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The Impact of Digital Inclusive Finance on the Rural Economy in Anhui Province

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Abstract: Anhui Province is a major agricultural province in eastern China, and the development of rural economy plays an important role in improving the overall economic level of the province. In recent years, the extensive use of digital technologies and ongoing financial innovations have contributed to the rapid growth of digital inclusive finance in rural areas of Anhui, significantly reducing the lack of financial services in these regions. The main objective of this paper is to explore in depth how digital inclusive finance impacts the rural economy of Anhui Province and to provide practical policy recommendations based on these findings.

Keywords: Digital inclusive finance; Rural economic development in Anhui Province; Regression model

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1. Introduction

As a major agricultural province in China, Anhui's unique geographical location, climate, land resources, agricultural history, and reforms in agriculture highlight the vital role of the rural economy in the overall economic development of the province. Rural economic development is crucial for the economic security and progress of Anhui [1]. The Chinese government has continuously strengthened its support for agriculture by implementing a series of pro-farmer policies, effectively promoting the overall improvement of the rural economy [2]. Despite these efforts, rural areas continue to lag behind urban regions in economic development due to the structural divide between urban and rural areas. As of 2023, rural residents in Anhui made up 39.85% of the total population. Despite their significant numbers, their contribution to economic growth is lower than that of urban residents. This trend highlights a continuing widening income gap between urban and rural populations [3].

In this context, the integration of digital technology and inclusive finance has given rise to the concept of "digital inclusive finance." This new concept leverages digital means to promote the development of inclusive finance, aiming to break the temporal and spatial limitations of traditional financial services [4]. Digital inclusive finance seeks to tap into the growth potential of the rural economy by providing more convenient consumption channels for rural residents, thereby driving healthy economic growth, improving living standards, and stimulating market vitality [5]. Ultimately, it lays a solid foundation for the long-term growth of China's economy [6].

Digital inclusive finance leverages digital technologies to transform traditional financial models, ensuring that equal and comprehensive financial services are available to disadvantaged groups. This includes rural populations, migrant workers who lack sufficient rights protection, and small to medium-sized enterprises that face financial challenges [7]. The core goal of digital inclusive finance is to reduce financial exclusion and provide inclusive services for all, enabling vulnerable groups to generate their own wealth [8].

2. Related work

While research on inclusive finance in China has progressed more slowly than in other countries, the nation has significantly emphasized developing this sector, proposing numerous related policy recommendations at key conferences. Additionally, many researchers in the field of economics have combined foreign research findings with China's actual conditions, conducting studies that are more aligned with China's national circumstances.

Currently, research on inclusive finance in China mainly focuses on the national and provincial levels, examining its measurement and influencing factors [9]. Du *et al.* discovered that the development of inclusive finance promotes economic growth when it is below a certain threshold. However, once it exceeds that threshold, it can hinder economic growth. This finding is based on their study of the relationship between inclusive finance and regional economic growth in the eastern, central, and western regions of China [10]. Song *et al.* used the "China Digital Inclusive Finance Index" to prove that digital inclusive finance can narrow the income gap between urban and rural areas [11]. Du *et al.* empirically showed that inclusive finance plays a significant role in optimizing resource allocation, improving social production efficiency, and contributing to economic development [12]. Chen demonstrated that inclusive finance contributes to regional economic growth and enhances regional economic stability [13]. Hao *et al.* used the system generalized method of moments (GMM) estimation method and found that inclusive finance significantly promotes inclusive economic growth [14]. Yi *et al.* empirically proved that digital inclusive finance significantly improves currency liquidity and facilitates resident payments, thereby promoting consumption [15]. Regarding the relationship between digital inclusive finance and economic growth, Hao *et al.* used a spatial autoregressive model to conduct an empirical study on inter-provincial panel data, proving that digital inclusive finance promotes economic growth but exhibits regional heterogeneity; they also demonstrated a nonlinear relationship between digital inclusive finance and economic growth [14]. Zhan also conducted an empirical study on inter-provincial panel data, using the dynamic panel SYS-GMM model to analyze the impact of digital inclusive finance on both the quantity and quality of economic growth. The results showed that digital inclusive finance suppressed the quantity of economic growth but promoted the quality of economic growth [16].

