

# Digital Inclusive Finance and the Integrated Development of Urban and Rural Areas: An Empirical Analysis based on Data Model

Mei Cheng\*, Xiaojie Wei

School of Economics, Anhui University of Finance and Economics, Anhui, China

## Abstract

**The urban rural integration development mechanism is the institutional guarantee for rural revitalization, and how to achieve high quality integration of urban and rural development has received deep attention from the state. Based on the mechanism of the impact of digital inclusive finance on urban-rural integration, this project constructs a data model to empirically measure the impact of digital inclusive finance on urban-rural integration with the help of the annual data of 2011-2020 effect, using the intermediary effect model, selecting entrepreneurial activity as the intermediary variable, analyzing the realization path of digital inclusive finance to promote the integration of urban and rural development, and proposing policy suggestions on how digital inclusive finance can promote the integration of urban and rural development with high quality, in order to obtain a more economical integration effect, boost the high-quality and orderly integration and development of China's urban and rural economy, and contribute to the further victory of rural revitalization.**

## Keywords

**Digital Financial Inclusion; Urban-rural Integration; Entrepreneurial Activity.**

## 1. Introduction

Since the report of the Nineteenth National Congress of the Communist Party of China elevated rural revitalization to a strategic height, the CPC Central Committee and the State Council have successively issued the No.1 document of the Central Committee to point out the direction for comprehensively promoting rural revitalization, and clearly proposed to improve the institutional mechanism for the integration of urban and rural development and promote the integration of urban and rural development, which is an important measure to narrow the gap between urban and rural areas, break the dual creation structure between urban and rural areas, and reconstruct urban-rural relations. At this stage, China has made great achievements in the integration of urban and rural population, industrial integration, infrastructure and public service facilities, urban-rural old-age integration, and urban-rural ecological environmental protection integration, etc., and the institutional mechanism of urban-rural integration has been gradually improved, and a number of national urban-rural integration development pilot zones have been piloted.

With the rapid development of digital technology, artificial intelligence, blockchain, cloud computing and big data, financial services and digital technology are cross-converging, and digital inclusive finance has emerged. As a combination of digital technology and inclusive finance, digital inclusive finance can effectively alleviate the information asymmetry in traditional inclusive finance, limit the limitations of financial service activity space, and bring specific benefits to more people. With the help of the Internet and mobile platforms, digital finance has expanded the coverage of financial services, especially to help less developed regions access convenient financial services. At present, the rapid development of the Internet

in China's rural areas has greatly promoted the development of rural digital inclusive finance and is of positive significance to promoting the integrated development of urban and rural areas. In particular, in 2021, the CPC Central Committee and the State Council issued the "Opinions of the CPC Central Committee and the State Council on Comprehensively Promoting Rural Revitalization and Accelerating the Modernization of Agriculture and Rural Areas", proposing to "develop rural digital inclusive finance", use digital inclusive finance to support rural revitalization, and accelerate the process of urban-rural integration.

So, can the development of digital inclusive finance greatly promote the development of urban-rural integration, and what are its development characteristics? Can the coverage of digital finance promote urban-rural integration by increasing entrepreneurial activity? The answers to the above questions will help us deeply understand the theoretical research and practical exploration of digital inclusive financial development for enriching rural revitalization and urban-rural integration development.

## 2. Theoretical Analysis and Study of Hypotheses

### 2.1. Theoretical Analysis

Around this research topic, there are two main types of literature closely related to this research: one is the study of the mechanism and measurement indicators of urban-rural integration, and the other is the study of the effect of digital inclusive finance on rural revitalization and income increase and poverty reduction.

The mechanism of action and measurement indicators of urban-rural integration: from urban-rural duality to urban-rural integration development, promoting the synchronous development of urban-rural modernization is the key to maintaining the sustained and stable growth of China's economy. (Gao Bo and Kong Lingchi, 2019). Through the construction of a new urbanization and rural revitalization evaluation index system, the entropy method and the coupling coordination mode were used to analyze the coordination between the development level of new urbanization and rural revitalization, and it was found that coastal cities such as Heze and Liaocheng had obvious characteristics of "low coupling - low coordination". The relationship between urban and rural development should be further optimized. (Chen Jingshuai, Zhang Dongling, 2022). The essence of rural revitalization is to move towards common prosperity through the integrated development of urban and rural areas, and the key to achieving this goal lies in promoting the flow of factors between urban and rural areas, and gradually realizing the two-way barrier-free flow of population, technology, capital, information and other elements (Xiong Yihan, 2022).

