

Empirical Research on the Synergetic Relationship of Agricultural Insurance, Agricultural Credit and Rural Revitalization in Sichuan Province

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ABSTRACT

Using data from Sichuan's agricultural premium income, agricultural credit balance and total value of agricultural output from 2007 to 2017, this paper applied correlation analysis, unit root test, cointegration test, and Granger causality test to research the relationship among agricultural insurance, agricultural credit and rural revitalization in Sichuan Province. It was found that they have a long-term stable equilibrium relationship, but the synergistic effect is insufficient. Based on this result, this paper makes recommendations from improving the information sharing mechanism, increasing the reloan intensity, optimizing the agricultural compensation mechanism, and improving the regulatory system to solve problems.

Keywords: *agricultural insurance, agricultural credit, rural revitalization, synergistic effect, Granger causality test*

1. INTRODUCTION

Agricultural insurance and agricultural credit are vital tools for supporting agriculture. Whether they can effectively promote the development of agricultural economy has become a topic of concern. No.1 central document of 2019 and the Regulations on Agricultural Insurance all emphasized the role of agricultural insurance and agricultural credit in improving the anti-risk ability of agricultural production and reducing transaction costs of farmers. However, the problems of insufficient synergistic effect, inadequate loan increment, imperfect compensation mechanism for supporting agriculture and unsound regulatory system are significant. Therefore, it is worth investigating how to develop agricultural insurance and rural credit synergistically and how to implement the strategy of rural revitalization effectively.

2. LITERATURE REVIEW

In the literature researching on the relationship between agricultural insurance and rural credit, some scholars believe that agricultural insurance has a positive role in promoting agricultural credit [1] and effectively reduce the risk of credit institutions [2]. From the perspective of Supply-side structural reform, agricultural insurance has the ability to enhance rural revitalization [3]. Both play an important role in targeted poverty reduction [4]. However, others believe that agricultural insurance has little effect on promoting agricultural credit [5]. There is no

synergistic effect between them [6]. Liu [7] used a coupled coordination model to find that there is no matching cooperation mechanism between them and they can not achieve synergistic development. Even if there is a synergistic relationship, incomplete government finance measures greatly affect the synergy [8].

In summary, previous studies have different opinions about the synergy between agricultural insurance and agricultural credit, and lack of research on how to promote economic development and rural revitalization. Therefore, this paper studies the relationship among agricultural insurance, agricultural credit and rural revitalization based on the time series data of Sichuan Province, and in order to provide countermeasures for the development of Sichuan's financial service system.

3. EMPIRICAL ANALYSIS

3.1. Variable selection

Referring to relevant literature, this paper selects agricultural premium income, agricultural credit balance and total value of agricultural output of Sichuan province from 2007 to 2017 as research data, which is used to measure the development degree of agricultural insurance, agricultural credit, as well as the agricultural development level (rural revitalization). Variable selection are shown in the following table:

Table 1 variable indicators

Index	Meaning	Code	Data Sources
Explained Variable	Total value of agricultural output	AG	Taken from the Sichuan Provincial Statistics Bureau
Explanatory Variable	Agricultural credit balance	AL	Taken from the China Financial Yearbook
	Agricultural premium income	AI	Taken from the China Insurance Yearbook

3.2. Descriptive statistics

Table 2 Descriptive statistics of variables

Variable	Mean	SD	Minimum value	Maximum value
AL	9311.95	4602.31	3676.01	16047.56
AI	21.30	9.87	7.25	35.48
AG	2641.04	874.19	1316.60	4004.20

3.3. Correlation analysis

In order to reasonably analyze the synergy between agricultural premium income, agricultural credit balance, and total value of agricultural output in Sichuan Province, this paper firstly uses Pearson correlation analysis to test the correlation between the two pairs of data to provide a basis for subsequent empirical analysis.

Table 3 Pearson correlation coefficient

Correlation coefficient	AL	AI	AG
AL	1		
AI	0.9833	1	
AG	0.9863	0.9835	1
T-statistic	AL	AI	AG
AL	/		
AI	16.2194	/	
AG	17.9498	16.3309	/

From the results of T-statistic and correlation coefficients of the three variables, there is a significant positive correlation between any two.