However, when inclusive finance develops to a certain stage, it inevitably competes with the real economy, squeezing the profit margins of enterprises and hindering the development of the real economy. Bai *et al.* discovered that the relationship between inclusive finance and regional economic development follows an inverted "U" shape. This means that up to a certain critical point, the growth of inclusive finance encourages regional economic development. However, beyond this critical point, further development of inclusive finance can negatively impact regional economic growth [17]. Liu *et al.* demonstrated that inclusive finance promotes economic growth by constructing a more inclusive financial system [18]. Jia used a mediation effect model to conduct empirical analysis and found that digital inclusive finance plays a significant role in narrowing the income gap between urban and rural areas, with the effect being more pronounced in regions with higher levels of education [19]. Zhang *et al.* believed that digital finance enhances entrepreneurial behavior among low-income households, thus increasing household income, especially among rural low-income groups [20].

In summary, there is still vast space and potential for research on inclusive finance, digital inclusive

finance, and their relationship with rural economies, which requires further exploration and study by more scholars and researchers.

This paper, based on the practical context of Anhui Province, focuses on digital inclusive finance, using reliable data from the Anhui Province Statistical Yearbook and the Digital Inclusive Finance Index. It conducts an empirical study on the relationship between digital inclusive finance and the rural economy of Anhui Province, further examining the mechanisms between the two. The paper also proposes feasible and targeted suggestions for the development of inclusive digital finance and the promotion of rural economic development in Anhui Province.

3. Research design

3.1. Data sources and selection

Based on the construction of the model, the content of this study, and the availability of relevant data, the data for this study was carefully selected. Considering data availability, data from 2013 to 2022 was selected, covering a total of 10 years. Second, based on Yang's research on the empirical study regarding the impact of digital inclusive finance on farmers' income in Shandong Province, the per capita disposable income of rural residents in Anhui Province was chosen as an indicator for measuring rural economic development [21]. Lastly, data from 16 prefecture-level cities in Anhui Province from 2013 to 2020 was selected as the sample. The Digital Inclusive Finance Index from 2013–2022 was sourced from Peking University's Digital Inclusive Finance Index, while the other data was obtained from the Anhui Provincial Statistical Yearbook and other relevant sources [22].

3.2. Selection of variables and descriptive statistical analysis

In the model, following the research of Yang Zewen on the Empirical Study regarding the Impact of Digital Inclusive Finance on Farmers' Income in Shandong Province, the income level of rural residents in Anhui Province was selected as the dependent variable, with a period from 2013 to 2022. The Digital Inclusive Finance Index was used as the independent variable, as it comprehensively reflects the development status of digital inclusive finance in Anhui Province. After reviewing numerous studies, this paper also introduces agricultural development level, government behavior, education level, and industrial structure as control variables. The selection of these control variables is based on their potential direct or indirect effects on rural residents' income. A detailed description of these variables is provided in **Table 1.**

Table 1. Variable selection

Variable type	Variable symbol	Variable name	Measurement method
Dependent variable	inc	Rural residents' income level	Per capita disposable income of rural residents
Independent variable	difi	Digital inclusive finance development level	Digital inclusive finance index
Control variable	agro	Agricultural development level	Logarithm of total agricultural output
	gov	Government behavior	Regional fiscal expenditure / Gross Domestic Product
	edu	Education level	Education expenditure / Fiscal expenditure
	is	Industrial structure	Primary industry added value / Gross Domestic Product

3.2.1. Dependent variable

Following the research of Yang Zewen on the Empirical Study regarding the Impact of Digital Inclusive Finance on Farmers' Income in Shandong Province, the per capita disposable income of rural residents in Anhui Province from 2013 to 2022 across 16 prefecture-level cities (denoted as **inc**) were selected as the measure of rural economic development. The disposable income of farmers intuitively reflects improvements in their living standards and serves as an indicator of rural economic growth.

3.2.2. Independent variable

The Digital Inclusive Finance Index of Anhui Province (**difi**) was selected as the core independent variable in the model. This index effectively reflects the level of digital inclusive finance development in Anhui Province.

3.2.3. Control variables

(1) **Agricultural development level (agro)**: The level of agricultural development is directly related to farmers' economic activities and production efficiency. It is represented by the logarithm of total agricultural output value.

(2) **Government behavior (gov)**: Government actions play a crucial role in resource allocation and policy support. This is represented by the ratio of local government expenditure to Gross Domestic Product (GDP) in Anhui Province on an annual basis.

(3) **Education level (edu)**: The education level influences farmers' labor skills and employment opportunities. It is represented by the percentage of education expenditure relative to the total government fiscal expenditure in a given year.

