# The Impact of Digital Inclusive Finance on Resident Income under the Background of Rural Revitalization: Evidence from County-level Data in the Wuling Mountain Area

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**Abstract: As a continuation and development of traditional inclusive finance, digital inclusive finance can effectively improve the efficiency of traditional financial services and promote income growth for rural residents in county-level areas. Based on panel data from 71 counties and cities in the Wuling Mountain area from 2014 to 2018, a fixed effects model and an intermediary effects model were comprehensively used, and heterogeneity analysis was conducted to test the impact mechanism and differences of digital inclusive finance on new urbanization. The research results indicate that digital inclusive finance can promote the increase of income for farmers in poverty-stricken counties, but there is regional heterogeneity. Regions with lower dependence on county-level fiscal expenditure enjoy more of the digital financial technology dividend, while regions with higher dependence on county-level fiscal expenditure are not significantly affected by the digital financial policy dividend. In addition, different dimensions of digital inclusive finance also show a positive impact on increasing farmers' income. Further research has found that urbanization is an important intermediary channel for digital inclusive finance to affect the income increase of farmers in the Wuling Mountain area.**

**Keywords: Digital Inclusive Finance; Fiscal Expenditure; Urbanization; Increasing Farmers Income**

## 1. Introduction

Digital inclusive finance has provided strong financial support in the process of rural revitalization and development in China. Currently, the role of digital inclusive finance in supporting national economic growth has been recognized by most people in academia. Developing digital inclusive finance is conducive to promoting the rapid development of poverty alleviation in China. Although the coverage and depth of digital inclusive finance in cities have made significant progress, the coverage and breadth in rural areas are still slightly insufficient. Therefore, in the context of promoting rural revitalization in China, it is necessary to strengthen the construction of rural digital finance infrastructure and improve the coverage of rural digital finance [1]. This article reviews the existing achievements from the perspectives of the development of digital inclusive finance and the impact on farmers' income.

In the context of rural revitalization, how to consolidate the achievements of poverty alleviation in the new era through the development of digital inclusive finance has become an important research topic for scholars. Yang believes that digital inclusive finance can significantly improve the per capita disposable income level of urban and rural residents in China, and its promotion effect on the income level of urban residents is far greater than that of rural residents [2].Through He's research, it was founds that the coverage breadth of digital inclusive finance is the main driving force for promoting income growth of rural residents. Overall, the promotion effect in the eastern, central, and western regions decreases in order, and digital inclusive finance has a threshold effect in promoting income growth of rural residents. When the development level of digital inclusive finance exceeds the threshold value, it can further stimulate the income

 

growth effect [3].In his research on the upgrading of county-level industries and the growth of farmers' income, Zhang found that the promoting effect of digital inclusive finance is mainly achieved through two paths: one directly promotes the growth of farmers' income, and the other promotes the growth of farmers' income by promoting the upgrading of county-level industries, and the promoting effect on poverty-stricken counties is greater than that on non poverty-stricken counties [4].Zhang found that digital inclusive finance can stimulate economic growth through three paths: increasing rural per capital income, activating private enterprises to promote innovation, and optimizing industrial structure [5]. Wang believes that digital finance is very significant in narrowing the income gap among urban residents with lower levels of economic development, and the availability of financial services is a key factor affecting the urban-rural income gap [6]. The inclusiveness, comprehensiveness, and convenience brought by digital inclusive finance have a significant positive impact on regional innovation output in China. In the mediation effect test, digital inclusive finance can indirectly expand regional innovation output by improving the level of higher education, infrastructure construction, and average wage income [7].Hua found through empirical analysis that the impact of rural financial development on farmers' income is very limited, but there are regional differences in this impact. The impact in the eastern region is positive and significant, while in the central and western regions, except for rural financial credit support that can expand the income gap of farmers, rural financial development has not had a significant impact on the income of farmers and residents [8]. Hu found through his research that there is a spatial polarization phenomenon in the income of rural residents in China. As the income level of rural resident increases, the promoting effect of rural informal finance on increasing farmers' income gradually increases [9].

Digital inclusive finance is not a tree without roots, but relies on traditional finance [10].Although there are differences in the external forms of the two, they cannot be separated from the core essence of finance. Most scholars believe that there is a complementary relationship between digital finance and traditional finance: the financial knowledge and experience gradually accumulated by the demand side of financial services in the use of traditional finance can help them obtain digital financial services [11]; As an innovative extension of traditional finance, the regional differences in the development level of digital finance stem from the imbalance in the development of traditional finance [12].

