Research on the Impact and Countermeasures of Digital Inclusive Finance on the Integration and Development of Rural Industries in Jiangsu Province

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Abstract: Deepening the integration of rural industries is one of the important measures for China to implement the rural revitalization strategy. With the rapid development of digital inclusive finance, it is gradually becoming popular in rural industries. However, there are still difficulties in financing in the process of deepening the integration and development of rural industries. Based on this, this article starts from a new perspective of digital inclusive finance and takes rural areas in Jiangsu Province as the research object to study the impact of digital inclusive finance on the integrated development of rural industries in Jiangsu Province, and proposes corresponding suggestions and measures to achieve rural revitalization.

1. Introduction

The rural revitalization strategy has attracted widespread attention from all walks of life since it was first proposed in the report of the 19th National Congress of the Communist Party of China. To promote rural revitalization and achieve common prosperity, it is necessary to narrow the gap between urban and rural consumption and incomes as soon as possible, improves farmers' income, and truly enrich farmers. Rural industry is the core part of the county economy and an important core of rural revitalization. Accelerating the integration and development of rural primary, secondary, and tertiary industries is an important link in solving the "three rural" issues. Jiangsu Province has actively responded to the call of the central government. On the basis of summarizing the experiences and practices of various regions, seven departments including the Provincial Development and Reform Commission have jointly studied and formed the "Guidelines for the Integration and Development of Primary, Secondary, and Tertiary Industries in Rural Areas of Jiangsu Province". Through the joint efforts of relevant provincial departments and cities and counties, a number of national demonstration parks for the integration and development of rural industries have been successfully created. However, the problems of financing difficulty and low financing efficiency are still serious, and digital inclusive finance has become an inevitable choice to solve the problem of rural industrial integration. In this context, how to give full play to the financial and digital elements of digital inclusive finance to achieve the goal of rural industrial

integration and development has become a major practical issue that needs to be addressed urgently [1-3].

2. Definition of Concepts Related to Digital Inclusive Finance and Integrated Development of Rural Industries

(1) Definition of the concept of digital inclusive finance

Digital inclusive finance is developed on the basis of inclusive finance, and it has digital advantages over traditional inclusive finance. It can achieve a degree that traditional inclusive finance cannot achieve in the past; greatly meeting the financial service requirements of vulnerable groups such as farmers, and can promote social fairness and social harmony. This article believes that digital inclusive finance can greatly help rural industrial integration in terms of coverage and depths of use, improve the availability of financial services for farmers, reduce the threshold for financial services, and ease farmers' financing constraints, thereby bringing a large amount of funds to farmers and accelerating the pace of rural industrial integration. Digital finance is one of the manifestations of the digital economy, with low threshold, simple process, and high accuracy, which can better solve the problems of difficult and small rural financing [4-6].

(2) Definition of the concept of integrated development of rural industries

Rural industrial integration refers to the linkage and cooperation between agriculture and other industries in production, such as the combination of agricultural production and advanced technology industries, to make agricultural production more scientific and efficient. Extending the industrial chain, improving the interest mechanism, and developing new forms of business are inevitable requirements for building a modern agricultural production system, and are effective ways and important means to cultivate new industries, forms of business, and models in rural areas.

3. Construction of Indicator System for Rural Industrial Integration

As a complex system, the academic community has not yet formed a unified indicator system for rural industrial integration. Based on previous scholars' research, this article selects 9 secondary indicators to construct a rural industry integration indicator system from five levels: agricultural industry chain extension, agricultural multifunction, integration of agriculture and service industries, penetration of advanced technology elements, and integration effect. The significance test of rural industry integration index type is calculated through entropy method, as shown in Table 1 [7-8].

As the level of rural industrial integration is a comprehensive indicator. This article refers to the methods of scholars such as Xie Tingting. This article selects the entropy weight method for processing. Considering that each indicator unit is different, the original indicator is standardized.

The first step is to standardize the original indicators:

$$Y_{ijt} = \frac{y_{ijt} - \min(y_{jt})}{\max(y_{jt}) - \min(y_{jt})}$$

(1)

In Equation (1), Yijt is the value after standardization of the jth indicator (j=1, 2,..., n; n is the number of indicators) in County i in Year t (i=1, 2,..., m; m is the number of counties), Yijt is the original indicator, max (Yjt) is the maximum value of the jth indicator in all years, and min (Yjt) is the minimum value.

Table 1: Indicator System for Rural Industrial Integration.

