Does Credit Loans of Banks Affect the New Energy Technology Power Industry Growth? *—Evidence from Commercial Banks in Guangxi*

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Abstract: In the era of information technology economy, the deep integration of the digital revolution and the energy revolution provides new impetus and possibilities for the development of the energy technology power generation industry. However, energy shortage and carbon emissions have become the focus of attention in our country. This paper draws on various experiences of domestic and foreign commercial bank credit in the new energy technology power generation industry to demonstrate that commercial bank credit supports the development of new energy technology power generation industry in Guangxi. Through VAR model analysis, it is found that commercial bank credit has a positive role in promoting the development level of Guangxi's new energy technology power generation industry, and government support as a control variable also promotes new energy technology power generation industry.

Keywords: Financial Support; New Energy Technology Power Generation Industry; Vector Auto Regression; Commercial Bank Credit Loan.

1 Introduction

In order to cope with the changes in the field of information technology in the new era, and at the same time give play to the role of the new energy technology industry in promoting the information technology industry, all local governments in China have taken a series of measures to improve the level of new energy technology and improve the quantity and quality of new energy technology industries, transforming the pressure brought by the information technology change into a new impetus and possibility for economic development. With the continuous development of Guangxi's economy, the comprehensive promotion of information technology, the increasing demand for industrialized electricity and residential electricity, Guangxi's increasing demand for electricity also indicates that the requirements for the new energy power generation industry have increased.

On the basis of the increasingly deep integration of the digital revolution and the energy revolution, the research of this paper is based on the relevant theories and policies of domestic

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and foreign financial support for the new energy technology industry and the new energy technology power generation industry. Analysis, drawing on various experiences of domestic and foreign commercial bank credit acting on the new energy technology power generation industry, analyzes the four new energy technologies of hydropower, solar energy, wind energy and nuclear energy in Guangxi and the current situation of Guangxi commercial banks, finds the problems, and finds out the problems through The model observes the relationship between variables and puts forward targeted suggestions, so as to promote commercial banks to better serve Guangxi's new energy technology power generation industry, realize low-carbon transformation of energy, optimize Guangxi's energy structure, and effectively reduce the impact of power generation on the ecological environment , to promote the long-term development of Guangxi's power generation industry.

2 Literature review

In recent years, the role of Credit loans of banks in affecting new energy technology power industry growth has received increased attention among the researchers. Wang (2021) believes that measures such as innovating the management system, improving the guarantee mechanism, and establishing school-enterprise cooperation can standardize the market environment of the new energy technology power generation industry, eliminate the bottleneck of core technologies, and promote the development of the new energy technology power generation industry [6]. Xiao et al. (2021) believe that it is necessary to deepen the reform and innovation of new energy technology power generation technology, comprehensively explore new models of new energy technology power generation development, and strengthen the modernization of new energy technology power generation [9].

Liu (2020) believes that financial efficiency has a certain inhibitory effect on the development of the new energy industry in the short term, but in the long run, financial scale, financial efficiency, and government fiscal and taxation support will help promote the development of the new energy industry [3]. Chen et al. (2018) believe that increasing the proportion of direct financing is conducive to the development of the emerging energy industry, and by rectifying the financial market, it can also indirectly drive the development of the new energy industry [1]. Wang (2012) discussed financial support channels such as bank loans, and put forward countermeasures to improve the financial support system, so that the new energy industry can truly become a green growth point for economic development [7]. Wu (2020) believes that the adjustment of the industrial structure requires the support of bank credit loans, and providing planned capital support according to the actual development of the industry can help the industry to control the expansion of its own scale [8].

Mischa (2006) believes that there are two reasons for the success of the German new energy industry [5]. First, a good natural resource environment suitable for Germany's abundant new energy reserves and industrial development. Second, the state has put forward many new policies to support the energy industry. Laurence L. Delina (2013) studied the role of bank loans in supporting the development of the new energy industry, and which method is more effective for the development of the new energy industry between indirect financing and direct financing [2].