On the aspects of digital inclusive finance for rural revitalization and income increase and poverty reduction: There are obvious regional differences in the positive role of financial development and human resources investment in narrowing the income gap between urban and rural areas and promoting urban-rural integration, which is very obvious in economically developed areas (Wen Tao, Chen Yiming, 2020). Digital financial inclusion can narrow the income gap, promote farmers' consumption, and reduce the poverty rate of farmers, and digital inclusive finance can narrow the income gap between urban and rural areas by increasing the availability of funds (Zhou Li et al. 2020). Digital financial inclusion plays an important role in promoting rural residents' consumption expenditure, in which payment and investment services and wide coverage can improve the consumption efficiency of rural residents (Guo et al. 2020). The level of human resources, regional industrial structure and infrastructure is an effective way for digital inclusive finance to effectively transmit rural entrepreneurship activities (Li Xiaoyuan and Liu Yumeng, 2021). Through the popularization of mobile payment, digital financial inclusion accelerates capital flows, increases the comprehensive demand of society, thereby increasing the demand for labor in the market, thereby promoting social

employment (Ran Guanghe and Tang Tao, 2021). The common interests of digital finance can promote entrepreneurship and innovation, thereby promoting the revitalization and development of rural areas, and its intensive and digital utilization has a positive effect on promoting rural revitalization and development (Ma Yaming and Zhou Lu, 2022). Digital financial coverage and urban-rural insurance integration have a positive impact on coordinated urban-rural development and spatial spillover effects (Zhang et al., 2022).

In summary, some scholars have constructed an indicator system for the integration of urban and rural development, measured and analyzed the mechanism of action of the whole country or different regions, and some scholars have studied the rural revitalization of digital inclusive finance and the realization of income increase and poverty reduction from different angles. There is relatively little research literature on the relationship between inclusive finance and urban-rural integration development, and even less research on the relationship between digital financial inclusion and urban-rural integration development. From the perspective of research methods, the research content of issues related to digital inclusive finance is not comprehensive and in-depth, focusing on qualitative analysis and lacking quantitative research. The main marginal contributions of the project are as follows: first, the research on the influencing factors of urban-rural integration development, the economic effect of digital inclusive finance, the second is the quantitative disclosure of the impact of digital inclusive financial mechanism on urban-rural integration and development, and the third is to provide new enlightenment for digital inclusive finance to promote urban-rural integration and rural revitalization.

## 2.2. Study Hypotheses

Digital inclusive finance reduces the cost of rural financial services, adopts the online service model, relies on the support of digital technology, and gradually forms a non-manual processing mode, which greatly improves the payment environment, provides funds and online loans for rural and backward areas, provides more guarantees for rural financial consumers, and financial services are convenient and diverse, and financial institutions develop financial service products that are more suitable for rural populations and backward areas through digital technology. It will greatly improve rural residents' access to financial services and give rural residents more opportunities and willingness to participate in the financial system. The use of big data means to build a more optimized risk control model, mining more standardized credit approval activities, achieving safer risk control, and improving the risk control capabilities of financial institutions can improve investors' investment confidence in rural areas, and use financial services to increase income, which can promote the integrated development of urban and rural areas. On this basis, hypothesis 1 is proposed: digital inclusive finance will promote the integrated development of urban and rural areas.

At present, a large number of documents have studied the effects of poverty alleviation and entrepreneurship and income increase, and in the era of digital finance, information transparency based on Internet technology and digital platforms makes investors more likely to choose projects that are more in line with risk attitudes. According to its ability to bear capital responsibility, it realizes the accurate supply of funds for entrepreneurial projects and improves the success rate of entrepreneurship. Digital inclusive finance not only reduces financing costs and entry barriers, reduces the financial pressure of entrepreneurs, but also provides entrepreneurs with a large number of innovation and entrepreneurship opportunities. The information exchange platform built by digital inclusive finance provides an information basis for entrepreneurs to identify business opportunities, make entrepreneurial decisions, reach entrepreneurial cooperation, and stimulate entrepreneurial enthusiasm. On this basis, hypothesis 2 is proposed: digital financial inclusion can promote the integration of urban and rural areas by increasing entrepreneurial activity.

