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Analysis on the Promotion Mechanism of Agriculture-related Loans to Agricultural Development in the "Post-epidemic Era"
-- Based on National Panel Data

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ABSTRACT
Based on the relevant data of 31 provinces and cities, this paper constructs the total effect model and intermediary effect model of agricultural loans on agricultural development, and uses stata to do multiple regression analysis of the data. The results show that there is a significant positive correlation between agricultural loans and agricultural development before and after the epidemic, and agricultural loans mainly promote the recovery and development of agriculture in the post-epidemic era by ensuring the supply of agricultural production materials, promoting the circulation of agricultural materials and agricultural and sideline products, and improving the level of agricultural mechanization. This study shows that we should continue to play the role of agricultural-related loans in financial security of agriculture, increase capital investment in agricultural production and circulation, and promote agricultural development with greater effectiveness.

Keywords: *Post-epidemic, Agriculture-related loans, Agricultural development, The mediation effect*

1. INTRODUCTION

After the new coronavirus pneumonia, in order to effectively prevent and control the epidemic, many areas have implemented closed management and home isolation and strict traffic management, resulting in agricultural enterprises and farmers facing ' difficult employment, expensive employment ', lack of agricultural materials, agricultural products sales channels blocked and other issues, seriously affecting agricultural development. Since mid-2020, China ' s epidemic has been basically stable, the first to enter the ' post-epidemic era ', the potential impact of the epidemic on agriculture gradually released. According to the survey data of 253 farmers and 134 agricultural enterprises in Jiangxi Province, Wang found that the negative impact of the new corona pneumonia epidemic on rural agriculture was gradually emerging. In the production side, the preparation of spring farming is affected, agricultural activities are difficult to carry out, and agricultural enterprises stop production and shut down ; at the circulation end, the transport of agricultural products is limited, fruit and vegetable products are stagnant, and livestock products are frosted ; in the consumer side, the contradiction between supply and demand of agricultural products is prominent, the tertiary industry is seriously damaged, and the process of employment and poverty alleviation is slowing.[1]

Capital accumulation is a key factor of agricultural development, and agricultural credit is an important source of agricultural capital accumulation.Ge Xiaowei believes that the support of financial loan funds plays an important role in promoting the development of modern agriculture.[2] In the case of serious shortage of capital accumulation of agricultural enterprises and farmers caused by the new corona epidemic, our government actively guides financial institutions to issue agricultural loans to ensure the needs of agricultural development. According to data released by the People 's Bank of China,

agricultural loans amounted to 38.95 trillion yuan by the end of 2020, an increase of 10.7 per cent year on year; the annual increase of3.94trillion yuan, an increase of1.26trillion yuan. On this basis, through the relevant data of 31 provinces and cities, this paper studies the impact of agricultural loans on agricultural development in the post-epidemic era and tests the intermediary mechanism.

The contribution of this paper is mainly reflected in the following two aspects. Firstly, the effect of agricultural loans on agricultural development under the epidemic situation is studied and compared with that before the epidemic. At the same time, the internal promotion mechanism of agricultural loans on agricultural development under the background of the epidemic is explored, which makes up for the blank of relevant theories. Second, the current epidemic normalization prevention and control, agricultural uncertainty events are more frequent, and agricultural loans to promote rural economic development effect is remarkable. Therefore, the exploration of this research direction is not only of great significance to the development of China ' s agriculture in the post-epidemic era and the stability of agriculture in the face of similar epidemic risks in the future, but also can provide reference for comprehensively promoting rural revitalization and implementing more active and effective agricultural loan policies.

2. LITERATURE REVIEW

Agriculture is the first industry in China. As the basic industry of national economic development, the development of agricultural economy has always played an important role in the development of provincial economy. A large number of studies have shown that agricultural loans as an effective means of obtaining funds play a supporting role in the development of agricultural economy. Hong Zhenjiang, Guo Jianxin[3] research showed that the improvement of agricultural loan financial system is most closely related to the improvement of agricultural economic growth efficiency. Yang Xiao[4] believed that agricultural loan business was the core of modern agricultural economy and had a favorable impact on agricultural output. Ding Zhiyong [5] combined the experience of global financial support for the development of agriculture, rural areas and farmers to believe that agricultural loans can promote agricultural development.