(4) **Industrial structure (is)**: Changes in industrial structure can have a profound impact on farmers' income sources and employment structure. It is represented by the percentage of the added value of the primary industry in the total GDP for the given year.

Table 2. Descriptive statistical analysis of variables

	N	Minimum	Maximum	Mean	Standard deviation
is	160	3.37	3.55	3.4423	0.06347
edu	160	15.93%	17.33%	16.6718%	0.40839%
agro	160	7.28	7.47	7.3630	0.06093
gov	160	0.66%	0.76%	0.7259%	0.02988%
inc	160	3.91	4.29	4.1230	0.12175
difi	160	2.18	2.59	2.4279	0.14307

3.3. Construction of the regression model

Following the approach used by Yang Zewen in the Empirical Study regarding the Impact of Digital Inclusive Finance on Farmers' Income in Shandong Province, his study selects rural residents' disposable income in Anhui Province from 2013 to 2022 as the dependent variable, with the Digital Inclusive Finance Index as the independent variable. After reviewing several research studies, this paper introduces agricultural development level, government behavior, education level, and industrial structure as control variables to construct the following model:

$$inc_{it} = \beta_0 + \beta_1 difi_{it} + \beta_2 X_{it} + \varphi_t + \varepsilon_{it}$$

Among them: *difi* represents the development level of digital inclusive finance in Anhui Province, inc represents rural residents' income level in Anhui Province, *X* includes the control variables: agricultural

development level (agro), government behavior (gov), education level (edu), and industrial structure (is), *i* represents the sequence number of each prefecture-level city in Anhui Province, *t* represents time, β_i represents the estimated parameters of the respective variables, φ represents time fixed effects, ε represents the random disturbance term.

3.4. Correlation analysis

When examining the relationships between the explanatory variables and control variables, data correlation is a critical consideration. By reviewing **Table 3**, it is observed that the maximum correlation coefficient among the variables is 0.991, which is very close to 1 in absolute value. This suggests a strong correlation between the explanatory and control variables. However, this correlation is not expected to negatively impact the regression results. Therefore, we can proceed with the regression analysis using these variables without concern for the interference of their correlation on the results.

Table 3. Correlation coefficient table between variables

	inc	difi	is	edu	agro	gov
inc	1					
difi	0.991**	1				
is	0.970**	0.939**	1			
edu	0.589	0.602	0.644*	1		
agro	0.976**	0.945**	0.984**	0.617	1	
gov	-0.611	-0.568	-0.653*	-0.667*	-0.704*	1

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

4. Empirical results and analyses

4.1. Overall regression results analysis

This section analyses the panel data selection model and conducts empirical analysis using a linear regression model in SPSS.

Without considering the control variables, the regression analysis results shown in **Table 4** indicate that the model's goodness of fit reaches 0.983, suggesting a very good fit. The variable representing the development of digital inclusive finance has a significant positive effect on rural residents' income levels. At the 1% significance level, the coefficient is 0.992. This implies that with each unit increase in the development of digital inclusive finance, rural residents' per capita disposable income increases by 0.992 units. It is clear that the higher the level of development of digital inclusive finance, the more pronounced its role in increasing rural residents' income.

Table 4. Regression analysis without control variables

Variable	*R*	R^2	Adjusted R^2	Beta	*T*	Significance
difi	0.992[2]	0.985	0.983	0.992	22.781	0.000

After introducing the control variables, as shown in **Table 5**, the goodness of fit of the model reaches 0.996, indicating that the regression equation has a very good fit. The level of development of digital inclusive finance has a significant positive impact on rural residents' income levels. At the 5% significance level, the coefficient is 0.875. Although this coefficient is lower compared to the case without control variables, it still

indicates that the control variables have a certain effect on the relationship between the explanatory variable and the dependent variable. From this, we can conclude that for every one-unit increase in the development level of digital inclusive finance, the per capita disposable income of rural residents increases by 0.875 units. This confirms that improving the development of digital inclusive finance helps increase rural residents' income.

At the same time, the effects of the moderating variables, such as agricultural development, in the regression analysis were explored. The results show that the regression coefficient for government behavior is -0.075, which suggests that the government's support policies for rural residents and farmers in Anhui are not sufficiently comprehensive. The government's financial input has not been adequately focused on rural economic development. The regression coefficient for rural education level and income level is -0.106, which indicates a significant impact. However, there is still room for improvement in rural education. The government can focus on increasing investments in rural education. This would expand employment options and opportunities for rural residents. Furthermore, improving farmers' education levels would help them acquire more financial knowledge, enhance their financial literacy, and better accept financial products, ultimately increasing their income.

