Academic Journal of Management and Social Sciences
ISSN: 2958-4396 | Vol. 2, No. 3, 2023

Mechanism and Effect Analysis of Digital Finance Empowering Rural Revitalization in Anhui Province: Based on the Mismatch of Urban and Rural Factors

Huachao Zha*, Xueqing Liu

School of Economics, Anhui University of Finance and Economics, Bengbu, Anhui 233030, China
* **Corresponding author**: Huachao Zha (Email: allen19811026@126.com)

Abstract: From the perspective of urban-rural factor mismatch, study the mechanism and effect of digital finance empowering rural revitalization in Anhui. The results showed that digital finance and its coverage had a positive impact on rural revitalization in Anhui, but the positive impact of depth of use on rural revitalization in Anhui was not significant. Mechanism analysis shows that there is a mesomeric effect with the mismatch of agricultural and non-agricultural sectors as the intermediary variable. Digital finance has a positive impact on rural revitalization in Anhui by improving the mismatch of urban and rural factors. Suggestions include further optimizing the allocation of urban-rural factors, increasing the penetration rate of digital finance, and emphasizing the application of digital finance in rural governance to accelerate the comprehensive revitalization of rural areas in Anhui.

Keywords: Digital finance; Mismatch of urban and rural factors; Rural revitalization.

1. Introduction

Promoting new progress in rural revitalization is an important strategic task for achieving agricultural and rural modernization. The report of the 20th National Congress of the Communist Party of China emphasizes the need to "prioritize the development of agriculture and rural areas, adhere to the integration of urban and rural development, and smooth the flow of urban and rural factors", and "improve the agricultural support and protection system, and improve the rural financial service system." Therefore, continuously strengthen financial services for rural revitalization, better promote the transfer and flow of production factors to rural areas, and actively play the empowering and supportive role of digital finance, Becoming a necessary path for the comprehensive revitalization and development of rural areas in China.

In practice, as far as Anhui Province is concerned, using digital finance as a starting point to accelerate the smooth flow of urban-rural factors and better play the role of empowering the comprehensive revitalization of rural areas has received high attention from all sectors of society. By exploring various forms of digital financial services, Anhui Province is striving to explore a digital financial support model for the comprehensive revitalization and development of rural areas. Dongzhi County has launched the "Red Credit E-Loan" platform, with over a million agricultural users in Anhui using digital loans and satellite loans. The Anhui Agriculture and Rural Department actively explores the introduction of internet banking and other practices, all of which are exemplary examples of digital financial services for rural revitalization in Anhui. However, at the same time, influenced by the overall development concept of "rural support for cities" at the beginning of reform and development, a large amount of financial resources and human capital in rural areas of Anhui have been flowing to urban areas for a long time. The problem of mismatch between urban and rural factors in Anhui is very serious, and there are still bottlenecks and difficulties in more efficient utilization of digital finance to empower rural revitalization.

As a crucial agricultural province in the central region of China, Anhui Province urgently needs to make more effective use of digital financial services, products, and platforms. By continuously accelerating the optimized allocation of urban-rural factors, it aims to accelerate the comprehensive revitalization and development of rural areas. Based on this, from the perspective of urban-rural factor mismatch, studying the mechanism and effects of digital finance empowering rural revitalization in Anhui, and proposing positive policy recommendations, has important theoretical significance and practical value.

2. Literature Review and Theoretical Analysis

2.1. Literature review

The academic community has conducted extensive research on digital finance, urban-rural factor mismatch, and rural revitalization and development. While achieving fruitful results, there are also certain shortcomings. On the one hand, some studies have pointed out that rural revitalization faces problems such as financial resource constraints and labor mismatch, and the long-term mismatch of urban and rural resources will slow down the development process of rural revitalization in China. For example, the problem of financial exclusion is severe in rural areas of developing countries, and there is a serious shortage of financial institutions, products, and services in rural areas. There is a phenomenon of distorted distribution of financial resources in rural areas of China, and the implementation of the rural revitalization strategy faces difficulties such as imperfect rural financial supply mechanisms and imbalanced allocation of financial resources. Analysis at the county level in China found that from 1991 to 2010, the overall agricultural labor force in the county level of China showed a decreasing trend and the decreasing extent gradually increased. Rural revitalization in China is facing a

crisis of rural labor force generation failure, and the current situation of "amphibious" rural labor force is an important reason for insufficient rural development. Therefore, China has implemented the rural revitalization strategy, we must attach great importance to the decline in rural collective action capacity caused by large-scale labor outflow.

On the other hand, some studies have explored the positive effects of digital finance and optimized allocation of factors on how to accelerate the process of rural revitalization. For example, it is necessary to establish a cooperation mechanism for agricultural Financial innovation and form a joint effort to promote rural revitalization. More financial resources should be allocated to key areas and weak links of rural economic and social development to better meet the diversified financial needs of rural revitalization. Digital finance is a new trend in the development of rural finance and a new way to promote the prosperity of rural industries and achieve rural economic revitalization. Digital finance has the advantages of mitigating the geographical exclusion of traditional finance, promoting the transformation of commercial banks, and providing diversified financial services for the integrated development of rural industries. Digital finance can also promote the reemployment of returning migrant workers and narrow the wealth gap between urban and rural areas. At the same time, both digital inclusive finance and rural revitalization and development aim to serve rural vulnerable groups or areas in poverty alleviation and income growth. The internal goals of the two are consistent and there is a coupling interaction relationship. Digital inclusive finance has a positive promoting effect on the level of rural revitalization in China. In addition, a small amount of research has also focused on the issue of digital finance promoting rural revitalization and development in Anhui. Under the economic "New Normal", building an inclusive financial system is an important financial development strategy of Anhui. Digital finance has significantly promoted the inclusive growth of Anhui's economy, and this promoting effect is not only influenced by the development level of digital finance itself, but also by the regulatory effect of human capital.