To sum up, most of the research of scholars at home and abroad is to study a certain sub-sector, and the literature on the overall level of new energy is still relatively small, and the scope is relatively large, specific to the new energy technology power generation of provinces, cities and districts. The industry literature is sparse. On the basis of predecessors, this paper uses relevant theories to study the commercial banks' support for the Guangxi new energy technology power generation industry, and puts forward suggestions for its shortcomings, so as to promote the commercial banks to better serve the development of Guangxi's new energy technology power generation industry.

3 Data and methodology

The sample interval selects the time series data from the fourth quarter of 2015 to the third quarter of 2021 for model analysis. The RMB credit of Guangxi Commercial Bank is selected as a financial support tool. In terms of measuring the development indicators of the new energy technology industry, the paper mainly analyzes the overall development of the new energy technology power generation industry in Guangxi from the perspective of each sub-sector of the new energy technology industry. The output value is used as a measure of the development of its new energy technology industry. In addition, in order to make the model more explanatory, we select government support as a control variable. The specific variables are explained as follows.

3.1 Development level of new energy technology power generation industry (NE)

Referring to the practice of Li (2019), the paper selects the ratio of new energy technology power generation to total power generation as an indicator to measure the development of new energy industry [4]. new energy technology power generation consists of hydropower, wind power, solar power, nuclear power The four parts of power generation are summed up to get. The calculation formula is: NE = new energy technology power generation / total power generation. Guangxi's new energy technology power generation and total power generation data come from the National Bureau of Statistics, China Industrial Research Institute, and Huajing Industrial Research Institute.

3.2 Credit support scale (NL)

Mainly considering that loans are the core business of banking financial institutions, the balance of deposits and loans can directly reflect the development of commercial banks. The banking industry can provide short-term loans to new energy companies to meet the short-term capital needs of new energy companies, and can also provide medium and long-term loans to alleviate the problems of new energy companies' renewal of fixed assets and the shortage of developmental production funds. This paper selects the practice of Xu (2013), and selects the ratio of bank RMB credit to GDP as a tool to measure credit support. The calculation formula is: NL=Guangxi Commercial Bank credit/GDP [10]. The data comes from the Prospective Industry Research Institute.

3.3 Government Support (GS)

The new energy industry has always been strongly supported by the government, which is reflected in policy support and the fiscal and taxation system. Therefore, the Guangxi fiscal expenditure balance is used as the data source of the government support index, and the data comes from the Prospective Industry Research Institute.

4 Empirical results

The paper selects the vector autoregressive model (VAR) for empirical analysis. The first step is to perform a stability test on the original time series data to determine the optimal lag term of the model; the second step is to perform a co-integration test to determine whether there is a long-term co-integration relationship in the model, and to establish a VAR model; the third step is to use Granger causality test to evaluate the causal relationship between variables; fourth step, through impulse response analysis, analyze the dynamic relationship between new energy industry development variables, financial support variables and control variables; fifth step, use variance decomposition Measure the contribution of bank credit and government support to the development of the new energy technology power generation industry.

4.1 ADF unit root test

The data required by the VAR model is stable time series data. If an unstable time series is used for analysis, there may be a "pseudo-regression" phenomenon. In order to judge whether the time series is stable, the ADF unit root test is selected.

Table 1: The result of ADF unit root test.

Variables	ADF unit root test		
	t-Statistic	Prob	stationary
NE	-5.016742	0.0631**	non-stationary
D (NE)	-4.868633	0.0000***	stationary
NL	0.383843	0.7848	non-stationary
D (NL)	-1.693428	0.0849*	stationary
GS	0.182555	0.7296	non-stationary
D (GS)	-9.741404	0.0000***	stationary

a. Notes: *, ** and *** denote 10%, 5% and 1% significance level, respectively

The test results are shown in Table 1. The variable NL is not significant at the 5% significance level, indicating the existence of a unit root. The data stationarity test requires the original series to be integrated in the same order, so the first-order difference is performed on the variables. The results show that the variables NE, NL and GS are less than the significance levels of 1%, 10% and 1%, respectively, rejecting the original hypothesis and indicating that the original

sequence is a non-stationary first-order single integer sequence. A further cointegration test can be performed.