### 3. Research Design

#### 3.1. Model Building

To test hypothesis 1, the following basic model is constructed:

$$Gapi, t = \alpha_0 + \alpha_1 Difi, t + \alpha c Xi, t + \epsilon_{i,t} \tag{1}$$

Wherein:  $Gapi, t$  is the urban-rural integration index of province  $i$  in  $t$  year,  $Difi, t$  is province  $i$  in the digital financial inclusion index for the  $t$  year, vector  $Xi, t$  represents a series of control variables that may have an impact on rural-urban integration;  $\epsilon_{i,t}$  represents a random perturbation term.

To test hypothesis 2, the following model is built based on the basic model:

$$Entrepi, t = \beta_0 + \beta_1 Difi, t + \beta c Xi, t + \epsilon_{i,t} \tag{2}$$

$$Gapi, t = \gamma_0 + \gamma_1 Difi, t + \gamma_2 Entrepi, t + \gamma c Xi, t + \epsilon_{i,t} \tag{3}$$

Wherein:  $Entrepi, t$  is the intermediary variable entrepreneurial activity, other variables are consistent with the basic model.

#### 3.2. Variable Selection Description

The level of urban-rural integrated development: the proportion of per capita income in urban and rural areas is weighted by 40%, the proportion of per capita consumption in urban and rural areas is weighted by 40%, and the proportion of employed persons in secondary and tertiary industries is 20% to measure the level of urban-rural integration development.

Digital Inclusive Finance Level: Select the 2011-2020 Digital Inclusive Financial Index released by Peking University, record the development level of digital inclusive finance with  $Dif$ , and divide the original index by 1000 to make the regression coefficient easier to observe and compare.

Entrepreneurial activity: Expressed as  $Entrep$  in terms of the ratio of the number of newly registered enterprises in the country to the urban employment population in that year.

Control variables: the level of household consumption, the added value of the secondary industry, the added value of the tertiary industry, and the per capita gross domestic product, which are recorded as  $x_1$  (One hundred thousand yuan),  $x_2$  (10 trillion yuan),  $x_3$  (10 trillion yuan), and  $x_4$  (100,000 yuan / person), respectively.

**Table 1.** Data related to China's green inclusive finance and urban-rural integration development from 2011 to 2020

Time	Gap	Entrep	Dif(/1000)	X1	X2	X3	X4
2020	0.4977	1.74	0.3412	0.2744	3.8356	5.5197	0.7183
2019	0.4781	1.63	0.3237	0.2750	3.8067	5.3537	0.7008
2018	0.4697	1.51	0.3002	0.2524	3.6484	4.8970	0.6553
2017	0.4545	1.40	0.2720	0.2297	3.3158	4.3836	0.5959
2016	0.4430	1.31	0.2304	0.2080	2.9543	3.9083	0.5378
2015	0.4344	1.08	0.2200	0.1886	2.8134	3.4974	0.4992
2014	0.4238	0.92	0.1797	0.1722	2.7728	3.1065	0.4691
2013	0.4108	0.65	0.1553	0.1559	2.6195	2.7798	0.4350
2012	0.3981	0.64	0.0997	0.1407	2.4464	2.4486	0.3977
2011	0.3909	0.64	0.0400	0.1267	2.2704	2.1612	0.3628

## 4. Empirical Analysis

### 4.1. Model Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
C	0.389498	0.012876	30.25106	0.0000
X3	0.093394	0.015839	5.896332	0.0011
X1	-1.626387	0.365116	-4.454438	0.0043
DIF	0.112414	0.037109	3.029329	0.0231
R-squared	0.997141	Mean dependent var		0.440105
Adjusted R-squared	0.995712	S.D. dependent var		0.035256
S.E. of regression	0.002309	Akaike info criterion		-9.015172
Sum squared resid	3.20E-05	Schwarz criterion		-8.894137
Log likelihood	49.07586	Hannan-Quinn criter.		-9.147946
F-statistic	697.6667	Durbin-Watson stat		2.330015
Prob(F-statistic)	0.000000			