Through the sorting of previous achievements, it has been found that most scholars believe that digital inclusive finance can promote the increase of farmers' income through the analysis of national and provincial data. In terms of factors that affect the growth of farmers' income, many scholars believe that credit support and rural financial development will have an impact on it. This article is based on the background of rural revitalization, and the possible marginal contribution lies in: analyzing the targeted impact of digital inclusive finance on the income of residents in various county-level areas of the Wuling Mountain area at the county level; The differentiated impact of digital inclusive finance on counties with different levels of financial support dependence in the Wuling Mountain area; A study on the impact of digital inclusive finance on the mediating effect of urbanization in the Wuling Mountain area.

## 2. Model Design

In order to explore the relationship between digital inclusive finance and the income of rural residents in the Wuling Mountain area under the background of rural revitalization, this article takes the income level of rural residents in the Wuling Mountain area as the dependent variable, and the 2014-2018 Peking University Digital Inclusive Finance Index released by the research group of the Peking University Digital Finance Research Center as the main explanatory variable. Other factors that affect the income level of rural residents are used as control variables to construct a model, Quantitative analysis of the relationship between digital inclusive finance and the income level of rural residents from an empirical perspective.

### 2.1 Selection of Data Sources and Variables

This article selects panel data from 71

 

counties and 5 years in the Wuling Mountain area from 2014 to 2018 as the analysis sample. The income level of residents in Wuling Mountain is used as the dependent variable of the model, the development level of inclusive finance is used as the explanatory variable, and other indicators that affect rural residents' income are used as the control variables to construct the panel data model. As the current digital inclusive finance index is from 2014 to 2020, based on the availability of data, the research period of this article is controlled within the range of 2014-2018. The other control variables are sourced from the 2014-2018 China Rural Statistical Yearbook.

The dependent variable. Income level of rural residents (INCOME). At present, the official national statistical data used to represent the income level of farmers is the per capita disposable income of rural residents. Therefore, this article selects the per capital disposable income of rural residents from 2014 to 2018 as a factor to measure the income level of rural residents.

Core explanatory variables. The development level of digital inclusive finance (IFI) is measured by three dimensions: the comprehensive development index of digital inclusive finance, the coverage width of digital inclusive finance, and the depth of digital inclusive finance use. The authoritative data on the development level of digital inclusive finance currently comes from the 2014-2018 Peking University Digital Inclusive Finance Index released by the research group of the Peking University Digital Finance Research Center. This article uses this data as an explanatory variable to measure the development level of digital inclusive finance in various provinces, autonomous regions, and municipalities across the country.

Mediating variables. We use urbanization rate (UR) to measure the urbanization process in the Wuling Mountain area.

Control variables. Industrial Structure (IS), measured by the ratio of the total value of the secondary and tertiary industries to the annual GDP of the Wuling Mountain area, shows a significant correlation between the impacts of industrial structure on the income of rural residents. The more optimized the industrial structure, the faster the transfer of rural labor force. Employment level (QE). This indicator refers to relevant research and is measured by urban residents and employed workers. Education level (MS), measured by every ten thousand students enrolled in secondary schools, can significantly improve the quality of human resources in the region, thereby increasing the income level of rural residents. The fixed asset level (FA) and investment in infrastructure projects will promote local economic development, thereby further increasing the disposable income of urban and rural residents. The level of market development (CONSU) is represented by the total retail sales of social goods. The total retail sales of social goods refer to the total retail sales of wholesale and retail, accommodation and catering, and other industries directly sold to urban and rural residents and social groups. It is an important indicator reflecting the degree of economic prosperity and the level of retail market development, and therefore will have an impact on the income level of farmers to a certain extent. County financial development level (FIN) and fiscal expenditure (FE): The level of county financial development is measured by the ratio of financial deposit and loan balance to regional GDP. Research has shown that the synergistic development of county financial development level and fiscal expenditure level can effectively promote the increase of farmers' income, and the promotion effect gradually strengthens with the improvement of the synergy level of county financial intermediaries and fiscal expenditure. The level of hygiene and health is represented by the number of medical and health beds per 10000 people and the number of medical and health technical personnel (HB, HP) per 10000 people. A good level of hygiene and health can provide assurance for local healthcare, thereby ensuring the health level of local residents, and the accumulation of healthy human capita has an important contribution to the income growth of Chinese farmers. The level of regional industrial development (IA) is measured by the added value of industrial enterprises above designated size. The improvement of regional industrial development can significantly affect the improvement of local employment, per capita income, welfare provision, and other levels. Therefore, through industrial poverty alleviation, the problem of rural poverty can

 

also be effectively alleviated.