In the study of how to promote agricultural development, Li Quan[6], Chang Jiaqi[7] pointed out that the increase of agricultural loans has a significant role in promoting the growth of agricultural gross output value and per capita output value. Xing Weibo, Zhang Simin[8] found that the agricultural loan incentive policy significantly stimulated the growth of grain production and farmers ' income in various regions, and promoted the development of China 's agricultural economy. At the same time, a small number of scholars have questioned the conclusion that agricultural loans promote agricultural development. For example, Zhou Mei, Zhao Dequan[9], Yu Yang and Wu Mingran[10] believed that at present, the growth of agricultural loans in China has declined, the non-performing rate of agricultural loans in some regions has increased, the proportion of investment in agricultural industry is small, and agricultural loans in some regions have not been used well, and the contribution rate to agricultural development is low. Guo Xiangyu[11] pointed out that in the field of agriculture, the existing loan guarantee products are not clearly defined, the positioning of insurance companies is not clear, the anti-guarantee system is not perfect, and the rate setting is single, so that it does not play a guarantee function.

Thus, in today ' s research, most scholars believe that agriculture-related loans have a positive effect on agricultural development, emphasizing that at present through a large number of agriculture-related loans can make agricultural development funds and other aspects of support, help the development of agricultural industrialization, improve per capita output value. However, there are still some imperfections in agricultural loans in China.Guo Shengtai, Yao Yucheng[12] believed that although financial support for agriculture has promoted agricultural development to a certain extent, its embedding degree in agricultural development is still low. In addition, China ' s research on agricultural loans mainly focuses on its contribution to agricultural development in specific regions, and most scholars focus on local provinces and cities. There are few studies on the overall phenomenon in China, and there is a lack of certain integrity. Therefore, how agriculture-related loans can better serve the needs of agricultural development, and the role and reference of each region need more attention from researchers.

During the outbreak of the new corona pneumonia, China ' s agricultural economy was facing a downward crisis, and there were problems such as blocked logistics of agricultural products, reduced agricultural supply and blocked agricultural production. Sun Xuetao[13] proposed that the epidemic had an impact on the purchase of agricultural means of production, migrant workers, agricultural product sales, rural tourism and aquaculture development. Tan Jingjian[14] also believed that the new corona epidemic caused the phased stagflation of agricultural products such as grain and some agricultural products with short shelf life. In this case, agricultural loans are particularly important for agricultural recovery and development. Zhang Guangqing [15] pointed out that more attention should be paid to the improvement of the scientific and technological financial system, the continuous enhancement of loan tracking during the outbreak of new corona pneumonia, and the formulation of various flexible repayment methods, so as to restore and guarantee the normal production and operation of

agriculture. Although the new coronavirus epidemic in China has been basically stable, its impact on agricultural economy will continue. Therefore, this paper explores the internal driving mechanism of agricultural loans for agricultural development in the post-epidemic era, not only can make agricultural loans more effectively promote agricultural development in the post-epidemic era, but also provide reference for China to stabilize agriculture in the face of emergencies such as new coronavirus pneumonia.

3. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESIS

3.1 Agriculture-related loans and agricultural development

The development of agriculture is inseparable from the land, labor, machinery and agricultural materials and other key elements, and these factors are inseparable from the protection of funds. However, agricultural production activities have strong uncertainty, which is easy to receive the influence of uncontrollable factors such as natural environment and market changes. Farmers ' income fluctuates greatly, which is prone to problems such as insufficient capital accumulation, thus affecting the level of agricultural development. As an important measure for financial institutions to support agriculture, agricultural loans are an important source of agricultural funds. They not only support the rural " separation of three rights " reform to solve the problem of agricultural land through funds, but also provide protection for several other key factors by improving the cultural level of farmers and the ownership of agricultural machinery. Financial development theory points out that there is a close relationship between financial development and economic growth, and Raymond W. Gold ' s financial structure theory believes that financial correlation rate is positively promoting the level of economic development. Therefore, this paper speculates that agricultural loans as part of rural finance will promote the development of China ' s agricultural economy.

After the new coronal epidemic, affected by the prevention and control of the epidemic, China ' s agriculture has suffered more severe problems than before, such as the difficulty of spring farming, transportation and employment. In order to ensure the residents ' daily needs and the stable development of agriculture and protect the interests of farmers, financial institutions have invested a lot of agricultural loans under the call of the state. The report of the People ' s Bank of China shows that the amount of agricultural loans in 2019 increased by 7.7 % year on year, while the amount of agricultural loans in 2020 increased by 10.7 % year on year, and increased by 3.94 trillion yuan throughout the year. Therefore, this paper speculates that agricultural loans will play a greater role when other key factors of agricultural development are limited. In summary, the research hypothesis H1a and H1b are as follows :

H1a: Agriculture-related loans have a significant positive effect on agricultural development.