**Figure 1.** Benchmark regression results of digital financial inclusion affecting urban-rural integration

Figure 1 shows the model fitting result after eliminating multicollinearity, which can be seen from the analysis of the main indicators: the r-squared is 0.9971, and the adjusted r-squared is 0.9957, the model matches well. The F-statistic is 697.6667, indicating that the regression equation as a whole is  $\alpha = 0.05$  clearly significant at the level and the digital inclusive finance will promote the integrated development of urban and rural areas, and the hypothesis one is established.

### 4.2. Mediating Effect Testing

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.260434	0.105958	2.457890	0.0394
DIF	4.123129	0.449846	9.165635	0.0000
R-squared	0.913052	Mean dependent var		1.152000
Adjusted R-squared	0.902183	S.D. dependent var		0.424808
S.E. of regression	0.132862	Akaike info criterion		-1.022161
Sum squared resid	0.141218	Schwarz criterion		-0.961644
Log likelihood	7.110803	Hannan-Quinn criter.		-1.088548
F-statistic	84.00886	Durbin-Watson stat		1.282436
Prob(F-statistic)	0.000016			

**Figure 2.** The result of the return of digital financial inclusion to entrepreneurial activity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.352740	0.005920	59.58315	0.0000
ENTREP	0.044902	0.014911	3.011452	0.0196
DIF	0.164807	0.064339	2.561555	0.0375
R-squared	0.980355	Mean dependent var		0.440105
Adjusted R-squared	0.974742	S.D. dependent var		0.035256
S.E. of regression	0.005603	Akaike info criterion		-7.287624
Sum squared resid	0.000220	Schwarz criterion		-7.196849
Log likelihood	39.43812	Hannan-Quinn criter.		-7.387205
F-statistic	174.6583	Durbin-Watson stat		0.993434
Prob(F-statistic)	0.000001			

**Figure 3.** The test results of digital financial inclusion affecting urban-rural integration

Figure 2 shows the model fitting results of the impact of entrepreneurial activity on digital financial inclusion, which can be seen from the analysis of the main indicators the r-squared coefficient is 0.9131, and the adjusted r-squared coefficient is 0.9022, and the model matches well. The F-statistic is 84.0089, indicating that the regression equation is quite significant at the level  $\alpha = 0.05$ .

In Figure 3, entrepreneurial activity is used as an intermediate variable and the r-squared of the model fitting result is 0.9804, adjusted r-squared is 0.9747 and the model matches well. The

F-statistics are 174.6583, indicating that the regression equation  $\alpha = 0.05$  is significantly significant as a whole, in summary Digital financial inclusion can promote urban-rural integration by increasing entrepreneurial activity, so hypothesis two holds.

## 5. Conclusion and Policy Recommendations

### 5.1. Conclusion

Based on the impact mechanism of digital inclusive finance on urban-rural integration, based on the annual data of 2011-2020, a data model is constructed to measure the impact of digital inclusive finance on the integration of urban and rural development, and it is found Digital inclusive finance is an important measure to narrow the gap between urban and rural areas, break the dual structure of urban and rural areas, and reconstruct the relationship between urban and rural areas. Using the intermediary effect model, the entrepreneurial activity is selected as the intermediary variable, and the realization path of digital inclusive finance to promote the integration of urban and rural development is analyzed, and it is concluded that entrepreneurial activity plays an important role in the promotion of urban-rural integration development of digital inclusive finance, and digital inclusive finance can be promoted by stimulating rural entrepreneurial vitality and increasing investment in innovation and research and development Urban-rural integration development.

### 5.2. Policy Recommendations

First, digital inclusive finance is an important driving force for urban-rural integration, and it is necessary to vigorously develop digital inclusive finance. Digital technology has fully released financial inclusion, and the smooth implementation and comprehensive role of rural digital inclusive finance are inseparable from rural digital infrastructure. All localities should improve the construction of digital inclusive financial infrastructure by increasing the penetration rate of the Internet and smart phones, so that more people can enter the digital information highway, and achieve the balanced development of digital inclusive finance by providing policies. Provide financial support to rural areas with low level of development of digital inclusive finance, improve the construction of regional systems, provide a favorable market environment for the play of the advantages of digital inclusive financial inclusion and inclusiveness, and optimize the function and efficiency of digital inclusive financial services for the integration of urban and rural development.