### 2.2 Benchmark Model Setting

According to the variable settings in this article, the income level of rural residents is used as the dependent variable, and the Digital Inclusive Finance Index (IFI) for 5 years in 71 counties in the Wuling Mountain area is used as the explanatory variable. The industrial structure (IS), employment level (QE), education level (MS), fixed asset level (FA), market development level (CONSU), county-level financial development level (FIN), fiscal expenditure (FE), and health level (HB, HP) are adjusted, The level of regional industrial development (IA) is used as a control variable in the model to improve the accuracy, objectivity, and comprehensiveness of empirical analysis. The basic model is as follows:

$$INCOME_{it} = \beta_0 + \beta_1 IFI + \beta_2 IS + \beta_3 QE + \beta_4 MS + \beta_5 FA + \beta_6 \text{CONSU} + \beta_7 FIN + \beta_8 FE + \beta_9 HB + \beta_{10} HP + \beta_{11} IA + \beta_{12} GDP + \varepsilon_{it} \quad (1)$$

Among them: i represents each county-level region, and t represents the year.

In order to eliminate heteroscedasticity in the data, this article performs logarithmic processing and tail reduction on some of the data. The modified model is:

$$LN_{INCOME_{it}} = \beta_0 + \beta_1 LN_{IFI} + \beta_2 IS + \beta_3 QE + \beta_4 LN_{MS} + \beta_5 LN_{FA} + \beta_6 LN_{\text{CONSU}} + \beta_7 LN_{FIN} + \beta_8 LN_{FE} + \beta_9 LN_{HB} + \beta_{10} LN_{HP} + \beta_{11} LN_{IA} + \beta_{12} LN\_GDP + \varepsilon_{it} \quad (2)$$

### 2.3 Overall Sample Analysis

The descriptive statistical analysis results for each variable in the overall sample are shown in Table 1. It can be seen that the average per capita disposable income in the Wuling Mountain area is 8695 yuan, but the highest income can reach 21184 yuan, while the lowest is only 4626 yuan, with a significant difference. After taking the logarithm, the difference in this value has been reduced; The Digital Inclusive Finance Development Index fluctuates between a minimum value of 17.85 and a maximum value of 113.3, with a mean of 87.52 and a standard deviation of 67.09; There are also significant differences in fiscal expenditures among county-level regions, with the highest reaching 12.25 billion yuan and the lowest only 155 million yuan; The urbanization rate fluctuates between 16% and 93%, with an average of only 42%. The overall level of urbanization is relatively low and there are significant differences between different regions. The other control variables have similar fluctuations in industrial structure, education level, county financial development level, number of employees, fixed assets investment level, health level, market development level and industrial development level. There is a significant gap between various indicators in different regions.

**Table 1. Descriptive Statistics for Each Variable**

| Variable Name | mean value | standard error | minimum value | median | Maximum value | sample size |
|---|---|---|---|---|---|---|
| per capita income | 8695 | 2152 | 4626 | 8494 | 21184 | 343 |
| Digital Inclusive Finance Composite Index | 78.38 | 25.02 | 17.85 | 87.52 | 113.3 | 343 |
| industrial structure | 0.921 | 0.657 | 0.151 | 0.754 | 4.593 | 343 |
| educational level | 600.0 | 210.0 | 209.8 | 554.1 | 1305 | 343 |
| Development level of county-level finance | 94.49 | 76.14 | 0.00600 | 73.79 | 504.9 | 343 |
| Urbanization rate | 42.11 | 11.21 | 16.04 | 40.03 | 93.23 | 343 |
| Employment numbers | 6.263 | 10.54 | 0.542 | 2.170 | 66.04 | 343 |
| Fixed assets investment level | 1145450 | 674750 | 155266 | 1000000 | 3612937 | 343 |
| Health and hygiene level (HB) | 56.36 | 23.33 | 16.43 | 51.19 | 185.5 | 343 |
| Health and hygiene level (HP) | 50.10 | 22.52 | 10.74 | 45.08 | 171.6 | 343 |
| Market development level | 48.51 | 35.73 | 4.603 | 39.16 | 218.6 | 343 |
| Fiscal expenditure | 319096 | 202539 | 15549 | 298068 | 1225363 | 343 |
| Industrial development level | 843748 | 746585 | 20163 | 599573 | 4233609 | 343 |

## 3. Empirical Analysis Process

### 3.1 Benchmark Regression Analysis

 