H1b: In the context of the epidemic, agriculture-related loans have a more significant promoting effect on agricultural development.

3.2 Analysis of promotion mechanism

Financial institutions increase investment in credit funds in rural areas. From the perspective of agricultural loan investment direction, they focus on supporting agricultural industrialization, cotton grain and oil acquisition, agricultural development and other fields, providing strong financial support for farmers ' spring farming and preparation, agricultural enterprises ' reworking and reproduction, and stable agricultural production during the epidemic period, and leading to the recovery and development of agriculture in the post-epidemic era through several potential channels. These channels may include : first, financial institutions issuing loans for agricultural production materials such as seeds, fertilizers and pesticides to guarantee the demand for funds for the supply of agricultural materials for spring cultivation during the epidemic and stabilize food production and supply ; second, agricultural loans are used for the acquisition, distribution and reserve of agricultural, forestry, animal husbandry and fishery products, and are engaged in agricultural production materials, consumer goods for rural residents, and retail and wholesale activities of agricultural, forestry, animal husbandry and fishery products, so as to promote the circulation of agricultural materials and agricultural by-products, and ensure the production and sales of agricultural products ; third, agricultural loans may be directly invested in agricultural machinery, automatic management equipment, modern temperature control devices and other mechanical equipment to improve the level of agricultural mechanization and thus develop agriculture ; fourthly, agriculture-related loans may invest in agricultural infrastructure with huge demand for funds, such as rural roads, flood control and waterlogging prevention facilities, farmland water conservancy, irrigation systems, communication networks, heating gas projects, rural power grids and other economic infrastructure and social infrastructure such as science, education, cultural and health facilities, rural medical security, so that farmers ' lives and work are more convenient and agricultural production is more efficient. Figure 1 shows the theoretical mechanism of agricultural loans promoting agricultural development. In summary, this paper proposes the second hypothesis:

H2: Agriculture-related loans promote agricultural development by ensuring the supply of agricultural production materials, promoting the circulation of

agricultural materials and agricultural by-products, improving the level of agricultural mechanization and improving rural infrastructure.

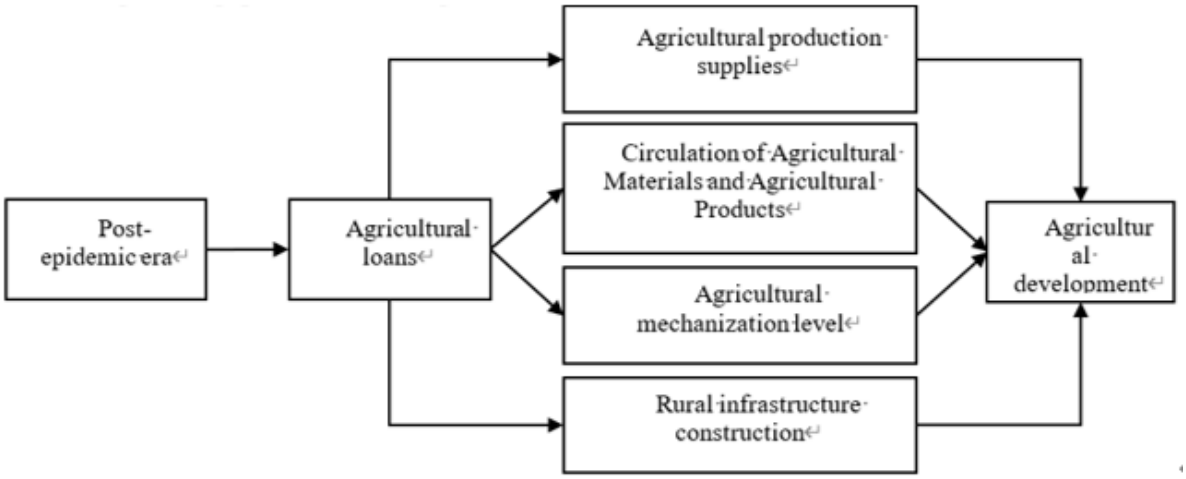

Figure 1 Theoretical mechanism of agriculture-related loans promoting agricultural development

4. EMPIRICAL RESEARCH

4.1 Sample selection and data sources

This paper selects the relevant data of 31 provinces and cities from 2015 to 2020 as samples, among which the data related to agricultural loans are from China Financial Yearbook, agricultural data are from China Rural Statistical Yearbook, and other data are from China Statistical Yearbook.