Primary indicator	Secondary indicators	Indicator definition	unit	Indicator Properties
Extension of agricultural industry chain	Number of professional villages and towns per million people Number of demonstration	Number of demonstration villages and towns of "one village, one product"/rural population	Per million people	Positive indicators
	Ratio of agricultural product processing industry to total agricultural output value	Main business income of agricultural product processing enterprises/total agricultural output value	%	Positive indicators
	Per capita gross output value of primary industry	Gross output value of primary industry/rural population	10000/person	Positive indicators
Bringing Agriculture into Full Play	Fertilizer use intensity per unit area	Fertilizer application amount/crop planting area	10000 tons/1000 hectares	Negative indicator
	Per capita output of main agricultural products	Total grain output/rural population	Tons/person	Positive indicators
Integrated development of agricultural service industry	Proportion of added value of agricultural, forestry, animal husbandry and fishery services	The ratio of added value of agriculture, forestry, animal husbandry and fishery services to that of the primary industry	%	Positive indicators
Training on new agricultural formats	Ratio of facility agricultural area to cultivated land area	Ratio of facility agricultural area to cultivated land area	%	Positive indicators
Fusion effect	Proportion of non operating income	Proportion of wage income and property income of rural residents	%	Positive indicators
	Proportion of rural self-employed people	Rural self-employed population/rural people	%	Positive indicators

Step 2: Calculate the proportion of the jth indicator in county i in year t, Wijt:

$$W_{ijt} = Y_{ijt} / \sum\nolimits_{i=1}^{m} Y_{ijt}$$

(2)

Step 3: Calculate the entropy value of the jth index in year t:

$$F_{jt} = -\frac{1}{\ln m} \sum\nolimits_{i=1}^{m} P_{ijt} \ln P_{ijt}$$

(3)

Step 4: Calculate the weight of the jth indicator in year t:

$$S_{jt} = X_{jt} / \sum_{j=1}^{m} Y_{ijt}, X_{jt} = 1 - F_{jt} \tag{4}$$

Step 5: According to the weight of each indicator and the standardized value, calculate the index conversion of the level of rural industrial integration development:

$$\text{convergent} = \sum_{j=1}^{n} S_{jt} \times Y_{ijt} \tag{5}$$

4. Research Design

(1) Variable definition
① Explained variable. Rural industrial integration level (Con). Refer to the relevant indicator systems of multiple scholars and obtain based on the availability of data.
② Explanatory variables. Digital Inclusive Finance Level (Dig): Referring to existing research results, the measurement of the development level of digital inclusive finance has not yet reached a unified standard. Referring to existing research results, there are many applications of the "Peking University Digital Inclusive Finance Index". Therefore, this article also selects the county-level data provided in the "Peking University Digital Inclusive Finance Index (2011-2021)" to measure the development level of digital inclusive finance in various counties of Jiangsu Province [9-11].
Control variables. Based on the explained variables and referring to the research results of previous scholars, the following control variables are selected from the perspective of factors affecting the development of rural industrial integration: rural residents' income level (Living). As one of the main players in the development of rural industrial integration, farmers' willingness to participate is influenced by their income level. The higher their income level, the stronger their willingness to participate in rural industrial integration, which in turn contributes to the development of rural industrial integration. This article uses the per capita disposable income of rural residents to express. The development level of traditional agriculture. Traditional agriculture, as the basis for the integrated development of rural industries, is expressed in this paper by dividing the total grain output of each province by the rural population, which is the per capita grain output. Rural production facilities. In agricultural production, production facilities are needed to optimize production conditions and improve the quality of agricultural production, thereby consolidating the basic industry of rural industrial integration. This paper uses the area of irrigated cultivated land divided by the area of cultivated land to express.
(2) Model Setting and Estimation Methods
The benchmark regression model in this article is as follows::

$$\text{convergent} = \text{cons} + \beta_1 \text{Dig}_{i,t} + Z\gamma + \lambda_i + \varepsilon_{i,t} \tag{6}$$

Among them, convert represents the level of rural industrial integration, and Dig represents the level of digital inclusive finance development. Z is the set of control variables, cons is the constant term, λ I represents a fixed individual i, ε i. T is the random Error term. If in the above equation β If 1 is significantly positive, the development of digital inclusive finance can help improve the level of rural industrial integration.
(3) Data source
This article selects the panel data formed by various counties in Jiangsu Province from 2011 to 2021 as the sample data. The relevant data mainly come from the "China Statistical Yearbook", as well as the statistical yearbooks of various counties in Jiangsu Province and the official website of the Ministry of Agriculture and Rural Affairs of the People's Republic of China [12-14]. The descriptive statistical results of the sample data are shown in Table 2.

Table 2: Descriptive Statistical Results of Variables.