Due to the selection of panel data from 71 counties, districts, and cities in the Wuling Mountain area from 2014 to 2018, this panel data belongs to a short panel, and due to the missing values of individual variables, it also belongs to an unbalanced panel. According to the principles of econometrics, imbalanced panel data does not affect the intra group estimation of the dispersion form, therefore, the estimation of fixed effects models can still be carried out. For random effects models, a generalized dispersion transformation strategy is required, which is completed behind the scenes by relevant programs when using Stata software. Non equilibrium panel data also has no substantial impact on the estimation results. Therefore, in order to demonstrate the differences in estimation methods and the robustness of estimation, fixed effects and random effects are used simultaneously, and the most effective estimation model is ultimately selected based on the Hausman test. According to the Hausman test result, chi2 (12) = -0.25, a fixed effects model was chosen for multiple regression analysis.

### 3.2 Robustness Testing

In order to avoid endogeneity issues and measurement errors that may lead to inaccurate conclusions, the results of the benchmark regression were tested from three dimensions: the comprehensive index of digital inclusive finance, the breadth of digital inclusive finance coverage, and the depth of use. The robustness results are shown in Table 2.

**Table 2. Robustness Test**

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | ln_income | ln_income | ln_income |
| ln_LNDIFI | 0.184*** | | |
| | (0.0285) | | |
| ln_LCB | | 0.108*** | |
| | | (0.0130) | |
| ln_LUD | | | 0.0637** |
| | | | (0.0152) |
| IS | 0.0869*** | 0.0907*** | 0.0866*** |
| | (0.00666) | (0.00804) | (0.00698) |
| QE | 0.00233*** | 0.00225*** | 0.00313** |
| | (0.000440) | (0.000454) | (0.000705) |
| ln_MS | 0.0124 | 0.00813 | 0.0228* |
| | (0.00821) | (0.00775) | (0.0105) |
| ln_FA | 0.0398** | 0.0401** | 0.0374** |
| | (0.0101) | (0.00931) | (0.0105) |
| ln_CONSU | -0.0415* | -0.0345* | -0.0415** |
| | (0.0152) | (0.0142) | (0.0149) |
| ln_FIN | 0.0158** | 0.0151** | 0.0150*** |
| | (0.00351) | (0.00378) | (0.00322) |
| ln_FE | -0.00961 | -0.00831 | -0.0128 |
| | (0.0215) | (0.0212) | (0.0230) |
| ln_HB | -0.0760** | -0.0798** | -0.0661*** |
| | (0.0170) | (0.0182) | (0.0136) |
| ln_HP | 0.0713** | 0.0755** | 0.0768** |
| | (0.0219) | (0.0228) | (0.0230) |
| ln_IA | 0.00904 | 0.00972 | 0.0105 |
| | (0.00922) | (0.00978) | (0.0105) |
| ln_GDP | 0.153*** | 0.149*** | 0.149*** |
| | (0.0160) | (0.0148) | (0.0139) |
| Constant | 5.518*** | 5.882*** | 6.001*** |
| | (0.226) | (0.242) | (0.248) |
| Observations | 343 | 343 | 343 |

 

| | | | |
|---|---|---|---|
| R-squared | 0.336 | 0.337 | 0.322 |
| Numberofyear | 5 | 5 | 5 |

Note: Robust standard errors in parentheses; ***p<0.01,**p<0.05,*p<0.1

From column 1, it can be seen that digital inclusive finance has a promoting effect on the income of farmers. Moreover, the adjustment of the secondary and tertiary industries can further improve the income of rural residents, and the employment level and fixed assets investment level are also positively correlated. The impact of local government fiscal expenditure and industrial development level on the income of rural residents is minimal. According to previous research, digital inclusive finance relies on traditional finance. Although the two have different forms, they both have a consistent financial core. Due to the multiple complementary relationships between the two, the development of traditional finance will also have a promoting effect on farmers' income. From the table, it can be seen that although the development level of county-level finance in the Wuling Mountain area has a significant promoting effect on increasing farmers' income, there is only a promotion coefficient in the thousandth percentile, indicating that although the local county-level finance has shown a promoting effect on farmers' income, there is still significant development space. The two indicators representing the level of health and hygiene have shown positive and negative significance in the regression, respectively, Two indicators represent different aspects of health and hygiene levels, with HP representing every ten thousand healthcare professionals. The results indicate that HP has a significant positive promoting effect on rural residents' income, consistent with the hypothesis of this article. HB represents the number of healthcare beds per ten thousand people. The results indicate that HB has a negative and significant relationship with residents' income, as healthcare beds are usually positively correlated with the number of critically ill patients in the local area, Therefore, the higher the HB level, the lower the regional health and hygiene level.