4.2 Main variables and empirical models

4.2.1 The main variables

Table 1 Main variables

Variable types	The variable name	indicators	symbol	Calculation method
Explained variable	Level of agricultural development	Output value of agriculture, forestry, husbandry and fishery	ADL	Output value of agriculture, Forestry, Animal husbandry and Fishery at year-end by provinces and cities (Unit: 100 million Yuan)
Explanatory variables	Agricultural loans	Balance of local and foreign currency agriculture-related loans	AL	Balance of Local and Foreign Currency Agriculture-related loans at the end of each year (Unit: 100 million Yuan)
Control variables	Natural environmental factor	Average temperature in major cities	AT	Annual Mean air temperature in major cities of Provinces and cities (Unit: ℃)
		Average relative humidity in major cities	RH	Annual Average Relative humidity in major Cities of Provinces and Cities (%)
		Sunshine hours in major cities	SH	Annual Sunshine hours in major cities of Provinces and cities (Unit: hour)
	Labor factor	The rural population	RP	Total rural Population of Provinces and cities at the end of the year (unit: 10,000)
	Agricultural scale	Total sown area of	CSA	Total sown area of crops in provinces and

		crops		cities (Unit: 10,000 square meters)
	Agricultural production material supply	Agricultural fertilizer application amount	ACF	Amount of agricultural chemical fertilizer applied by provinces and cities (Unit: ten thousand tons)
	Circulation of agricultural materials and agricultural by-products	Total circulation of agricultural products	CON	Total population in each region multiplied by per capita food consumption in each region (Unit: kg)
Intervening variable	Level of agricultural mechanization	Total power of agricultural machinery	MP	Total power of agricultural machinery in provinces and cities (Unit: 10,000 kw)
		Rural power generation	ELE	Rural power generation of provinces and cities (Unit: 10,000 kwh)
	Agricultural infrastructure construction	The reservoir capacity	RES	Reservoir capacity of provinces and cities (Unit: 100 million cubic meters)
		Average total highway mileage of each province	HIG	Average total length of highway by province (Unit: 10,000 km)

4.2.2 The empirical model

Firstly, referring to the multiple regression model and combining with the theoretical model constructed in this paper, the total effect model of agricultural loans on agricultural development level before and after the new coronavirus epidemic is established:

$$ADL_{it} = \beta_0 + \beta_1 Al_{it} + \sum_{i=1}^{n} \beta_j control_{it} + \lambda_i + u_t + \varepsilon_{it} \quad (1)$$

ADL is the explained variable, which represents the level of agricultural development. i represents the region, and t represents the year. Al is the explanatory variable, representing agricultural loans, which is represented by the amount of agricultural loans in local and foreign currencies. Control variables include: natural environmental factors, labor factors, agricultural scale, the main indicators involved: the main city average temperature (AT), the main city average relative humidity (RH), the main city sunshine hours (SH), rural population (RP), total crop acreage (CSA).

Secondly, according to Baron and Kenny (1986) 's stepwise regression method for testing the mediation effect, the following verification steps are designed in this paper: (1) Regression is performed for each of the agricultural loans. If the regression coefficient is significant, it indicates that the agricultural loans have an impact on the corresponding mediation variables.(2) Regression was carried out between each intermediary variable and agricultural development. If the regression coefficient was significant, it indicated that the corresponding intermediary variable had an impact on agricultural development.(3) On the premise of the above results, agricultural loans and corresponding intermediary variables are put into the regression as well as the explained variable agricultural development. If the significance of the regression coefficient of agricultural loans decreases or becomes insignificant, it indicates that part or all of the impact of agricultural loans on agricultural development comes from the transmission of intermediary variables.