Previous studies have unanimously affirmed the promoting role of digital finance in rural revitalization, but there are also areas for expansion. Firstly, from the perspective of urban-rural factor mismatch, there is still a lack of research on the mechanism of the impact of digital finance on rural revitalization; Secondly, exploring the impact of digital finance on rural revitalization in Anhui Province is even rarer. Therefore, this paper starts from the theoretical mechanism analysis, measures and analyzes the rural revitalization index of 16 cities in Anhui, as well as the mismatch coefficient of agricultural and non-agricultural factors, and then empirically tests the impact of digital finance on rural revitalization in Anhui, examines the mesomeric effect of urban-rural factor mismatch, and finally provides empirical evidence for the digital financial support strategy of optimizing rural revitalization and development in Anhui.

2.2. Theoretical analysis

Since the reform and opening up, the problem of the "dual economic structure" between urban and rural areas in China has not been fundamentally solved, and there have been long-term problems such as delayed urban-rural factor market reform and restricted urban-rural factor flow. These problems have shown that the non-agricultural sector allocates too much capital and too little labor, while the agricultural sector allocates too much labor and too little capital. Among them, factor mismatch, also known as resource mismatch, refers to the phenomenon of resource allocation causing resource waste and hindering economic development in a market. Therefore, the long-term existence of the mismatch between urban and rural factors will inevitably lead to the waste of resources such as capital and labor, reduce the efficiency of production factor allocation in rural areas, hinder rural economic development, and ultimately hinder the comprehensive revitalization of rural areas. Therefore, it is crucial to better leverage the empowering and supportive role of digital finance.

The theoretical mechanism lies in: firstly, digital finance can significantly improve the availability and convenience of traditional financial services, greatly improving the financing constraints of relatively poor groups who suffer from credit discrimination under traditional financial service models, and thereby promoting the access of rural areas, including Anhui, to more financial resources. Digital finance focuses on serving vulnerable groups such as agriculture, rural areas, and farmers. Its continuous innovation and development also contribute to the innovation and application of digital technology in the field of rural financial services, helping to improve the supply efficiency of rural financial services and financial products, reduce the cost of financial services in rural areas, and improve the efficiency of financial resource allocation in rural areas, Effectively empowering and accelerating the resolution of the problem of insufficient allocation of financial resources in rural areas. At the same time, by developing digital financial service models, traditional financial institutions such as banks, securities, and insurance can also use big data analysis to more effectively understand the financial needs of rural customers, timely grasp their credit information, and more effectively alleviate the financing constraints of rural enterprises, rural entrepreneurship projects, and agricultural production and operation links. They can more accurately provide digital payments, digital credit Financial services, such as digital agriculture insurance and rural supply chain industry chain financing, have enabled Anhui's rural industry to thrive, be ecologically livable, be civilized, govern effectively and live well.

Secondly, the accelerated application and development innovation of digital finance in "agriculture, rural areas, and farmers" can alleviate the problem of insufficient capital allocation and excessive labor allocation in China's agricultural sector through significant improvement effects on capital and labor mismatch , continuously optimize the allocation of urban and rural factors in China, and bring urgently needed financial support and human talent for the development of rural enterprises, progress of rural industries, and rural innovation and entrepreneurship. Digital finance can reduce the financial mismatch between private enterprises and small and medium-sized enterprises, alleviate the "ownership discrimination" and "scale discrimination" in the credit market , provide timely credit services for rural small and medium-sized enterprises, solve the urgent funding shortage for the development of rural small and medium-sized enterprises, create job opportunities, help alleviate the employment pressure of rural labor, accelerate rural economic development, and increase rural human capital investment, Increase the material and spiritual wealth of rural residents. By utilizing digital financial platforms, rural small and medium-sized enterprises can also connect various cruxes of

production, warehousing, transportation, sales, and after-sales service at a lower cost, promote the smooth flow of rural factor resources, remove obstacles for the circular development of rural economy, and play an important role in actively empowering the revitalization and development of rural areas in Anhui.

In short, digital finance can effectively reduce the financing costs of the agricultural sector, improve the mismatch between urban and rural factors, accelerate the flow of capital to rural areas in Anhui, optimize the allocation of capital and labor for the development of rural economy in Anhui, and play an enabling and supporting role in the process of rural revitalization and development in Anhui.