3.4. Unit root test

Logarithmize the time series data, and then use the ADF unit root test method to check whether the data has a unit root. The test results show that LNAL, LNAI, LNAG and their first-order difference sequences all have unit roots. But their second-order difference sequences don't have unit root, which are stationary sequences, that is to say, all variables are denoted as I(2). The three variables are single integer of the same order. It indicates there may be a cointegration relationship between the variables.

3.5. Empirical model

$$LNAG = \beta_0 + \beta_1 LNAL + \beta_2 LNAI + e_t$$

3.6. Regression analysis and cointegration test

The Engle-Granger method was used to conduct the cointegration test on the model. As shown in Table 4, the results evidenced that the residual test value was stable at a 5% level, indicating that Sichuan's agricultural credit balance, agricultural premium income, and total value of agricultural output have long-term stable equilibrium relationship.

Table 4 Stationarity test of residual

	T-statistics	P Value
ADF statistics	-3.4409	0.0387
1% level	-4.4206	
Critical value 5% level	-3.2598	
10% level	-2.7711	

3.7. Granger Causality Test

The test results show that: the agricultural premium income is the Granger cause of the total value of agricultural output, and the total value of agricultural output is not the Granger cause of the agricultural premium income. The total value of agricultural output is the Granger cause of the agricultural credit balance, but the agricultural credit balance is not the Granger cause of the total value of agricultural output. The agricultural credit balance is the Granger cause of agricultural premium income, and the agricultural premium income is not the Granger cause of the agricultural credit balance.

4. CONCLUSIONS

The results of Granger causality test are consistent with the results of cointegration test, regression analysis and correlation analysis, which show that the agricultural premium income, agricultural credit balance and total value of agricultural output of Sichuan Province have a long-term stable equilibrium relationship. The interactive development among them has taken shape initially, but it is not yet consummate. For example, the role of agricultural credit in promoting agricultural development level is not significant. Furthermore, the promoting effect of agricultural premium income to agricultural credit is not strong, and the interaction between them is not apparent enough.

5. SUGGESTIONS

5.1. Improve the information sharing mechanism between agricultural insurance and agricultural credit

As an important security system of rural finance, agricultural insurance and agricultural credit reduce the operational risks of farmers to a certain extent, and provide financial support for the development of agricultural economy. Owing to same service targets, they have a common need for information resources. If a complete information resource database is established and the basic information of farmers is accurately grasped, it will reduce insurance risk and NPL ratio, mitigate the operational risks, form a long-term and stable sharing mechanism, and effectively solve information asymmetry problem. The improvement of the information sharing mechanism will effectively exert the synergy of them, and promote the progress of rural finance as well as the implementation of the rural revitalization strategy.

5.2. Increase the investment intensity of agricultural relloan and reduce capital outflows

With the development of agricultural modernization, the demand for funds in rural areas is increasing. The government should take measures to encourage financial institutions to increase agricultural relloan and clarify the distribution principle in underdeveloped areas, especially old revolutionary areas in Sichuan Province. Thereby, enthusiasm for agricultural activities of farmers and economic organization can be increased.

5.3. Optimize the agricultural compensation mechanism of local government finance

The weakness of agriculture determines its insufficient ability to resist natural disasters. Accordingly, the operating risks of agricultural insurance company increases, which in turn affect the guarantee role of insurance on agriculture. Not only should tax incentives be given to insurance companies, but also local government finance should establish a sound reinsurance mechanism to ease insurance companies' worries, so as to impel insurance companies to support agricultural credit better.

5.4. Improve the regulatory system to ensure the efficient operation of the linkage mechanism that supports agriculture

The government should draw lessons from experience of the eastern pilot regions and formulate appropriate regulatory system, which reduces the risks in the interaction between agricultural credit and agricultural insurance, such as ensuring the openness and transparency of agricultural credit service, rectifying the behavior of insurance companies using market status to force borrowers to purchase insurance, establishing complaint channels for farmers. Through these measures, the synergistic mechanism between agricultural credit and agricultural insurance can be operated in a benign environment.

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