According to the above steps, the following empirical model is established in this paper to briefly explain this intermediate test mechanism, and ZJ is used to represent all intermediary variables below:

The first step is to verify whether agricultural loans affect intermediary variables.

$$ZJ_{it} = \alpha_0 + \alpha_1 AL_{it} + \alpha_j \sum_{j=1}^{n} Z_{it} + \varepsilon_{it} \quad (2)$$

The second step is to verify whether each intermediary variable affects agricultural production.

$$ADL_{it} = \gamma_0 + \gamma_1 ZJ_{it} + \gamma_j \sum_{j=1}^{n} Z_{it} + \varepsilon_{it} \quad (3)$$

The third step is to put agricultural loans and corresponding intermediary variables and agricultural development indicators into the model at the same time.

$$ADL_{it} = \mu_0 + \mu_1 AL_{it} + \mu_2 ZJ_{it} + \mu_j \sum_{j=1}^{n} Z_{it} + \varepsilon_{it} \quad (4)$$

4.3 Descriptive statistical results

Table 2 reflects the results of descriptive statistics of the main variables. The average ADL and AL were 3276 and 10256, respectively, the difference is large, reflecting the wide flow of agricultural loans in China. In addition, the minimum and maximum values of 149.5, 413 and 10191 and 42415 reflect that there is a large gap in the level of agricultural development among provinces in China.

Table 2 Descriptive statistical results of main variables

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Sample size	The average	The standard deviation	The minimum value	The maximum
ADL	186	3726	2561	149.5	10191
AL	186	10256	8345	413	42415
AT	186	14.63	5.071	5	25.80
RH	186	65.89	12.35	34	84
SH	186	2068	579.2	858.5	3545
RP	186	1806	1228	212	5039
CSA	186	5373	3992	88.55	14910
MP	62	3361	2839	98.04	10965
ACF	62	171.8	137.8	4.400	666.7
ELE	60	824962	1105255	497.5	4405264
HIG	62	16.47	8.774	1.290	39.44
RES	60	299.4	269.2	26.42	1264
CON	62	6145334	402175	63779	1618397

4.4 Empirical analysis results

4.4.1 Correlation analysis

This paper mainly uses stata for empirical analysis of data. According to the research design, this paper first analyzes the correlation between the agricultural development level data and the agricultural loan data of 31 provinces and cities from 2019 to 2020 according to Model (1) to test whether Hypothesis H1a is valid. The analysis results are shown in Table 3. It can be seen that agricultural loans have a significantly positive correlation with agricultural development level, and agricultural loans can positively promote the improvement of agricultural development level, which proves Hypothesis H1a.

Table 3 Correlation analysis

	ADL	AL	AT	RH	SH	RP	CSA
ADL	1						
AL	0.70 * * *	1					
AT	0.26 * * *	0.26 * *	1				
EH	0.34 * * *	0.28 * *	0.69 * * *	1			
SH	0.27 * * *	0.28 * * *	0.68 * * *	0.77 * * *	1		
RP	0.89 * * *	0.64 * * *	0.36 * * *	0.36 * * *	0.38 * * *	1	
CSA	0.81 * * *	0.45 * * *	0.09 * *	0.16 * *	0.05 * *	0.74 * * *	1

*** P <0.01, ** P <0.05, * P <0.1

4.4.2 Regression analysis

In this paper, hausman test was performed on the data first, and the results showed that the P value was greater than 0.05, so the mixed regression is used for regression analysis of the data. Subsequently, according to the research design, this paper refers to Model (1) to conduct

mixed regression on the relevant data before the outbreak, namely, 2015 – 2018, and the relevant data from 2019 to 2020 after the outbreak, so as to test whether Hypothesis H1b is valid. The regression results are shown in Table 4. It can be seen that agricultural loans have significant indigenous effects on agricultural development before and after the outbreak, but there is no significant difference in values before and after the outbreak. This may be due to our country as a large agricultural country has been paying attention to the development of agriculture, rural areas and farmers, while the financial industry also actively support the development of agriculture, agricultural loan investment has always been more. Therefore, even after the outbreak, China ' s agricultural loans continued to grow, and the results were not significantly different from those before the outbreak. Therefore, this paper argues that H1b is not established, but agricultural loans still play an important role in protecting China ' s agricultural development after the outbreak.