3. Research Design

3.1. Variable Description

3.1.1. The dependent variable

The Rural Revitalization Index (RRindex) is the dependent variable obtained through measurement. Considering that the theoretical community generally selects specific indicators to depict rural revitalization from five dimensions: "industrial prosperity, ecological livability, rural civilization, effective governance, and affluent living" [23-24]. Therefore, based on existing research, following the principles and requirements of the "Rural Revitalization Strategic Plan (2018-2022)", and combining data availability, a "Anhui Rural Revitalization Indicator System" is constructed. The construction results are shown in Table 1.

Table 1. Anhui Rural Revitalization Indicator System

Dimensional indicators	Indicator code	Specific indicators	Indicator direction
Industrial prosperity	x1	Per capita agricultural, forestry, animal husbandry, and fishing output value (yuan/person)	Forward
	x2	Grain output efficiency (grain yield per unit area (kg/ha))	Forward
	x3	Ratio of effective irrigation area to sown area of grain crops (%)	Forward
	x4	Proportion of agricultural workers in rural areas (%)	Forward
	x5	Ratio of R&D investment to fiscal expenditure (%)	Forward
	x6	Total power of agricultural machinery per unit (kW/ha)	Forward
Ecological livability	x7	Fertilizer usage intensity (tons/hectare)	Negative
	x8	Usage of agricultural plastic film (ton/hectare)	Negative
	x9	Rural tap water penetration rate (%)	Forward
	x10	Household average solar water heater area (square meters/household)	Forward
Rural civilization	x11	Rural education facility construction level (rural schools/per 10000 rural population)	Forward
	x12	Number of rural graduates per 10000 rural population (person)	Forward
	x13	Number of rural medical and health personnel per 10000 rural population (person)	Forward
	x14	Proportion of rural telephone users (%)	Forward
Effective governance	x15	Number of village committees per 10000 people	Forward
	x16	Proportion of minimum living allowances (%)	Forward
	x17	Proportion of rural employees (%)	Forward
live in affluence	x18	Income gap between urban and rural residents (yuan)	Negative
	X19	Per capita disposable income of rural residents(yuan)	Forward
	x20	Per capita electricity consumption (kWh/person)	Forward
	x21	Per capita total retail sales of rural consumer goods (yuan)	Forward
	X22	Rural delivery routes (kilometers)	Forward

Table 1 mainly depicts rural revitalization in Anhui from five dimensions, with 19 positive indicators. The larger the values of these indicators, the more significant the effectiveness of rural revitalization in Anhui; There are three negative indicators, and the larger the values of these indicators, the less ideal the rural revitalization in Anhui is. Considering the availability of data, the data of 16 cities in Anhui from 2011 to 2020 are selected to calculate the rural revitalization index of Anhui. The original data mainly comes from the "Anhui Statistical Yearbook" (2012-2021), the statistical yearbooks of various cities (2012-2021), and the national economic and social development statistical bulletins of various cities. The measures are sequentially dimensionless processed using the extreme value standardization method, the coefficient of variation method to calculate the weights of basic indicators, and the linear weighted summation method to calculate the final score.

3.1.2. Explain and control variables

The Digital Finance Index (DFindex) is the core explanatory variable. At the same time, in order to test the heterogeneity of the coverage breadth and depth of use of digital finance on rural revitalization in Anhui, they are also used as two other explanatory variables. Referring to common practices in the academic community, the explanatory variables are selected from the "Digital Inclusive Finance Index" compiled by the Digital Finance Research Center of Peking University.

In addition, considering the impact of openness to the outside world, elderly dependency ratio, financial support for agriculture and forestry, industrial structure, informatization level, and regional infrastructure on rural revitalization, they are used as control variables. Among them, the degree of openness to the outside world (Open) is measured as a percentage of total imports and exports to GDP, the elderly dependency ratio (OLD) is measured as the proportion of the

elderly population aged 65 and above, and the fiscal support for agriculture and forestry (FSAG) is measured as the proportion of agricultural and forestry support in fiscal expenditures; The industrial structure (IS) is measured by the proportion of GDP in the secondary industry, the informatization degree (lninfom) is measured by the natural logarithm of mobile phone users, and the regional infrastructure (lnHighway) is measured by the natural logarithm of highway mileage.

3.1.3. Mediating variables

Drawing on the method of Cao Yushu et al., we characterize it by calculating the factor mismatch coefficient (AEM) in the agricultural sector and the factor mismatch coefficient (SEM) in non-agricultural sectors. The formulas used for calculation are:

$$AEM = (\frac{W_0}{R_0}) / (\frac{\beta_1}{\alpha_1} \times \frac{K_1}{L_1}) \quad (a1)$$

$$SEM = (\frac{W_0}{R_0}) / (\frac{\beta_2}{\alpha_2} \times \frac{K_2}{L_2}) \quad (a2)$$

Where, W_0/R_0 in equations (a1) and (a2) represents the wage interest rate ratio of the benchmark department, which is measured by the average wage interest rate ratio of 16 cities in Anhui. K_1 and K_2 respectively represent fixed capital investment in the agricultural and non-agricultural sectors, L_1 and L_2 respectively represent labor input in the agricultural and non-agricultural sectors. Considering that the agricultural sector is the main rural production sector and the non-agricultural sector is the main urban production sector, it is measured by the fixed assets investment of the primary industry and the secondary and tertiary industries, as well as the labor input of the primary and secondary industries.