Further robustness tests were conducted on the impact of the Comprehensive Index of Digital Inclusive Finance on the per capita income of residents in the Wuling Mountain area, as shown in columns 2 and 3. It was found that the development of digital inclusive finance still has a promoting effect on farmers' income in terms of coverage breadth and usage depth, and is significant at the 1% level.

In order to avoid bias in the regression results due to multicollinearity and endogeneity, multicollinearity tests were conducted on the above variables. The test results showed that the maximum value of the variance inflation factor for all variables was less than 10 and the mean of the variance inflation factor was 2.11. The multicollinearity test was passed, and therefore the results showed reliability.

### 3.3 Heterogeneity Analysis

It should be pointed out that the ways in which fiscal expenditure affects the income of rural residents are mainly composed of factors from non-agricultural and agricultural income channels. Previous studies have shown that all factors that affect the ways in which farmers increase their income directly or indirectly depend on the role of finance and finance [13]. Based on this, in order to further investigate whether there is heterogeneity in the impact of digital inclusive finance on the income of rural residents in areas with fiscal expenditure dependence, we will use the median of fiscal expenditure as the boundary. Areas with fiscal expenditure levels above the median are areas with higher fiscal dependence, while areas with lower fiscal dependence are those with lower fiscal dependence. We will conduct group regression on these areas, and the results are shown in Table 3.

According to the Fisher combination test, the difference in regression results between the two groups is significant within the range of 10%, indicating a significant difference in regression between the two groups. County level financial expenditure investing in county-level infrastructure projects can generate a large demand for farmers, create more employment opportunities, and drive farmers to participate in infrastructure construction; In addition, supporting agricultural expenditures will have a positive promoting effect on agricultural production and operation, effectively improving the investment environment for agricultural

 

production, and increasing the output input ratio while keeping the input of production factors unchanged, thereby increasing household operating income. It can be seen that the development of digital inclusive finance in regions with higher financial dependence has less significant effect on promoting the income level of rural residents, but the industrial structure and fixed assets investment can significantly promote the income of rural residents compared with regions with lower financial dependence; Digital inclusive finance can demonstrate a more significant effect in promoting income growth for farmers in regions with lower fiscal dependence.

**Table 3 Heterogeneity Analysis Results**

| | High fiscal dependency areas | Low fiscal dependency areas |
|---|---|---|
| VARIABLES | ln_income | ln_income |
| ln_LNDIFI | 0.002 | 0.349*** |
| | (0.03) | (3.82) |
| IS | 0.165*** | 0.099*** |
| | (3.09) | (5.21) |
| QE | 0.001 | 0.004* |
| | (0.92) | (1.78) |
| ln_MS | -0.047 | 0.082* |
| | (-1.18) | (1.81) |
| ln_FA | 0.061** | 0.018 |
| | (1.99) | (0.70) |
| ln_CONSU | -0.083** | -0.036 |
| | (-2.23) | (-0.99) |
| ln_FIN | 0.014 | -0.018 |
| | (1.58) | (-0.46) |
| ln_HB | 0.030 | -0.196*** |
| | (0.54) | (-3.25) |
| ln_HP | 0.058 | 0.154** |
| | (0.91) | (2.50) |
| ln_IA | 0.008 | 0.014 |
| | (0.46) | (0.81) |
| ln_GDP | 0.121** | 0.217*** |
| | (2.01) | (3.36) |
| Constant | 6.568*** | 4.094*** |
| | (7.89) | (5.41) |
| Observations | 171 | 172 |
| R-squared | 0.284 | 0.500 |
| Numberofyear | 5 | 5 |

Note: t-statistics in parentheses; ***p<0.01,**p<0.05,*p<0.1

Through analysis, it is found that due to serious financial repression for a long time, the financial system of Wulingshan District is not perfect, and fiscal expenditure is mainly composed of agricultural and non-agricultural channels, while fiscal expenditure in regions with high financial dependence will be more inclined to industrial structure adjustment and fixed assets investment, indirectly promoting rural residents' income, while for regions with low financial dependence, the level of economic development is relatively higher, Therefore, fiscal policies are not particularly targeted towards the region, but residents are relatively wealthier, and digital inclusive finance is more easily integrated into local industrial development, which can better promote farmers' income growth. This is consistent with existing research findings (Liu Luo, 2021).