Second, encourage mass entrepreneurship, promote employment with entrepreneurship, and give full play to the positive role of digital and inclusive business activities. On the one hand, accelerate the integration process of digital technology and financial products, develop diversified and humanized financial products and services, meet the personalized needs of residents, and stimulate the entrepreneurial willingness of rural residents; On the other hand, a high-quality business environment can help companies improve profitability and reduce economic benefits. The government can optimize the business environment by introducing various preferential policies, and all localities can encourage and guide the use of digital financial products, strengthen and develop local small and medium-sized enterprises, stimulate economic vitality, obtain entrepreneurial employment opportunities, and promote employment of farmers nearby; At the same time, we should strengthen the publicity and education of farmers, guide farmers to rationally use digital financial products, pay transfer fees, improve their skill level, and achieve non-agricultural employment.

Third, to comprehensively promote the coordinated development of urbanization and rural revitalization, we must further improve the level of urbanization, give play to the poverty reduction and spillover effects of urbanization, and promote high-quality rural development. In combination with regional comparative advantages, we should develop characteristic

industries, promote industrial transformation, raise the level of economic development, raise the income level of poor groups, narrow the income gap between urban and rural areas, promote urban-rural integration, and promote rural revitalization.

## Acknowledgments

This work was supported by the research of the National Student Innovation and Entrepreneurship Training Project.No.202210378197.

## References

- [1] Wang Yaping, Wei Liqian, Luo Jianchao. Development of Digital Financial Inclusion, Income Gap and Rural Economic Growth[J/OL].Statistics and Decision-making,2022(18):130-135[2022-10-07]. DOI: 10.13546/j.cnki.tjyj.2022.18.025.
- [2] Shi Lingling,Yu Xiujiang,Yang Wei,Liang Weisen. The Revenue Increasing Effect and Mechanism of Digital Inclusive Finance: An Empirical Analysis Based on China's Municipal Panel Data[J].Research in Financial Economics,2022,37(02):93-104.
- [3] Fang Xianming,Liu Yun'er,Chen Chu. Digital Inclusive Finance, Household Consumption and Economic Growth: Empirical Evidence from Provincial Panel Data in China[J].Journal of Southeast University (Philosophy and Social Sciences Edition), 2022,24(03):40-50+146-147. DOI: 10.13916/j.cnki.issn1671-511x.2022.03.008.
- [4] Zhai Renxiang,Xuan Changyong. Does digital financial inclusion increase urban entrepreneurship activity [J].Modern Economic Discussion, 2022(05):76-87.DOI:10.13891/j.cnki.mer.2022.05.004.
- [5] Fang Chuanglin. Theoretical analysis of the mechanism and evolution of urban-rural integration development[J].Acta Geographical Sinica,2022,77(04):759-776.
- [6] Zheng Hongyun,Li Gucheng. The Impact of Digital Financial Inclusion Development on the Growth of Total Factor Productivity of Agriculture at the County Level: Based on the Perspective of Heterogeneity[J].Contemporary Economic Management,2022,44(07):81-87. DOI: 10.13253/j.cnki.ddjjgl. 2022.07.011.
- [7] Han Liangliang,Peng Yi,Meng Qingna. Digital Inclusive Finance, Entrepreneurial Activity and Common Prosperity: An Empirical Study Based on Interprovincial Panel Data in China[J/OL].Soft Science:1-18 [2022-10-07].<http://kns.cnki.net/kcms/detail/51.1268.g3.20220218.1626.004.html>.
- [8] Ma Yaming,Zhou Lu. Research on the Path and Mechanism of Digital Inclusive Finance to Promote Rural Revitalization Based on the Perspective of Double Creation[J].Journal of Modern Finance and Economics (Journal of Tianjin University of Finance and Economics), 2022,42(02):3-20.DOI: 10.19559/j.cnki.12-1387.2022.02.001.