4.2 Optimal lag order

Since the original series is a first-order single integral data, and before the cointegration test can determine whether there is a long-term stable relationship between the variables, the optimal lag order of the VAR model must be determined. The results of the optimal lag order of the VAR model are shown in Table 2. According to the FPE, AIC and HQ criteria, the optimal lag order of the model is 3.

Table 2: The VAR lag order.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-33.8	NA	0.006	3.50	3.7*	3.5
1	-21.9	19.2	0.005	3.22	3.8	3.4
2	-8.77	17.5*	0.004	2.83	3.9	3.1
3	2.40	11.7	0.004*	2.63*	4.1	3.0 *

4.3 Johansen cointegration test

Table 3 shows that the original hypothesis has no cointegration relationship, the trace statistic 89.81512 is greater than the critical value of 29.79907 for the 5% significance level, and the original hypothesis was rejected. In the hypothesis of "there is at most one cointegration relationship", the trace statistic of 30.94003 is greater than the critical value of 15.49471 at the 5% significance level, rejecting the null hypothesis. In the case of "at most two cointegration relationships exist", the P value is greater than 5% and the original hypothesis is accepted, so there are two cointegration relationships.

Table 3: Johansen cointegration test.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-33.8	NA	0.006	3.50	3.7*	3.5
1	-21.9	19.2	0.005	3.22	3.8	3.4
2	-8.77	17.5*	0.004	2.83	3.9	3.1
3	2.40	11.7	0.004*	2.63*	4.1	3.0 *

4.4 Stationarity test of VAR model

The way to judge the stability of the model is to observe whether all the points fall within the circle. If they are all within the circle, it means that the absolute value of the reciprocal of all the characteristic roots of the model is less than 1, indicating that the model is stable.

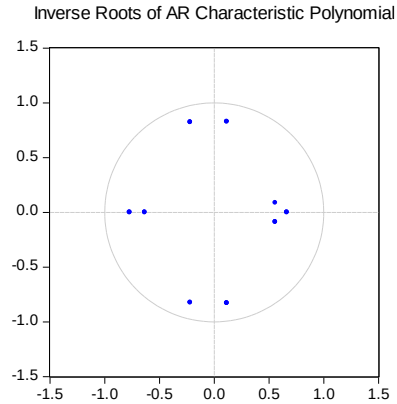

Figure 1: Inverse Roots of AR Characteristic Polynomial.

Figure 1 shows that all points are within the unit circle, and the reciprocal of all roots in the VAR model are less than 1, so the VAR model is stationary.

4.5 Granger causality test

This paper uses the Granger causality test to judge whether commercial bank credit and government support have a causal relationship with Guangxi's new energy power generation industry. The optimal lag order of the model is 3, and the Granger causality test is performed. The results are shown in Table 4, commercial bank credit and government support have a two-way Granger reason for the development level of the new energy power generation industry. The p-value of the null hypothesis that "commercial bank credit is not the Granger reason for the development level of the new energy power generation industry" is less than 0.05, indicating that the null hypothesis is rejected, that is, the commercial bank credit is the Granger reason for the development level of the new energy power generation industry. NE has a significant impact; government support and the level of new energy development have a one-way Granger reason, the null hypothesis is that "government support is not the Granger reason for the development level of the new energy power generation industry", the significance level is less than 0.05, the same reason rejects. The null hypothesis is that GS has a significant effect on NE.

Table 4: Granger causality test.

Null Hypothesis:	F-Statistic	Prob.
NL does not Granger Cause NE	4.62074	0.0190***
NE does not Granger Cause NL	3.85146	0.0335***
GS does not Granger Cause NE	4.17501	0.0263***
NE does not Granger Cause GS	0.49607	0.6908
GS does not Granger Cause NL	5.21389	0.0126***
NL does not Granger Cause GS	1.71543	0.2096

a. Notes: *, ** and *** denote 10%, 5% and 1% significance level, respectively

4.6 Impulse response of the VAR model

Impulse response analysis As shown in Figure 2~Figure 4, the response of the development level of the new energy technology power generation industry to its own shock is positive, and then gradually tends to decline, reaching a negative maximum value in the third period, and then turning positive, and it continues to stabilize; The development level of the new energy technology power generation industry had a negative response to commercial bank credit in the first period, reached a negative maximum value in the fourth period, then gradually increased, turned into a positive impact, and started to flatten in the ninth period; The impact of support on the new energy technology power generation industry is negative, reaching a negative maximum value in the third and seventh periods, and turning positive in the eighth period. The graphic shows that, first, the long-term development of the new energy technology power generation industry cannot only rely on the promotion of new energy technology power generation; it also needs to rely on scientific and technological innovation to improve supply from the "quality" aspect. Second, credit support, government support and the development level of new energy technology power generation industry show a negative correlation trend in the short term, but in the long run, NL and GS have a promoting effect on NE.

