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Research on Digital Finance in Promoting the Development of the Agricultural Industry

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Abstract: *This paper takes the sample of 31 provinces (municipalities and autonomous regions) from 2011-2019 to study the influence of digital finance development on the development of agricultural industry. The study found that digital finance can reduce information asymmetry and farmers financing costs, thus reducing financing difficulty and expensive financing, timely loan to ensure the smooth progress of agricultural production; and farmers' agricultural activities is directly reflected in the regional agricultural GDP, meaning that the extensive development of digital finance will promote the development of agricultural industry.*

Keywords: *digital finance, agricultural development, panel data*

1. Introduction and literature review

Since the launch of Alipay at the end of 2004, China's digital finance has started a long journey of exploration. Since the 18th National Congress of the Communist Party of China, China's digital finance development has entered a turning era and entered a stage of high-quality development. Digital finance reduces the cost of financial services and expands the coverage of financial services. These advantages can well solve the financing needs of China's agricultural industry. In China's agricultural industry, it is characterized by strong demand of capital timeliness, unstable repayment ability, small scale of enterprises, lack of effective collateral, remote agricultural industry location and high loan cost, so that traditional financial services can not effectively meet the needs of the development of agricultural industry. The development of digital finance has improved the efficiency of loan examination of financial institutions, reduced the information asymmetry with farmers, effectively alleviated the problem of few financial service outlets in rural areas, and is conducive to the development of agricultural industry. Therefore, whether the development of digital finance will have a certain impact on the development of agricultural industry and the relationship between the two is the theme of this paper.

In recent years, the rise of digital finance has attracted wide attention and research in the academic circle, and the relevant research groups have also carried out many data sorting on digital finance, such as the Digital Inclusive Financial Index (DFIIC) of Peking University [1] Wait. As for the research of digital finance and agricultural industry, the relevant research of China Institute of Inclusive Finance of Renmin University of China believes that digital inclusive finance can improve efficiency and fill the "gap between supply and demand", so as to promote the development of county industry and economy [2] Mr.Bedogo and others believe that the digital exploration of traditional rural financial institutions and the entry of online banking and small loan companies into rural financial markets bring more opportunities for these agricultural industry entities and promote the development of to some extent the agricultural industry itself [3] Chen Chibo believes that digital inclusive finance can alleviate the financial vulnerability of rural families by reducing credit constraints and improving farmers' financial literacy [4] It also reflects from the side that digital finance can promote the development of the agricultural industry. Huang Jie said that digital financial models such as online banking have opened up a new model of science and technology for helping agriculture, which is a beneficial attempt to strengthen the endogenous driving force of rural development and promote rural revitalization [5].

When sorting out the existing literature, it is found that the main research of scholars focuses on the relationship between digital finance and rural family finance. The research on digital finance and agricultural industry is still not very comprehensive, and mainly discusses the impact of digital finance on the agricultural industry and lacks empirical research. Therefore, this paper will study the development of digital finance and agricultural industry from an empirical perspective, and put forward relevant suggestions according to the research conclusions.

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2. Sample data and variable analysis

2.1 Data source

We selected 31 provinces (municipalities, autonomous regions) in mainland China from 2011-2019 to represent the degree of agricultural industry of 31 provinces (municipalities directly under the government and autonomous regions), and the Peking University digital inclusive finance index to represent the degree of digital finance. Since the announcement of Peking University's digital inclusive finance index began in 2011, it chose to start in 2011.

This paper adopts the data from 31 provinces (municipalities and autonomous regions) in mainland China. Digital financial data comes from the digital inclusive finance index database of Peking University, while other data from various provinces (municipalities and autonomous regions) comes from the National Bureau of Statistics.

2.2 Variable description

G Fi,t indicates that the agricultural GDP of i Province in t (unit 100 million yuan), there are many factors in the agricultural development level of a region to be measured. This paper selects agricultural GDP as the main representative, which is feasible.

DIFIi,t represents the digital inclusive financial index in t, this paper uses the digital inclusive financial index published by the 2021 Peking University Digital Financial Research Center in 2021 to indicate the degree of digital financial development in various provinces. At present, the digital inclusive finance index includes a total of three dimensions: the breadth of digital financial coverage, the use depth of digital finance and the digital degree of inclusive finance, and 3 3 specific indicators. Based on the above index system and the "hierarchical analysis method" commonly used in similar documents, the research group finally compiled the "Peking University Digital Inclusive Financial Index" at three levels of provinces, cities and counties in mainland China. This paper selects the provincial index data as the core interpretation variable. This paper assumes its coefficient, α1The estimate is greater than 0, namely, digital finance is positively correlated to the level of agricultural industry development.

FEAi,t represents i province t annual financial expenditure on agriculture, forestry and water (in 100 million yuan), PAMi,t indicates the total t power of i province (in 10,000 kW) and uses the total power of each province to indicate the agricultural production conditions of each province, SACi,t indicates the total crop sowing area (in one thousand hectares) in t year, i Province.The above variables are all control variables.

Description of the variables is shown in Table 1.