From the table, we can also draw the following conclusions: 1. In regions with high financial dependence, industrial structure optimization, fixed assets investment level and economic growth can significantly promote the income level of local rural residents. This to some extent also reflects that in areas with higher levels of financial

 

support, government spending is more used for upgrading industrial structures and investing in fixed assets such as infrastructure. From this perspective, financial support has achieved the expected effect and can significantly increase farmers' income. 2. In areas with lower levels of fiscal dependence, employment and education levels have a significant promoting effect on the growth of farmers' income. This indicates that compared to areas with higher levels of fiscal support, the overall development level of the region is higher, and the effect of digital inclusive finance on increasing farmers' income is more significant.

### 3.4 Mediation Effect

Referring to relevant research methods, we use urbanization rate to test the mediating effect between digital inclusive finance and household income. According to the mediation effect testing procedure, it can be divided into three steps: first, test the explanatory variable and the dependent variable; Secondly, test the explanatory variables and mediating variables; Thirdly, the explanatory variable, mediator variable, and dependent variable are simultaneously included in the model for testing. This article refers to relevant literature and further studies the role of urbanization in promoting income growth for rural residents through digital inclusive finance. The stepwise regression method was used to test the mediating effect, and the Sobel test showed that urbanization has a significant mediating effect. The mediation effect model is as follows:

$$LN_{INCOME_{it}} = \beta_0 + \beta_1 LN_{IFI} + \beta_2 IS + \beta_3 QE + \beta_4 LN_{MS} + \beta_5 LN_{FA} + \beta_6 LN_{\mathrm{CONSU}} + \beta_7 LN_{FIN} + \beta_8 LN_{FE} + \beta_9 LN_{HB} + \beta_{10} LN_{HP} + \beta_{11} LN_{IA} + \varepsilon_{it} \quad (3)$$

$$UR = \gamma_0 + \gamma_1 LN_{IFI} + \gamma_2 IS + \gamma_3 QE + \gamma_4 LN_{MS} + \gamma_5 LN_{FA} + \gamma_6 LN_{\mathrm{CONSU}} + \gamma_7 LN_{FIN} + \gamma_8 LN_{FE} + \gamma_9 LN_{HB} + \gamma_{10} LN_{HP} + \gamma_{11} LN\_IA + \mu_{it} \quad (4)$$

$$LN_{INCOME_{it}} = \eta_0 + \eta_1 UR + \eta_2 LN_{IFI} + \eta_3 IS + \eta_4 QE + \eta_5 LN_{MS} + \eta_6 LN_{FA} + \eta_7 LN_{\mathrm{CONSU}} + \eta_8 LN_{FIN} + \eta_9 LN_{FE} + \eta_{10} LN_{HB} + \eta_{11} LN_{HP} + \eta_{12} LN_{IA} + \sigma_{it} \quad (5)$$

Among them, UR is the urbanization rate.

To further verify whether the mechanism of promoting the income of farmers through digital inclusive finance exists, the mediating variable is used as the dependent variable to verify whether digital inclusive finance has a significant impact on the mediating variable.

Due to the significant coefficients of $\beta_1$、$\gamma_1$ and $\eta_1$ in the mediation effect model in columns (1) to (3) of Table 4, the mediation effect exists, and its magnitude is 0.05 (obtained by multiplying the coefficient of ln_LNDIFI in column (2) with the coefficient of UR in column 3), accounting for approximately 16.9% of the total effect of digital inclusive finance on rural residents' income (obtained by dividing the mediation effect by the coefficient of ln_LNDIFI in column (1) of Table 4).This result indicates the existence of a mechanism for improving the level of digital inclusive finance by promoting urbanization and increasing the income level of farmers, and this mechanism can explain the overall impact of digital inclusive finance on the increase of farmers' income. Compared to the regression model without mediating variables, the estimated coefficient of digital inclusive finance increased in the model with urbanization variables added.

The digital inclusive finance of urbanization has a significant effect on promoting the development of urbanization and increasing the income of rural residents. According to survey results, with the improvement of urbanization level, the per capita disposable income of rural residents also increases. The improvement of urbanization level can significantly promote the progress of agricultural technology, the adjustment of agricultural industrial structure, and the accumulation of agricultural human capital to promote the income of farmers. The improvement of urbanization level also requires the increase of fiscal expenditure on agricultural assistance and the deepening of county-level financial development. The development of digital inclusive finance can effectively promote the coordinated development of county-level finance and fiscal expenditure, strengthen financial infrastructure construction, and lay the foundation for urbanization development.