α_1 and α_2 respectively represent the capital output elasticity of the agricultural and non-agricultural sectors, β_1 and β_2 respectively represent the labor output elasticity of the agricultural and non-agricultural sectors. For these four elastic coefficients, reference can be made to the practices of Song Zheng and Yuan Zhigang, with values of 0.2, 0.4, and 0.8, 0.6, respectively. However, it was noted that they measured the elasticity coefficient at the provincial level, without considering the impact of regional heterogeneity. Therefore, this paper uses the C-D production function to measure and obtain it by establishing a variable coefficient model. The model used for calculation is:

$$\ln(\frac{Y_{1it}}{L_{1it}}) = \ln A_1 + \omega_1 \ln(\frac{K_{1it}}{L_{1it}}) + \phi_{1i} + \vartheta_{1t} + \tau_{1it} \quad (a3)$$

$$\ln(\frac{Y_{2it}}{L_{2it}}) = \ln A_2 + \omega_2 \ln(\frac{K_{2it}}{L_{2it}}) + \phi_{2i} + \vartheta_{2t} + \tau_{2it} \quad (a4)$$

In formula (a3) (a4), $\ln(Y_{1it}/L_{1it})$ and $\ln(Y_{2it}/L_{2it})$ represent the explained variable, that is, the natural logarithm of the average labor output of the primary and secondary industries; $\ln A_1$ and $\ln A_2$ represents a constant term, that is, the rate of technological progress; $\ln(K_{1it}/L_{1it})$ and $\ln(K_{2it}/L_{2it})$ is the core explanatory variable, that is, the natural logarithm of the average labor capital of the primary industry and the secondary and tertiary industries; ϕ_{1i} and ϕ_{2i} represent individual effects, ϑ_{1i} and ϑ_{2i} represent time effects, τ_{1it} and τ_{2it} are residual terms.

In addition, the calculation results of factor mismatch coefficients in both agricultural and non-agricultural sectors are relative values, indicating whether the allocation of factors is reasonable relative to the benchmark sector. When the factor mismatch coefficient is 1, it indicates that there is no factor mismatch. When the factor mismatch coefficient is greater than 1, it indicates that there is too little capital allocation and too much labor allocation. When the factor mismatch coefficient is less than 1, it indicates that there is too little labor allocation and too much capital allocation. And generally speaking, the factor mismatch coefficient in the agricultural sector is greater than 1, while the factor mismatch coefficient in the non-agricultural sector is less than 1.

3.1.4. Robustness test variables

In order to avoid false regression, the digital degree index (Digital) compiled by the Digital Finance Research Center of Peking University will also be used as the robustness test variable.

3.2. Data description

Table 2. Descriptive statistics of variables

Variable		Mean	Standard	Minimum	Maximum
Rural revitalization index	RRindex	0.3945	0.0461	0.2846	0.5179
Digital Finance Index	DFindex	1.7646	0.6877	0.2708	2.9916
Coverage breadth of digital finance	DFbreadth	1.6067	0.6509	0.1429	2.9847
Depth of use of digital finance	DFdepth	1.8587	0.7029	0.4140	3.1611
Factor mismatch coefficient in the agricultural sector	AEM	1.2842	1.3684	0.0944	8.9603
Factor mismatch coefficient in non-agricultural sectors	SEM	0.4062	0.3513	0.0620	1.5360
Openness to the outside world	Open	0.1081	0.1028	0.0182	0.5324
old-age dependency ratio	OLD	0.1030	1.6671	-0.6578	0.4119
Financial support for agriculture and forestry	FSAG	0.1152	0.0365	0.0336	0.1989
Industrial structure	IS	0.4839	0.0972	0.3062	0.7473
Informatization level	lninfom	5.4838	0.5920	4.0427	6.9689
Regional Infrastructure	lnHighway	9.2094	0.6041	7.3492	10.13
Digitization degree index	Digital	2.1153	0.8752	0.1993	4.3790

Considering the availability of data, panel data of 16 cities in Anhui Province from 2011 to 2020 are selected for empirical analysis. Among them, the explanatory variables are obtained from the previous measurement, the core explanatory variables and robustness test variables are from the Peking University Inclusive Finance Index (2011-2020), and the measurement data of control and intermediary variables are from the Anhui Statistical Yearbook (2012-

2021). The descriptive statistical results of variables are shown in Table 2.

Table 2 shows that the average values of agricultural sector factor mismatch coefficient (AEM) and non-agricultural sector factor mismatch coefficient (SEM) in 16 cities in Anhui from 2011 to 2020 are 1.2842 and 0.4062, respectively. This indicates that the agricultural sector in 16 cities in Anhui has problems of insufficient capital allocation and excessive labor allocation; On the contrary, there is a problem of insufficient labor allocation and excessive capital allocation in the non-agricultural sector.

3.3. Model settings

Based on theoretical analysis content, construct a benchmark regression model. The results are as follows:

$$RRindex_{it} = C_0 + \alpha_0 DFindex_{it} + \sum_{k=1}^{n} \alpha_k control_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad \text{(b1)}$$

Among them, $RRindex_{it}$ represents the dependent variable, namely the rural revitalization index; C0 represents a constant term; $DFindex_{it}$ representing the core explanatory variable, namely the digital finance index; $cotrol_{kit}$ represents the control variable, where k is the number of control variables; μ_i represents individual effects, λ_t represents time effects, and ε_{it} is a residual term.