Table 1: Variables description

Variable name	Economic implications	Details
G F	Agricultural GDP	Total agricultural product of the provinces published by the National Bureau of Statistics
DIFI	Digital inclusive finance index	The Digital Inclusive Finance Index was released by Peking University in 2021
FEA	Fiscal expenditure on agriculture, forestry and water resources	Provincial financial expenditure on agriculture, forestry and water resources announced by the National Bureau of Statistics
PAM	Total driving power of agricultural machinery	The total power of provincial agricultural machinery announced by the National Bureau of Statistics
SAC	Total crop seeding area	The total area of crops sown in the provinces announced by the National Bureau of Statistics

2.3 Descriptive statistics

First, perform a descriptive statistical analysis of the data, as shown in Table 2.

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Table 2: Sample descriptive statistics

Variable name	Observations	Mean	Standard deviation	Min	Max
G F$_{i,t}$	279	1725.5	1246.4	49.62	5408.6
DIFI$_{i,t}$	279	202.3	91.65	16.22	410.28
FEA$_{i,t}$	279	512.91	255.558	91.78	1310.89
PAM$_{i,t}$	279	3308.8	2932.5	93.97	13353.0
SAC$_{i,t}$	279	5316.3	3935.1	88.55	14902.7

3. Empirical analysis

3.1 Measurement model

This article focuses on exploring the relationship between the digital finance development and the development of agricultural industry. To test our proposed hypothesis, we set up multivariate regression equations to study the relationship between digital finance and the development of the agricultural industry. The analysis model is as follows:

$$G\ F_{i,t}=\alpha_0+\alpha_1 DIFI_{i,t}+\alpha_2 FEA_{i,t}+\alpha_3 PAM_{i,t}+\alpha_4 SAC_{i,t}+\varepsilon_{i,t}$$

Among them $\alpha_1, \alpha_2, \alpha_3$, α_4 are the regression coefficients of $DIFI_{i,t}$, $FEA_{i,t}$, $PAMi,t$ and $SACi,t$ respectively.

3.2 Model checking

We use Stata software to carry out multiple linear regression analysis on the collected data, The results are shown in Table 3.the multiple linear regression equations of $DIFIi,t$, $FEAi,t$, $PAMi,t$ and $SACi,t$ are as follows:

$$GG_{i,t} = 1463.8 + 0.7615DIFIi,t + 1.1503FEAi,t + 0.0189PAMi,t - 0.1025SACi,t + \varepsilon_{i,t}$$

Table 3: Regression results

Explained variable	GFi,t					
GFi,t	Coef.	Std.Err	t	P>|t|	[95% Conf.	Interval]
DIFIi,t	0.7615438	0.3436226	2.22	0.028	0.0846986	1.438389
FEAi,t	1.150286	0.2165271	5.31	0.000	0.7237849	1.576786
PAMi,t	0.0188528	0.0300155	0.63	0.531	-0.0402696	0.077975
SACi,t	-0.1024686	0.0814208	-1.26	0.209	-0.2628459	0.057909
_cons	1463.815	395.7221	3.70	0.000	684.3481	2243.283

According to Table 3, the relationship between digital finance and agricultural industry development has passed the remarkable test. The influence coefficient of digital finance on the agricultural industry is 0.7615, which shows that digital finance has a significant role in promoting the development of agricultural industry, which is consistent with the theory. The higher the level of digital finance development, the better the agricultural industry will develop under the influence of digital finance. For each unit increase of digital finance, the development level of agricultural industry increased by 76%, which shows that digital finance plays a large role in promoting the development of the real economy. It can be seen from the return that the biggest impact on agricultural GDP is undoubtedly the financial expenditure of agriculture, forestry and water. The positive relationship between the two and the correlation coefficient is 1.150286, which shows that the national financial policy plays an extremely important role in the development of agricultural industry in a region. The total power of agricultural machinery has a small impact on agricultural development, indicating that the total power of agricultural machinery is not an important condition to determine the development of agricultural industry. The total crop sowing area is negatively related to the gross agricultural product, which is somewhat different from the actual situation. It is likely due to the large difference in the crop sowing area in different regions, which has a certain interference to the model.

Multiple linear regression analysis proves that digital finance promotes the development of agricultural industry.

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4. Conclusions and recommendations

This paper studies the influence of digital inclusive finance on agricultural GDP and focuses on the influence of digital finance on the agricultural industry. By analyzing the impact of digital financial development on the agricultural industry through establishing the panel data of different years in 31 provinces, and conducting the data analysis through stata software, we found that the degree of digital financial development has a positive correlation with the agricultural industry.

There are still some limitations and room for further research: (1) this paper believes that digital finance can reduce information asymmetry and the financing costs of farmers, So as to reduce farmers financing difficulty, financing expensive and other problems, Then promote the development of agricultural industry, But the specific conduction mechanism still has room for further study (2) for independent variables, This paper only selects digital inclusive financial index, financial agriculture, forestry and water expenditure, total power of agricultural machinery, total crop sowing area as independent variables, Without considering more factors, It is necessary to include additional influencing factors in future studies to improve empirical accuracy.(3) The extensive development of digital inclusive finance may also improve the quality of financial services in rural areas by improving the financial literacy of farmers, so as to promote the development of the agricultural industry. This problem still needs to be explored further.

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