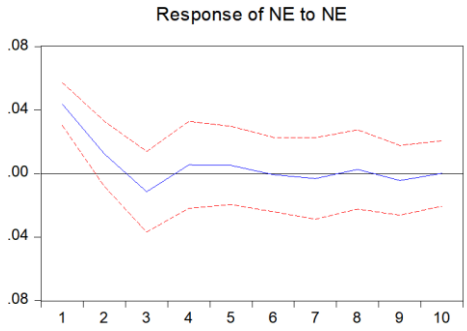

Figure 2: Response of NE to NE

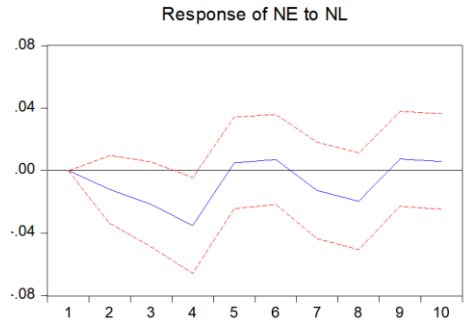

Figure 3: Response of NE to NL

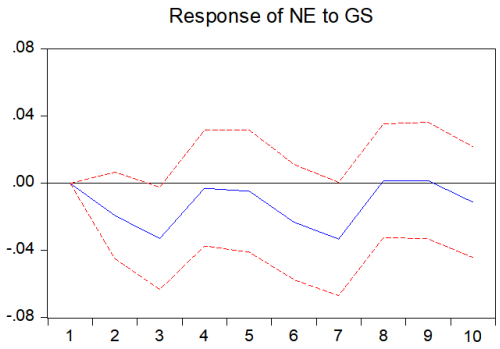

Figure 4: Response of NE to GS

4.7 Variance decomposition

From Table 5, it can be seen that the influence of commercial bank credit and government support in the first, second and third periods still shows a significant upward trend. fluctuation. Government support reached the maximum in the seventh period. The influence of the tenth phase of the new energy technology power generation industry itself is 28.21%, the influence of commercial bank credit is 31.80%, and the influence of government support is 39.99%, indicating that the credit support for the new energy technology industry is increasing, and the development of the new energy technology power generation industry Depends on credit support and government support.

Table 5: The result of variance decomposition.

Period	S.E.	NE	NL	GS
1	0.043711	100.0000	0.000000	0.000000
2	0.050736	80.06512	5.690605	14.24427
3	0.065224	51.56306	14.54694	33.89000
4	0.074391	40.16725	33.62678	26.20597
5	0.074872	40.10409	33.63456	26.26135
6	0.078695	36.31091	31.27307	32.41602
7	0.086404	30.26087	28.11701	41.62212
8	0.088656	28.82378	31.61224	39.56397
9	0.089098	28.78242	32.01287	39.20471
10	0.089991	28.21404	31.80055	39.98541
Period	S.E.	NE	NL	GS

5 Conclusions

Through empirical analysis, the paper finds that the increase of new energy technology power generation has a long-term and stable promotion effect on the development level of new energy technology, but this promotion effect is weakened, and it needs to rely on external factors to promote its own development; commercial bank credit and government support Intensity has a negative impact on Guangxi's new energy technology power generation industry in the short term, but credit will have a positive impact after a long-term effect. The contribution rate of commercial bank credit to the fluctuation of the development level of Guangxi's new energy technology power generation industry has gradually increased, reaching 31.80% in the tenth period, and government support is also gradually increasing, reaching 39.99% in the tenth period, compared with commercial bank credit. In terms of government support, the contribution rate is greater.

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