Considering endogeneity issues, the GMM method will also be used for verification, and the dynamic panel model to be established is:

$$RRindex_{it} = C_1 + \beta_0 RRindex_{it-1} + \beta_1 DFindex_{it} + \sum_{k=1}^{n} \delta_k control_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad \text{(b2)}$$

At the same time, in order to verify the mesomeric effect of urban-rural factor mismatch, the causal stepwise regression method will be used to test. The mesomeric effect model constructed is:

$$RRindex_{it} = C_2 + \gamma_0 DFindex_{it} + \sum_{k=1}^{n} \gamma_k control_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad \text{(b3)}$$

$$Z_{it} = C_3 + \chi_0 DFindex_{it} + \sum_{k=1}^{n} \chi_k control_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad \text{(b4)}$$

$$RRindex_{it} = C_4 + \kappa DFindex_{it} + \theta Z_{it} + \sum_{k=1}^{n} \varphi_k control_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad \text{(b5)}$$

Among them, Z_{it} is the mediating variable urban-rural factor mismatch coefficient, namely the agricultural sector factor mismatch coefficient (AEM) and the non-agricultural sector factor mismatch coefficient (SEM).

4. Empirical Results

4.1. Benchmark regression analysis

Using Stata15.0 software and a bidirectional fixed effects model, to test the impact of digital finance on rural revitalization in Anhui. The benchmark regression results are shown in Table 3.

Table 3. Benchmark regression results

Variable	Model (1.1)	Model (1.2)	Model (1.3)	Model (1.4)
			SYS-GMM	DIF-GMM
L.RRindex			0.2838*** (0.0578)	0.3681*** (0.0545)
DFindex	0.2013*** (0.0565)	0.1184*** (0.0218)	0.0084*** (0.0018)	0.0095*** (0.0027)
Control variable	NO	YES	YES	YES
C	0.3134*** (0.0259)	0.5823*** (0.1995)	0.2623*** (0.0244)	0.2292*** (0.0205)
Individual effects	control	control	control	control
time effect	control	control	control	control
N	160	160	160	160
Within-R^2	0.300	0.4278		
Hausman test P-value	0.8669	0.0000		
AR (2) test P-value /Sargan test P-value			0.2575 1.0000	0.2490 0.9999

Note: * * *, * *, * indicate significant at the 1%, 5%, and 10% levels, the same below.

In Table 3, the regression results of models (1.1) and (1.2) indicate that digital finance has a significant positive impact on rural revitalization in Anhui, with regression coefficients of 0.2013 and 0.1184 for the two models, respectively. With the development and progress of digital finance, the level of rural revitalization in Anhui is also constantly improving. For every unit increase in the digital finance index, the Anhui rural revitalization index will increase by approximately 0.2 and 0.12 units, respectively.

Meanwhile, Table 3 also reports the test results of the dynamic panel model. Among them, the regression results of model (1.3) show that digital finance has a significant positive impact on rural revitalization in Anhui, and there is no substantial change compared to the benchmark regression results. The regression results of the control group model (1.4) also support this conclusion. In addition, the P-values of the AR (2) test are all greater than 0.1, indicating that the autocorrelation of the second-order sequence is not significant; The P-values of the Sargan test are all greater than 0.1, indicating that the selected instrumental variable is reasonable.

4.2. Robustness test

Table 4 reports the results of the robustness test. Among them, in model (2.1), considering the supply and demand of digital financial services, both rely on the support of the internet provided by digital infrastructure, and digital construction is external to rural revitalization, so the Digital Degree Index (Digital) is used to replace the Digital Finance Index (DFindex) for testing.

In the model (2.2) - (2.5), the method of Xie Di and Su Bo is used for reference, and the five-dimensional indicators of rural revitalization are used as the explained variables to do the robustness test. The standard setting for determining whether it is robust is that if the regression coefficients of the

digital finance index to these five dimensions of indicator indices are all positive, and the majority of the regression coefficients are significant, it indicates that digital finance has a positive impact on rural revitalization in Anhui due to its advantages in industrial prosperity, ecological livability, rural civilization, effective governance, or affluent life.

Table 4. Robustness test results

Variable	Model (2.1)	Model (2.1)	Model (2.2)	Model (2.3)	Model 2.4)	Model (2.5)
	Rural revitalization	Industrial prosperity	Ecological livability	Civilized governance	Effective living	Prosperity in rural areas
	FE	RE	RE	FE	FE	RE
Digital	0.0248** (0.0110)					
DFindex		0.0584*** (0.0138)	0.0422*** (0.0135)	0.0376*** (0.0217)	0.0010 (0.0081)	0.0258* (0.0152)
C	0.7995*** (0.2732)	-0.0089 (0.0455)	0.3067*** (0.0447)	-0.0828 (0.0964)	0.0636 (0.0357)	0.1055** (0.045)
control variable	YES	YES	YES	YES	YES	YES
N	160	160	160	160	160	160
Individual effects	control	control	control	control	control	control
time effect	control	control	control	control	control	control
Within-R^2	0.4103	0.5733	0.5551	0.8958	0.5897	0.8055
Hausman test P-value	0.0000	0.1433	0.1249	0.0963	0.0006	0.1290

Note: * * *, * *, * indicate significant at the 1%, 5%, and 10% levels, the same below.