Table 4 Regression analysis results before and after the epidemic

VARIABLES	Before the outbreak ADL	After the outbreak ADL
AL	0.052 * * *	0.058 * * *
	(3.76)	(4.07)
AT	39.060	56.552
	(1.31)	(1.57)
RH	24.264 *	7.635
	(1.75)	(0.51)
SH	0.258	0.330
	(0.83)	(1.20)
RP	1.044 * * *	0.819 * * *
	(7.09)	(4.12)
CSA	0.245 * * *	0.241 * * *
	(5.98)	(4.76)
Constant	- 2541052 *	- 2046652.
	(1.76)	(1.52)
Observations	124	62
R-squared	0.885	0.892
F test	0	0
r2_a	0.879	0.880
F	149.7	75.90

*** P <0.01, ** P <0.05, * P <0.1

4.4.3 Intermediate mechanism test

4.4.3.1 Testing the intermediate mechanism of "agricultural production material supply"

It can be seen from table 5 that the regression results of the first step reflect the impact of agricultural loans on the supply of agricultural production materials. From the model (1), it can be seen that the coefficient of agricultural loans is 0.007, which is positive and passed the 1 % aboriginality test. It shows that the aboriginality of agricultural loans affects the supply of agricultural production materials. The test results also show that the supply of agricultural production materials increases by 0.007 % every one percentage point increase in agricultural loans. The regression results of the second step reflect the impact of agricultural production material supply on agricultural development. From the model (2), it can be seen that the coefficient of agricultural production material supply is 14.217, which is positive and shows indigenous at the level of 1 %, indicating that agricultural development will increase by 14.217 percentage points every one percentage point increase in agricultural production material supply. The regression results of the third step show that the regression coefficient of agricultural loans to agricultural development decreases significantly after adding the variables of agricultural loans and agricultural production material supply at the same time, which indicates that agricultural production material supply plays a partial transmission role in the process of promoting agricultural development, and the mediating effect is established.

Table 5 Testing the intermediate mechanism of agriculture-related loans and agricultural development: supply of agricultural production materials

VARIABLES	(1) ACF	(2) ADL	(3) ADL	(4) ADL	(5) ADL
ACF		14.217 * * *	2.037	10.980 * * *	2.348
		(7.10)	(0.85)	(5.70)	(1.14)
AT			38.338		41.802
			(1.09)		(1.29)
RH			18.340		15.069
			(0.93)		(0.87)
SH			0.354		0.330
			(0.95)		(1.02)

RP			1.072 * * *		0.720 * * *
			(5.37)		(3.59)
CSA			0.181 * * *		0.187 * * *
			(3.26)		(3.28)
AL	0.007 * * *			0.096 * * *	0.059 * *
	(2.69)			(3.73)	(2.61)
Constant	87.300 * * *	917.775 * * *	-2300022.	338.845	-2273151.
	(3.40)	(3.19)	(1.40)	(1.66)	(1.58)
R-squared	0.241	0.699	0.862	0.813	0.895
F test	0.00919	1.72 e-09	0	0	0
r2_a	0.228	0.694	0.847	0.807	0.881
F	7.247	50.35	104.5	67.88	81.57

Note: ***, ** and * are significant at the significance level of 1%, 5% and 10% respectively.

4.4.3.2 Intermediate mechanism inspection of "circulation of agricultural materials and agricultural by-products"

Table 6 reports the test results of the model. The regression results of the first step reflect the influence of agricultural loans on the circulation of agricultural materials and agricultural sideline products. According to Model (1), the coefficient of agricultural loans is 30.293, which is positive and passes the significance test of 1%, indicating that agricultural loans significantly affect the circulation of agricultural materials and agricultural sideline products. The results also show that the circulation of agricultural materials and agricultural sideline products increases by 30.293 percentage points when the agricultural loan increases by one percentage point. The second step regression results reflect the agricultural inputs and the impact on the agricultural development, agricultural and sideline products circulation by a model (2) the agricultural resources and agricultural and sideline products circulation coefficient is 0.005, positive and significant under 1% significant level, shows that whenever the circulation of agricultural resources and agricultural and sideline products increased by one percent, agricultural development will increase 0.005%;The third step of the regression results show that at the same time to join agricultural loans and agricultural resources and agricultural and sideline products circulation variable, agricultural loan drops to significant regression coefficient of the agricultural development, illustrates the agricultural loan in promoting the process of agricultural development, agricultural materials and circulation of agricultural and sideline products have part of the conduction effect, the mediation effect was established.