Digital inclusive finance has a significant effect on promoting the development of

 

urbanization and increasing the income of rural residents. Research results have shown that with the increase of urbanization level, the per capita disposable income of rural residents also increases. The improvement of urbanization level can significantly promote the progress of agricultural technology, the adjustment of agricultural industry structure, and the accumulation of agricultural human capital to promote the income of farmers. The improvement of urbanization level also requires the increase of fiscal expenditure on agricultural assistance and the deepening of county-level financial development. The development of digital inclusive finance can effectively promote the coordinated development of county-level finance and fiscal expenditure, strengthen financial infrastructure construction, and lay the foundation for urbanization development.

**Table 4. Regression Results of Urbanization Mediation Effect**

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | ln_income | UR | ln_income |
| | | | |
| UR | | | 0.00960*** |
| | | | (0.000957) |
| ln_LNDIFI | 0.296*** | 5.209*** | 0.246*** |
| | (0.0230) | (1.158) | (0.0207) |
| IS | 0.0902*** | 8.191*** | 0.0116 |
| | (0.0177) | (0.894) | (0.0174) |
| QE | 0.00153 | 0.148*** | 0.000118 |
| | (0.000979) | (0.0494) | (0.000870) |
| ln_MS | -0.00597 | 14.51*** | -0.145*** |
| | (0.0309) | (1.557) | (0.0304) |
| ln_FA | 0.0497** | -3.868*** | 0.0868*** |
| | (0.0204) | (1.027) | (0.0182) |
| ln_CONSU | -0.0449 | -2.152 | -0.0242 |
| | (0.0282) | (1.421) | (0.0248) |
| ln_FIN | 0.0195** | 0.707 | 0.0127 |
| | (0.00930) | (0.469) | (0.00818) |
| ln_FE | -0.00703 | -1.777*** | 0.0100 |
| | (0.0131) | (0.660) | (0.0116) |
| ln_HB | -0.0775* | -0.593 | -0.0718* |
| | (0.0432) | (2.177) | (0.0378) |
| ln_HP | 0.0713 | 3.952* | 0.0333 |
| | (0.0475) | (2.396) | (0.0418) |
| ln_IA | 0.00384 | -1.742*** | 0.0206* |
| | (0.0127) | (0.640) | (0.0112) |
| ln_GDP | 0.162*** | 13.40*** | 0.0336 |
| | (0.0435) | (2.194) | (0.0402) |
| Constant | 4.929*** | -175.7*** | 6.615*** |
| | (0.471) | (23.76) | (0.446) |
| | | | |
| Observations | 343 | 343 | 343 |
| Number of year | 5 | 5 | 5 |

Note: Standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1.

From the empirical analysis results, it can be seen that digital inclusive finance has a significant promoting effect on improving the income level of rural residents, indicating that the development of digital inclusive finance in rural areas has positive practical significance. Applying digital technology to financial services significantly reduces the marginal cost of financial services, which has a significant promoting effect on commercial banks providing financial services to remote rural areas. At the same time, the construction

 

of a credit reporting system based on big data has greatly reduced the cost of credit reporting, enhanced the willingness of the financial service industry to provide financial services to rural areas, and helped alleviate the current gap in rural lending supply. This has made it easier for rural residents to borrow, better meeting their production and living needs, and has a positive effect on promoting the increase of rural residents' income.

The impact of fiscal expenditure on the income of rural residents in the Wuling Mountain area shows a reverse relationship, which is contrary to the results of relevant research. This indicates that fiscal expenditure has regional heterogeneity in the income of rural residents. The main reason is that there are also significant income differences among residents in the Wuling Mountain area. As the level of fiscal expenditure increases, the growth effect of rural residents' income will depend more on fiscal expenditure, which makes the combination level of digital inclusive finance and local development not high. However, with the development of the local economy, this regional heterogeneity effect will gradually weaken. At the same time, some scholars have proposed that the optimization of fiscal expenditure structure will also have a positive impact on the income of farmers, but due to space limitations, it has not been further verified in this article.

## 4. Conclusion and Policy Recommendations

With the development of traditional finance and digital internet, the integration of the two has created huge development advantages. In recent years, digital inclusive finance has changed the development mode of most regions in China along with the changes in traditional payment methods. Based on this change, this article uses panel data from 71 counties and cities in the Wuling Mountain area from 2014 to 2018 to study the impact of digital inclusive finance on the income growth of farmers in county-level areas of the Wuling Mountain area in China, and tests heterogeneity and impact mechanisms.