Table 5. Regression analysis after adding control variables

Variable	Beta	*T*	Significance
is	0.229	3.096	0.017
edu	-0.106	-2.450	0.092
agro	-0.074	-0.276	0.800
gov	-0.075	-1.273	0.293
difi	0.875	3.877	0.030
R		0.999^2	
R^2		0.999	
Adjusted R^2		0.996	

4.2. Robustness test

This section conducts a robustness test to verify the regression results from the previous analysis, using an alternative dependent variable.

Residents' consumption is typically closely related to their income. The level of consumption often reflects residents' economic strength and quality of life. In rural areas, an increase in consumption not only signifies a clear indication of farmers escaping poverty but also reflects substantial improvements in their living standards. Here, we use the logarithm of per capita consumption expenditure of rural residents (denoted as *cons*) as the measurement indicator, instead of directly using income levels. The results are shown in **Table 6**. It is noteworthy that the regression coefficient for digital inclusive finance reaches 0.673, and this result is statistically significant at the 1% level. This finding strongly suggests that digital inclusive finance plays an active role in promoting the consumption level of rural residents. From this perspective, we can indirectly infer that the development of digital inclusive finance has a positive effect on increasing the income levels of rural residents.

Table 6. Robustness test results

Variable	Beta	*T*	Significance
difi	0.673	4.761	0.009
agro	-0.243	-0.678	0.535
is	0.498	1.689	0.167
edu	0.113	1.378	0.240
gov	-0.020	-0.196	0.854
R		0.996[2]	
R^2		0.991	
Adjusted R^2		0.981	

5. Conclusion and recommendations

5.1. Conclusion

Based on a review and summary of relevant domestic and international literature and theories, this study analyses the relationship between digital inclusive finance and rural economic development in Anhui Province. Using per capita disposable income of rural residents as an indicator of economic development in Anhui, this study analyzes panel data from 2013 to 2022 to investigate the impact of digital inclusive finance on farmers' income. The main conclusions of the research are as follows, firstly, regarding per capita disposable income of rural residents, the development of digital inclusive finance in Anhui Province has shown strong momentum, with its coverage and usage in rural areas continuously expanding. This trend provides strong financial support for rural economic development, promotes the optimization of rural industrial structures, and contributes to the increase in farmers' income.

Secondly, the impact of digital inclusive finance on the per capita disposable income of rural residents is significant. Since farmers' income is representative of the rural economy in Anhui, the widespread adoption and application of digital financial services can not only improve the financial accessibility in rural areas but also optimize the allocation of financial resources, promoting the diversified development of the rural economy.

Lastly, based on the results of the robustness test, the conclusions drawn in this study are highly reliable, providing strong empirical support for policymaking.

5.2. Recommendations

Based on the above conclusions, the following policy recommendations are made:

(1) Continue deepening the development of rural digital inclusive finance: Expand the scope and depth of financial service usage in rural areas. This includes strengthening rural digital infrastructure, enhancing farmers' digital financial literacy, and promoting operational innovation and service optimization in rural financial institutions.

(2) Fully leverage the advantages of digital inclusive finance to drive the upgrading and transformation of rural industrial structures: Optimize the allocation of fiscal resources to support the development of rural specialty industries, promote the integration of the primary, secondary, and tertiary industries in rural areas, and enhance the overall competitiveness of rural economies.

(3) Develop differentiated policies based on the nonlinear relationship between digital inclusive finance

and rural economic development: During the early stages of digital inclusive finance development, focus on strengthening infrastructure and financial knowledge dissemination. In the development stage, emphasize innovation and enhancement of financial service quality. In the mature stage, prioritize risk prevention and financial regulation.

(4) Strengthen policy coordination and interdepartmental cooperation: Form a collaborative effort to promote the development of digital inclusive finance. Stakeholders, including the government, financial institutions, and social organizations, should jointly participate in policy alignment to foster the healthy development of digital inclusive finance in rural areas.

In conclusion, digital inclusive finance plays a significant role in rural economic development. We should fully utilize its advantages and promote its deeper development in rural areas to provide strong financial support for sustainable rural economic growth.

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Disclosure statement

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References

[1] Corrado G, Corrado L, 2017, Inclusive Finance for Inclusive Growth and Development. Current Opinion in Environmental Sustainability, 24(4): 19–23.