In Table 4, the regression results of model (2.1) indicate that the regression coefficient of the digitalization degree index is significant at the 5% level, and there is no substantial change compared to the benchmark regression results. This indicates that using digitalization degree (Digital) as a proxy variable for the digital finance index still has a significant positive impact on rural revitalization in Anhui. The regression results of models (2.2) - (2.5) indicate that digital finance has a positive impact on the prosperity of rural industries, ecological livability, rural civilization, effective governance, and prosperity in Anhui province. Moreover, the regression coefficient of only effective governance is not significant. Therefore, it can be determined that digital finance does have a significant positive impact on rural revitalization in Anhui province.

4.3. Mesomeric effect test

Digital finance may have a positive impact on rural revitalization in Anhui by influencing the allocation of urban and rural factors. For this reason, the causal stepwise regression method is used to test the mesomeric effect. The results are shown in Table 5.

Table 5. Mesomeric effect test results

Dependent variable	Model (3.1)	Model (3.2)	Model (4.1)	Model (4.2)
	Agricultural sector factor mismatch coefficient	Rural revitalization	nonagricultural sector factor mismatch coefficient	Rural revitalization
Factor mismatch coefficient in the agricultural sector		-0.0075*** (0.0022)		
Factor mismatch coefficient in non-agricultural sectors				-0.0712*** (0.0121)
Digital Finance Index	-1.5697*** (0.1541)	0.0057 (0.0080)	-0.2026*** (0.0038)	0.0085 (0.0062)
Constant term (C)	YES	YES	YES	YES
control variable	YES	YES	YES	YES
R^2	0.5444	0.3569	0.5818	0.4585
N	160	160	160	160
Sobel test P-value	0.0252	0.0252	0.0000	0.0000

Note: * * *, * *, * indicate significant at the 1%, 5%, and 10% levels, the same below.

In Table 5, the regression results of models (3.1) and (4.1) indicate that the impact of digital finance on factor mismatch coefficients in the agricultural sector and non-agricultural sector is both negative and significant at the 1% level. With the development and progress of digital finance, the mismatch coefficients of agricultural and non-agricultural sector factors in 16 cities in Anhui have decreased. Digital finance is an important factor affecting the allocation of urban and rural factors in Anhui. Considering that the average factor mismatch coefficient of the agricultural sector in 16 cities in Anhui is greater than 1, the negative effect of digital finance is conducive to promoting the overall factor mismatch coefficient of the agricultural sector in Anhui to be closer to the ideal state; However, the average non-agricultural sector factor mismatch coefficient in 16 cities in Anhui is less than 1, so the negative effect of digital finance will cause the overall non-agricultural sector factor mismatch in Anhui to deviate from the ideal state.

The regression results of models (3.2) and (4.2) indicate that considering both digital finance and urban-rural factor

mismatch, the impact of factor mismatch in the agricultural and non-agricultural sectors on rural revitalization in Anhui is very significant, with regression coefficients of 0.0075 and 0.0712, both of which are negative. This means that the aggravation of factor mismatch in agriculture and non-agricultural sectors will significantly reduce the level of rural revitalization in Anhui, which will have a negative impact on the comprehensive development of rural revitalization in Anhui. Moreover, the hindrance caused by factor mismatch in non-agricultural sectors will be greater.

In addition, the sobel test P values given in Table 5 are all less than 0.05, indicating that the mesomeric effect is tenable, there is a mediation effect with the agricultural sector factor mismatch and non-agricultural sector factor mismatch as intermediary variables, and the urban-rural factor mismatch plays a complete intermediary role between digital finance and rural revitalization in Anhui.

4.4. Heterogeneity analysis

Digital finance can also be divided into dimensions such as coverage breadth and depth of use, and the impact of different dimensions on rural revitalization in Anhui may have heterogeneity. Therefore, further heterogeneity analysis is needed. The results are shown in Table 6.

Table 6. Heterogeneity analysis results

Dependent variable	Model (5.1)		Model (5.2)	
	Regression coefficient	Standard deviation	Regression coefficient	Standard deviation
DFbreadth	0.1912***	0.0425		
DFdepth			0.0298	0.0264
Constant term (C)	0.3686	0.2579	0.7838**	0.3358
control variable	YES		YES	
Individual effects	control		control	
time effect	control		control	
N	160		160	
Within-R^2	0.4274		0.3930	
Hausman value/P value	28.01	0.0005	41.45	0.0000

Note: * * *, * *, * indicate significant at the 1%, 5%, and 10% levels, the same below.

In Table 6, the regression results of models (5.1) and (5.2) indicate that the regression coefficient for the breadth of digital finance coverage is significantly positive at the 1% level, while the regression coefficient for the depth of digital finance use is positive but not significant. Therefore, increasing the coverage of digital finance can help promote the development of rural revitalization in Anhui, but the positive impact of the depth of digital finance use on rural revitalization in Anhui is not significant. When the coverage index of digital finance increases by 1 unit, the rural revitalization index of 16 cities in Anhui will increase by 0.19 units.