Variable	sample size	mean value	standard deviation	minimum value	Maximum	correlation coefficient
Integration level of rural industries		0.362	0.022	0.19	0.53	1
Digital Inclusive Finance Level		223.24	94.08	18.32	423.21	0.356
Income level of rural residents		12913.7	8210.17	4102.4	13425.6	0.310
Rural production facilities		0.462	0.287	0.213	4.8	0.138

5. Analysis of Empirical Results

(1) The Impact of Digital Inclusive Finance on Rural Industrial Convergence

This article uses a fixed effects model to quantitatively analyze the relationship between digital inclusive finance and rural industrial integration. The empirical results are shown in Table 3. In order to ensure the robustness of the empirical results, the regression is first carried out without adding control variables, and then the control variables are added to continue the above regression [15].

Table 3: Descriptive statistical results of variables.

Variable	FE	FE
	regression1	regression2
Digital Inclusive Finance Level	0.0195***	0.0187***
	(0.0019)	(0.0025)
Income level of rural residents		-0.0019*
		(0.0010)
Rural production facilities		0.0074*
		(0.0041)

From the estimation results of the FE method in Table 3, the F-value significance test results of regression 1 indicate that the model has strong persuasiveness. In order to ensure the robustness of the regression results, in the process of verifying the impact of digital inclusive finance on rural industrial integration, this article conducted two regressions, with regression 1 being the result without adding control variables and regression 2 being the result with adding control variables. From the regression results, it can be found that regardless of whether the impact of control variables on the development of rural industrial integration is considered, the level coefficients of digital inclusive finance are significant at a confidence level of 1%, And it is positive, indicating that the development of digital inclusive finance is conducive to promoting rural industrial integration, presenting a positive relationship.

(2) The Impact of Digital Inclusive Finance on Rural Industrial Convergence

As this article selects the "Peking University Digital Inclusive Finance Index (2011-2021)" to measure the development level of digital inclusive finance in various regions, which is a comprehensive index composed of sub indexes such as coverage, depth of use, payment, insurance, and credit. To explore the impact of different businesses of digital inclusive finance on rural

industry integration, this article will select payment, insurance The three main businesses of credit, as well as the sub indicators corresponding to the digital inclusive financial index, are respectively taken as explanatory variables and brought into the fixed effect model to further study the impact of payment, insurance, and credit businesses on the integration and development of rural industries. The empirical results are shown in Table4.The results show that the coefficients of payment, credit, and insurance variables are significantly positive at the 1% significance level.

Table 4: The impact of digital inclusive finance on rural industrial convergence.

Variable	FE	FE	FE
	Regression1	Regression2	Regression3
Payment			
insurance			
credit			
Income level of rural residents	0.0041		
	(0.0021)		
Rural production facilities		0.0092	
		(0.0052)	
Constant term	0.2503	0.2421	0.2432
	(0.0073)	(0.0073)	(0.0073)
sample size			
Model significance test	F=37.56	F=36.28	F=37.46
	(Prob=0)	(Prob=0)	(Prob=0)

6. Conclusions and Recommendations

(1) Main conclusions

Based on the theoretical analysis of the role of digital inclusive finance in supporting rural industrial integration, this article selects regional panel data from Jiangsu counties from 2011 to 2021 for empirical analysis. The results show that: ① Digital inclusive finance has a significant positive promoting effect on rural industrial integration. ② The three major businesses of digital inclusive finance, including payment, credit, and insurance, have significantly positive impacts on the integration and development of rural industries.

(2) The main suggestion

Firstly,we need to strengthen the cooperation and linkage between banks, governments, and enterprises. The development of rural industries involves various aspects such as government policies, financial institutions, enterprises, and farmers. We should encourage commercial banks and the government to establish close strategic cooperation relationships, jointly introduce high-quality agricultural enterprises, and achieve integrated linkage between banks, governments, enterprises, cities, counties, and townships to support rural revitalization. Banks provide financial credit resources and services to help upgrade traditional industries and strengthen emerging industries.

Secondly, we need to make up for the shortcomings in rural infrastructure and public services. Developing rural digital inclusive finance is an effective path to address the challenges of high costs and high risks in traditional rural financial services, which poses new requirements for the construction of digital infrastructure for network communication and mobile terminals in rural areas. At the same time, financial institutions, especially banks, should be encouraged to actively carry out financial service methods that combine offline branches with digital tools and platforms.

Thirdly, we need to strengthen the support of rural financial talents. Strengthen the training and support of various talents for the integration and development of rural industries, and actively encourage various talents, especially professional talents with modern financial awareness and industrial development experience, to participate in the development of rural industries.

7. Conclusion

The application of digital inclusive finance is becoming increasingly widespread, and the difficulties in financing and low financing faced by rural industrial integration have slowed down the progress of rural revitalization. Governments, financial institutions, and rural areas should fully utilize the advantages of digital inclusive finance, such as low threshold, convenience, and efficiency, to achieve high-quality development of rural industrial integration.

Acknowledgements

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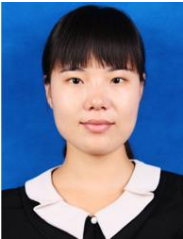
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