[2] Demirguc-Kunt A, Klapper L, Singer D, 2017, Financial Inclusion and Inclusive Growth: A Review of Recent Empirical Evidence. World Bank Policy Research Working Paper No. 8040: 1–27.

[3] Sahay R, Cihak M, N'Diaye P, et al., 2015, Financial Inclusion: Can It Meet Multiple Macroeconomic Goals? International Monetary Fund: 1–33.

[4] Kim D, Yu J, Hassan M, 2017, Financial Inclusion and Economic Growth in OIC Countries. Research in International Business and Finance, 43: 1–14.

[5] Chen D, Yao M, 2019, Empirical Analysis of the Impact of Digital Inclusive Finance on Rural Residents' Income. Shanghai Finance Research, 2019(6): 74–77.

[6] Guo F, Wang J, Wang F, et al., 2020, Measuring the Development of Digital Inclusive Finance in China: Index Construction and Spatial Characteristics. Economic Research (Quarterly), 19(4): 1401–1418.

[7] Li J, Peng Y, Ma S, 2020, Inclusive Finance and China's Economic Development: Multidimensional Connotations and Empirical Analysis. Economic Research, 19(4): 37–52.

[8] Tang Y, Long Y, Zheng Z, 2020, Research on the Inclusive Economic Growth Effect of Digital Inclusive Finance: An Empirical Analysis Based on 12 Provinces in Western China. Southwest Finance, 2020(9): 60–73.

[9] Xing Y, 2016, Inclusive Finance: A Basic Theoretical Framework. International Financial Research, 2016(9): 21–37.

[10] Du Q, Pan Y, 2016, Research on the Impact of Inclusive Finance on Regional Economic Development in China: An Empirical Analysis Based on Provincial Panel Data. Economic Issues Exploration, 2016(3): 178–184.

[11] Song X, 2017, Empirical Test of the Effect of Digital Inclusive Finance on Reducing the Urban-Rural Income Gap. Financial Science, 2017(6): 14–25.

[12] Du L, Pan X, 2017, Inclusive Finance, Financial Service Equalization, and Regional Economic Development: A Study Based on Provincial Panel Data in China. Journal of Social Sciences of Jilin University, 57(5): 37–44.

[13] Chen Y, 2017, Inclusive Finance, Supportive Policies, and Regional Economic Growth: Based on Spatial Panel Data from 30 Provincial Areas. Financial Economics, 18(26): 60–63.

[14] Hao Y, Lei H, Dong Y, 2018, Inclusive Finance and Inclusive Economic Growth: Empirical Evidence from Panel Data in Western China. Finance and Economics, 2018(5): 44–49.

[15] Yi X, Zhou L, 2018, Does the Development of Digital Inclusive Finance Significantly Affect Household Consumption: Micro Evidence from Chinese Households. Financial Research, 2018(11): 47–67.

[16] Zhan Y, 2018, The Effects of Digital Inclusive Finance on the Quantity and Quality of Economic Growth: A System GMM Estimation Based on Provincial Panel Data. Credit Information, 36(8): 51–58.

[17] Bai J, Zhang M, 2018, The Development of Inclusive Finance, Regional Convergence, and Inclusive Economic Growth: An Empirical Study Based on Data from 44 Counties (Cities/Districts) in Liaoning Province. Credit Information, 36(3): 20–26.

[18] Liu J, Bi Z, 2019, The Development of Inclusive Finance and Its Income Distribution Effects: A Dual Perspective of Economic Growth and Poverty Alleviation. Economic and Management Research, 40(4): 37–46.

[19] Jia J, 2019, "Digital Dividend" or "Digital Divide"?: Also Discussing How Digital Inclusive Finance Can Narrow the Income Gap. Regional Financial Research, 2019(12): 28.

[20] Zhang X, Wan G, Zhang J, et al., 2019, Digital Economy, Inclusive Finance, and Inclusive Growth. Economic Research, 54(8): 71–86.

[21] Yang Z, 2023, Empirical Study on the Impact of Digital Inclusive Finance on Farmers' Income in Shandong Province, thesis, Dalian Ocean University.

[22] Guo Q, Meng S, Mao Y, 2022, Can the Development of Digital Inclusive Finance Promote the Improvement of Employment Quality? Journal of Shanghai University of Finance and Economics: Philosophy and Social Sciences Edition, 24(1): 61–75.