The reason may be that, at the level of coverage breadth, digital finance is continuously increasing its coverage in rural areas of 16 cities in Anhui, promoting the continuous improvement of financial availability in rural areas of Anhui, allowing more and more Anhui rural areas with financial needs to fully enjoy digital financial services such as mobile payment, online payment, online credit, and online insurance. This helps to boost the e-commerce business, resident consumption, online healthcare, and other digital financial services in Anhui rural areas Online education and employment and entrepreneurship are conducive to the prosperity of rural industries, ecological livability, rural civilization, effective governance, and life services in Anhui, and have a positive impact on the revitalization and development of rural areas in Anhui. However, at the depth of use, what is examined is the degree of use of digital financial services and the purchase scale of digital financial products in rural areas of 16 cities in Anhui, especially the use of digital finance by vulnerable groups in rural areas in Anhui, which mainly depends on the willingness of the demand side for digital finance. However, the majority of middle-aged and elderly people in rural Anhui rely on one industry for their livelihood, with a significant shortage of young people engaged in agriculture, resulting in a weak desire to use digital finance. In addition, the lack of digital finance knowledge among rural middle-aged and elderly people and poor expectations for the development prospects of rural enterprises have resulted in only a small number of digital financial services and products being used in rural areas of Anhui, thereby restricting the positive impact of digital finance on rural revitalization in Anhui.

5. Conclusion and Suggestions

From the perspective of urban-rural factor mismatch, this paper analyzes the impact mechanism and effect of digital finance on rural revitalization in Anhui. The results showed that digital finance has a significant positive impact on rural revitalization in Anhui. After adding control variables, for every 1 unit increase in the digital finance index, the Anhui rural revitalization index will increase by approximately 0.12 units. Meanwhile, the breadth of digital finance coverage has a significant positive impact on rural revitalization in Anhui, but the depth of digital finance use has no significant positive impact on rural revitalization in Anhui. Mechanism analysis shows that there exists a complete mediating utility with mismatches in agricultural sector factors and non-agricultural sector factors as mediating variables. That is to say, digital finance mainly has a positive impact on rural revitalization in Anhui by improving the allocation of factors in the agricultural sector. The policy recommendations are as follows:

(1) Further optimize the allocation of urban and rural factors, accelerate the return of human capital, physical capital and industrial capital to rural areas in Anhui, and better play the enabling role of digital finance. Local governments in Anhui should increase the guidance and support of capital inflows to rural areas, explore long-term mechanisms for the return of various rural capital elements, promote the better service of Anhui's financial resource elements to hometown construction through multiple channels, continuously improve the rational allocation of urban and rural elements in Anhui, and consolidate the institutional guarantee of digital

finance empowering rural revitalization in Anhui.

(2) Continue to expand the coverage of digital finance, effectively enhance the penetration rate of digital finance in rural areas of Anhui, and more effectively support the comprehensive revitalization and development of rural areas in Anhui. Efforts will be made to promote the scale of the use of digital finance in rural areas of Anhui, continuously expand the online financial business in rural areas of Anhui, cooperate with moderately reducing the threshold and service fee standards for online financial services, and encourage rural residents and rural enterprises in Anhui to use digital financial services more. Vigorously promote the development of Anhui rural digital financial market, activate Anhui rural digital financial trading activities, and promote collaborative efforts from both breadth and depth levels to better leverage the empowering role of digital finance.

(3) We attach great importance to the application of digital finance in rural governance and fully leverage the positive role of digital finance in empowering digital rural governance. Empirical analysis shows that the promoting effect of digital finance on rural governance in Anhui is not significant, indicating that there is still significant room for digital finance to empower rural governance in Anhui and cannot maximize its supportive role. Therefore, local rural organizations in Anhui should fully attach importance to digital finance, increase the utilization of digital financial platforms, strengthen the areas where digital finance empowers rural revitalization, and enhance the empowering and supporting role of digital finance in the comprehensive revitalization and development of rural areas.

Acknowledgments

This study was funded by Anhui Province Philosophy and Social Science Planning Project "Implementation Mechanism and Path Optimization of Digital Financial Services for Rural Revitalization in Anhui Province" (Grant No.: AHSKQ2021D158).

References

[1] Demirgüç-Kunt, Aslı, Beck Thorsten, and Patrick Honohan, Finance for all? Policies and pitfalls in expanding access [R]. A World Bank Policy Research Report, 2008.

[2] Yang Lin, Gao Hongxia. The phenomenon and countermeasures of distorted distribution of rural financial resources: based on data analysis in Yuzhong County, Yongdeng County, and Gaolan County of Lanzhou City [J]. Economic Theory and Management, 2012 (8): 103-113.

[3] Chen Fang. The Problems and Institutional Construction of Rural Financial System Reform in the Process of Rural Revitalization [J]. Exploration, 2018 (3): 163-169.

[4] Ma Li, Long Hualou, Zhang Yingnan, Tu Shuangshuang, Ge Junior College. The spatiotemporal coupling between changes in agricultural labor force and agricultural economic development in Chinese counties and their implications for rural revitalization [J]. Journal of Geography, 2018 (12): 2364 2377.