Table 6 Test of the intermediate mechanism between agricultural loans and agricultural development: circulation of agricultural materials and agricultural by-products

VARIABLES	(1) CON	(2) ADL	(3) ADL	(4) ADL	(5) ADL
CON		0.005 * * *	0.002 * *	0.004 * * *	0.001
		(10.51)	(2.43)	(5.63)	(1.40)
AT			51.946 *		56.222 *
			(1.70)		(1.86)
RH			6.079		5.542
			(0.36)		(0.35)
SH			0.287		0.303
			(0.88)		(0.99)
RP			0.426		0.530*
			(1.24)		(1.95)
CSA			0.250 * * *		0.249 * * *
			(5.91)		(5.79)
AL	30.293 * * *			0.042	0.051 * *
	(5.45)			(1.01)	(2.12)
Constant	254879552 * * *	252.461	-1768413.	-189.822	-1901651.
	(4.50)	(0.99)	(1.23)	(0.83)	(1.39)
R-squared	0.512	0.754	0.874	0.768	0.895
F test	1.01 e-06	0	0	0	0
r2_a	0.504	0.750	0.860	0.760	0.881
F	29.66	110.4	86.08	76.22	92.55

Note: ***, ** and * are significant at the significance level of 1%, 5% and 10% respectively.

4.4.3.3 Intermediate mechanism test of "agricultural mechanization level"

As can be seen from table 7, the regression results of the first step reflect the impact of agriculture-related loans on the level of agricultural mechanization. From model (1), it can be seen that the coefficient of agriculture-related loans is 0.164, which is positive and passed the 1 % aboriginality test, indicating that the aboriginality of agriculture-related loans affects the level of agricultural mechanization. The test results also show that the level of agricultural mechanization increases by 0.164 percentage points every one percentage point increase in agriculture-related loans. The regression results of the second step reflect the impact of the level of agricultural mechanization on agricultural development. From Model (2), it can be seen that the coefficient of the level of agricultural mechanization is 0.710, which is positive and passes the 1 % significance test, indicating that for every one percentage point increase in the level of agricultural mechanization, agricultural development increases by 0.710 percentage points. The regression results of the third step showed that the regression coefficient of agricultural loans to agricultural development decreased significantly after adding the variables of agricultural loans and agricultural mechanization level at the same time, which indicated that the agricultural mechanization level played a partial conduction role in the process of promoting agricultural development, and the mediating effect was established.

Table 7 Test of intermediate mechanism between agriculture-related loans and agricultural development: agricultural mechanization level

	(1)	(2)	(3)	(4)	(5)
VARIABLES	MP	ADL	ADL	ADL	ADL
MP		0.710***	0.269*	0.560***	0.175
		(15.77)	(1.94)	(8.83)	(1.43)
AT			31.483		43.318
			(1.01)		(1.47)
RH			24.304		16.069
			(1.34)		(1.01)
SH			0.305		0.300
			1.05)		(1.08)
RP			0.944***		0.711***
			(5.54)		(3.44)
CSA			0.092		0.151**
			(1.20)		(2.27)
AL	0.164***			0.082***	0.053**
	(2.92)			(3.30)	(2.33)
Constant	1414286***	973.235***	-2346214*	505.724***	-2209189*
	(2.70)	(4.92)	(1.68)	(3.08)	(1.71)
R-squared	0.301	0.741	0.871	0.818	0.897
F test	0.00487	0	0	0	0
r2_a	0.289	0.736	0.857	0.812	0.883
F	8.549	248.6	76.85	280.0	83.25

Note: ***, ** and * are significant at the significance level of 1%, 5% and 10% respectively.

4.4.3.4 Testing the intermediate mechanism of "rural infrastructure construction"

Table 8 reports the results of the model test. The regression results of the first step reflect the impact of agricultural loans on rural infrastructure construction. From Model (1), Model (2) and Model (3), we can see that the coefficients of agricultural loans are 12.658, 0.000 and 0.005, respectively, and the explicitness is not obvious. Therefore, agricultural loans do not affect agricultural development through rural infrastructure construction, and the mediating effect of rural infrastructure construction is not established.

