-term and low-return green loan funds will bring losses to commercial banks to a certain extent, which is also in line with the second hypothesis put forward by the paper, that is, the development of green credit business has a negative effect on the operating performance of local city commercial banks in Guangxi in the short term.

From the coefficients of the control variables, there is a negative correlation between NPLR and the established model, and it is significant at the 1% significance level. The non-performing loan ratio coefficient is -0.4834, indicating that when the non-performing loan ratio of Guangxi local city commercial banks increases by 1 unit, the return on assets will decrease by 0.4834 units. SIZE is negatively correlated with the established model and is significant at the 10% significance level, and its coefficient is -0.0024, indicating that when the bank scale increases by 1 unit, the return on assets of Guangxi local city commercial banks will decrease by 0.0024 unit. CAR is positively correlated with the established model, and the capital adequacy ratio coefficient is 0.0368, indicating that when the capital adequacy ratio increases by 1 unit, the return on assets of Guangxi local city commercial banks will increase by 0.0368 units.

## 5.CONCLUSIONS

To sum up, there is a short-term negative correlation between the non-performing loan ratio, bank scale and the operating performance of the three local city commercial banks in Guangxi, which verifies the second Hypothesis proposed in the paper. There is a positive correlation between capital adequacy ratio and bank operating performance, which verifies the first Hypothesis proposed in the paper, that is in the long run, the green credit business of the three local city commercial banks in Guangxi has a positive impact on their operating performance.

From the results of the random effect model, the following conclusions can be drawn: the implementation of green credit business is not conducive to the improvement of bank performance in the short term, because commercial banks engaged in green credit will have a large number of "two high" enterprises, namely high energy consumption and high pollution enterprises. Loans are unavailable, leading to a corresponding drop in bank profits. However, in the long-term development process, commercial banks have vigorously developed green credit, continuously enriched the credit structure, and the balance of green loans has also increased year by year. Establishing a green reputation will have a positive impact on the operating performance of local city commercial banks in Guangxi. Therefore, developing green credit business is the long-term development strategy of local city commercial banks in Guangxi, and plays a vital role in promoting the development of the three local city commercial banks in Guangxi.

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