[5] Jiang Heping, Wang Kejun, Yang Dongqun. The crisis of rural labor force aging faced by rural revitalization in China and the solutions [J]. Journal of Jiangsu University (Social Science Edition), 2019 (1): 28-34.

[6] He Ying, Liu Hong. Mechanism and Guiding Measures of Labor Reflux under the Background of Rural Revitalization Strategy [J]. Journal of Yunnan University for Nationalities (Philosophy and Social Sciences Edition), 2020 (5): 46-51.

[7] Wang Yahua, Su Yiqing, Shu Quanfeng. Labor Force Outflow, Rural Collective Action, and Rural Revitalization [J]. Journal of Tsinghua University (Philosophy and Social Sciences Edition), 2022 (3): 173-187.

[8] Jiang Song, Yu Zhuo. Research on the Path of Agricultural Value Chain Finance Supporting Rural Revitalization [J]. Agricultural Economy and Management. 2019 (3): 19-32.

[9] Lu Minfeng. Research on Rural Financial Supply Side Structural Reform Supporting Rural Revitalization Strategy [J]. Contemporary Economic Management, 2019 (10): 90-96

[10] Zhu Liping, Yang Xubiao, Li Cheng. Digital finance boosts the prosperity of rural industries [J]. Macroeconomic Management, 2022 (8): 42-49.

[11] He Hongqing. Digital Finance Boosts the Integrated Development of Rural Industries: Advantages, Difficulties, and Approaches [J]. Journal of Northwest A&F University (Social Sciences Edition), 2020 (03): 118-125.

[12] Zeng Xiangquan, Guo Qing. Can the Development of Digital Finance Promote the Reemployment of Returning Migrant Workers: An Empirical Analysis Based on the China Labor Force Dynamics Survey (CLDS) [J]. Economic Theory and Management, 2022 (04): 12-26.

[13] Wu Haitao, Qin Xiaodi. Digital finance, family entrepreneurship, and urban-rural wealth inequality [J]. Journal of Wuhan University (Philosophy and Social Sciences Edition), 2022 (06): 121-132.

[14] Tan Yanzhi, Li Yunzhong, Ye Chengfang. Evaluation and Coupling Synergy Analysis of Provincial Digital Inclusive Finance and Rural Revitalization [J]. Economic Geography, 2021 (12): 187-195.

[15] Tian Lin, Zhang Yuanyuan, Zhang Shijie. Research on the Dynamic Impact of Digital Inclusive Finance on Rural Revitalization: Based on System GMM Test [J]. Journal of Chongqing University (Social Sciences Edition), j.issn.1008-5831.2021.11.003.

[16] Jiang Zhonghe, Yan Jie. Empirical research on the impact of inclusive finance on economic development based on panel data of 52 counties in 15 cities in Anhui [J]. Journal of Huaihua Normal University (Social Science Edition), 2018 (6): 51-57.

[17] Sun Luyun, Shi Minghua, Zhang Jinbo. The impact of digital finance on inclusive economic growth: an empirical analysis based on 16 cities in Anhui Province [J]. Journal of Anhui Agricultural University (Social Sciences Edition), 2021 (6): 56-65.

[18] Wang Songji, Bai Yongxiu. Mismatch of urban-rural factors and lagging transformation of China's dual economic structure: theoretical and empirical research [J]. 2013 (7): 31-43

[19] Liu Minghui, Lu Fei. Mismatch of urban and rural factors and integrated urban and rural development: an empirical study based on China's provincial panel data [J]. Agricultural Technology and Economy, 2019 (2): 33-46.

[20] Liu Xinyi, Huang Ying, Huang Sirui, Zhang Taolin. Digital Inclusive Finance and common prosperity: Theoretical Mechanism and Empirical Facts [J]. Research on financial economics, online launch time: 2022-2-16.

[21] Tian Jie, Tan Qiuyun, Jin Jingyu. Can digital finance improve resource mismatch? [J] Financial Essays, 2021 (4): 49-59.

[22] Ma Fenfen, Wang Mancang Digital Finance and Financial Resource Allocation [J]. Financial Theory and Practice, 2021 (8): 9-19.

[23] Lv Chengchao, Cui Yue. Rural Revitalization and Development: Indicator Evaluation System, Regional Gap and Spatial Polarization [J]. Agricultural Economic Issues, 2021 (5): 20-32.

[24] Mao Jinhuang. Improvement and Empirical Study on the Construction Method of Rural Revitalization Evaluation Index System [J]. Journal of Lanzhou University (Social Science Edition), 2021 (3): 47-58.

[25] Xie Di, Su Bo. Digital Inclusive Finance Helps Rural Revitalization and Development: Theoretical Analysis and Empirical Testing [J]. Shandong Social Sciences, 2021 (4): 121-127.

[26] Cao Yushu, Lou Dongwei. Resource Mismatch, Structural Change, and China's Economic Transformation [J]. China Industrial Economy, 2012 (10): 5-18.

[27] Song Zheng. Deconstructing the Source of China's Rapid Economic Growth: A Perspective of Institutional Transition [A]. Edited by Yuan Zhigang, China's Economic Growth: Institutions, Structures, and Welfare [C]. Shanghai: Fudan University Press, 2006.