Table 8 Testing the intermediate mechanism of agriculture-related loans and agricultural development: rural infrastructure construction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	ELE	HIG	RES	ADL	ADL	ADL	ADL
ELE				0.001 * *	0.000	0.000 * *	0.000
				(2.23)	(0.92)	(2.07)	(0.50)
HIG				224.726 * * *	1.860	160.265 * * *	3.420
				(7.01)	(0.07)	(4.24)	(0.13)
RES				0.793	0.238	0.935	0.307
				(0.85)	(0.41)	(1.28)	(0.50)
AL	12.685	0.000	0.005			0.106 * * *	0.057 * *
	(1.02)	(2.69)	(1.62)			(3.02)	(2.19)
AT					63.152 * *		54.617
					(2.19)		(1.51)
RH							8.606
							(0.42)
SH					0.156		0.316
					(0.55)		(0.90)
RP					1.157 * * *		0.834 * * *
					(5.36)		(3.49)
CSA					0.224 * * *		0.226 * * *
					(4.86)		(3.91)
Constant	670088240 * * *	11.293 * * *	238.236 * * *	156.551	- 1029514.	514.262 *	- 2047087.
	(4.08)	(6.15)	(4.96)	(0.43)	(0.98)	(1.80)	(1.17)
R-squared	0.012	0.223	0.031	0.589	0.854	0.736	0.887
F test	0.311	0.00933	0.110	0	0	0	0
r2_a	0.00522	0.210	0.0144	0.567	0.834	0.717	0.867
F	1.046	7.216	2.637	43.29	52.32	59.26	64.41

Note: ***, ** and * are significant at the significance level of 1%, 5% and 10% respectively.

5. CONCLUSIONS

Firstly, agriculture-related loans are promoting the improvement of agricultural development level. The implementation of the RRR and interest rate reduction policy has promoted the changes in the credit scale and structure of banks, and stimulated banks to strengthen financial support for agriculture and small loans. So in addition to large farmers, small farmers also received strong support for agricultural development.

Secondly, although agriculture-related loans still play an important role in ensuring China's agricultural

development after the epidemic, the promotion effect is not more significant. This conclusion is different from previous research results, and this paper thinks that the reasons may be: China is a big agricultural country, and the emphasis on "agriculture, rural areas and farmers" has been throughout the ancient and modern times. At the same time, a large number of financial institutions aiming at serving agriculture, rural areas and farmers have flooded into the market, and the amount of agriculture-related loans has always been large.

Thirdly, when agriculture-related loans promote agricultural development, the supply of agricultural production materials, circulation of agricultural materials and agricultural sideline products, and agricultural mechanization level play a part of the conduction effect, but the rural infrastructure construction does not produce the intermediary effect. This paper argues that this is due to the complex rural terrain and scarce labor force, and the infrastructure construction involves a large number of people and property, which requires the support of various forces such as finance and society. Therefore, the role of agriculture-related loans in promoting rural infrastructure construction is not obvious.

6. SUGGESTIONS

Firstly, Increase financial input to agricultural development. To solve the problem of financing agricultural development, it is of primary importance to expand the supply of agriculture-related loans. Insufficient supply will not only limit the development of policies aimed at promoting agricultural development, but also make agricultural development in need of financial support not effective guarantee. Therefore, China should continue to increase the supply of funds, and continue to play the role of agriculture-related loans for agricultural funds. Agriculture-related financial institutions should be more clearly positioned to serve "agriculture, rural areas and farmers", and establish more branches in rural areas, so as to increase the capital output to agricultural development.

Secondly, developing new models of agriculture-related loans. The influx of financial institutions and the variety of agricultural development businesses require financial institutions related to agriculture to keep innovating and launch loans more suitable for agriculture, rural areas and farmers. For example, according to the different types of credit, it can be divided into "planting loan" and "raising loan", and according to the different farming time, it can be divided into "spring ploughing loan" and "autumn harvesting loan". The diversification of financial agriculture-related loan products is conducive to promoting the extension of industrial chain, promoting the development of small and medium-sized agricultural enterprises and promoting the improvement of China's agricultural level.

Thirdly, improving the supply structure of agriculture-related loans. Adjusting and optimizing the supply structure of agriculture-related loans is an important link in supporting agricultural development. On the one hand, more funds can be invested in agricultural production, circulation and other links, giving full play to the greater effectiveness of agriculture-related loans in promoting agricultural development. On the other hand, when the investment fund is limited, it should be invested in the key points of agricultural development, such as the research and development of new farming technologies and new varieties of agricultural products, so as to promote the development of China's key agricultural fields.

Finally, this paper empirically tests the positive effect of agricultural loans on agricultural development in the post-epidemic era, but does not analyze whether there is heterogeneity in the impact of agricultural loans on agricultural development in different regions. Future scholars can conduct more detailed studies by region and province. In addition, agricultural development can be further refined to explore the impact and mechanism of agricultural loans on agricultural production, circulation and sales.

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