This article finds that firstly, digital inclusive finance can effectively promote the income level of farmers in the Wuling Mountain area. After considering endogeneity issues caused by measurement errors, omitted variables, and bidirectional causality, as well as other statistical biases such as sampling errors, standard error clustering bias, and model setting bias, this core conclusion remains very robust. Secondly, from the results of heterogeneity analysis, it can be seen that digital inclusive finance has a more significant impact on the income of rural residents in non fiscal dependent areas. The possible reason is that the economic development level in non fiscal dependent areas is relatively good, and the employment and education levels in these areas are relatively high compared to fiscal dependent areas. At the same time, fiscal expenditure can have a good synergistic effect with digital inclusive finance. Thirdly, from the perspective of the impact mechanism, the promotion effect of digital inclusive finance on the income increase of farmers in the Wuling Mountain area can be divided into two channels: direct and indirect. The indirect channel mainly integrates digital finance with local urbanization development by promoting the increase of urbanization rate, thereby indirectly increasing the income of rural residents. This study advances the understanding of the economic effects of the Internet and also has important policy implications. Firstly, local governments at the county level should strengthen the integration of traditional finance and digital inclusive finance, expand the coverage of digital finance, and ensure that relatively impoverished areas are fully covered by digital finance, which is conducive to comprehensively improving the financial literacy of rural residents. Secondly, fiscal expenditure dependent regions should enhance education incentives and stimulate employment, drive economic growth through employment, cultivate local pillar industries, and provide guarantees for the role of digital inclusive finance. Thirdly, strengthening urban infrastructure construction, improving the comprehensive quality of residents, deepening the development of county-level areas through multiple channels, thereby increasing urbanization rates, and deepening the effect of digital inclusive finance in promoting rural residents' income growth through indirect channels.

## References

[1] He H Q. Digital Finance Propelling

 

Integrated Development of Rural Industries Dilemma Reflection and Road Exploration. Journal of Northwest A&F University (Social Science Edition), 2020, 20(03):118-125.

[2] Yang W M, Su L, Wang M W. Digital Financial Inclusion and Income of Urban and Rural Residents: Based on the Intermediary Effect of Economic Growth and Entrepreneurial Behavior. Journal of Shanghai University of Finance and Economics, 2020, 22(04):83-94.

[3] He Y Q, Wang M C Li Y Q Li J X. Residents' Income Growth ls the Digitization of inclusive Finance a "Digital Dividend": From the Perspective of Rural. South China Finance, 2020, 22(04):83-94.

[4] Zhang L. Residents' Income Growth Digital Inclusive Finance, County Industrial Upgrading With Farmers' Income Growth. Research on Financial and Economic Issues, 2021(06):51-59.

[5] Zhang H. The impact of Digital Financial inclusion on the Economic Growth of Western China against the Background of Comprehensively Promoting Rural Revitalization. Journal of Yunnan Minzu University (Philosophy and Social Sciences Edition), 2021(06): 51-59.

[6] Wang Y Z. The Effect of Digital Inclusive Finance on the Urban-rural income Gap: Taking the Yangtze River Delta of China as an Example. Journal of Shanxi University (Philosophy and Social Science Edition), 2020, 43(06):118-126.

[7] Zhang Y X. Can Digital Inclusive Finance Promote the Output of Chinese Regional Innovation? An Empirica Study Based on China's Provincial Panel Data. On Economic Problems, 2020(10): 53-61.

[8] Hua D C, Li P C, Jin R. The Effect of the Rural Financial Credit on the Income of Rural Residents. Forum on Science and Technology in China, 2015(04): 135-140.

[9] Hu Z Y Liu C Liu Y W. The Study on the Effect of Formal and Informal Rural Finance on the Income of Rural Residents: A Spatial Econometric Analysis Based on the Panel Data of 30 Provinces. Economic Geography, 2014, 34(12):147-152.

[10] Guo F, Kong S T, Wang J. General patterns and regional disparity of internet finance development in China: Evidence from the Peking University Internet Finance Development Index. China Economic Journal, 2016:1-19.

[11] Guo F, Wang J Y, Wang f, Cheng Z Y, Kong T, Zhang X. Measuring China's Digital Financial Inclusion: Index Compilation and Spatial Characteristics. China Economic Quarterly, 2020, 19(04):1401-1418.

[12] Yao Y J, SHI D Y. Dependence and Government Interference Exploring Regional Differences in Development of Internet Finance: Perspectives of Path. Journal of Financial Research, 2017(05):127-142.

[13] Liu L. A Study on the Financial-Fiscal Synergy Threshold Effect in the County Urbanization Process. Journal of Financial Development Research, 2021(9):7.

 