

Research on the impact of digital financial inclusion on rural revitalization

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Abstract: *The development of digital financial inclusion is an important measure to implement the rural revitalization. Based on the provincial panel data from 2011-2020, and on the basis of constructing the rural revitalization measurement system, this paper uses the entropy weight TOPSIS method to measure the development process of rural revitalization in each province, and empirically explores the relationship between digital financial inclusion and rural revitalization. We conclude that digital financial inclusion can significantly promote rural revitalization, and the positive effect is also significant in the three sub-dimensions (coverage breadth, depth of use, and degree of digital service support). Further, the robustness test results also confirm the reliability of the above conclusions. Therefore, at the current stage, we should vigorously promote the construction of digital financial inclusion to provide policy and tool support for the realization of rural revitalization.*

Keywords: *digital financial inclusion; rural revitalization; entropy weight TOPSIS*

1. Introduction

Urban and rural areas are an inseparable organic integration, but China's urban and rural areas presented two documents, two policies, the implementation of two skins for a long time leading to the division of urban and rural opposition of the dual structure system, which greatly restricted the quality of urban and rural development, resulting in inadequate agricultural and rural development, urban and rural development of the social reality of imbalance. Report of the 19th National Congress emphasized that "The issues of 'agriculture, farmer and rural area' are fundamental issues related to the national economy and people's livelihood, and solving the issues of 'agriculture, farmer and rural area' must always be the top priority of the whole work." The rural revitalization strategy, as the golden key to solving "agriculture, rural areas, farmers" issues, points out the direction for agricultural and rural modernization. At the same time, as a powerful driving force for promoting rural revitalization, finance can significantly drive more social funds into rural areas on the basis of preventing large-scale outflows of rural funds. And finance will promote the transformation and upgrading of rural industries and in-depth integrated development, which further lay a solid foundation for the comprehensive realization of common prosperity. Additionally, policy finance and public welfare finance have enhanced their assistance to poor rural areas by exerting a redistribution adjustment mechanism. In 2022, the "Implementation Opinions on Promoting the High-Quality Development of Financial Inclusion" required "Let digital financial products and services serve farmers more accurately and inclusively". The continuous increase of relevant policy support has strongly promoted and supported the continuous improvement of digital financial inclusion infrastructure and services, and continue to accelerate the popularization of digital financial inclusion to rural areas, furtherly, it can also increase the coverage, availability and satisfaction of rural financial services, which effectively promote the process of rural revitalization.

2. Literature review

2.1 The conception of rural revitalization

Since the rural revitalization strategy was proposed, many scholars have discussed and studied the connotation of rural revitalization development. On the one hand, regarding the construction of its indicator system, most scholars take the connotation of rural revitalization as the first-level indicator which includes "Prosperous industry, Livable ecology, Affluent life, Effective governance and Civilized rural customs". In terms of selecting the second-level and third-level indicators, each has its own

emphasis. For example, Wang Zhizhang et al. (2020) start from the perspective of poverty alleviation, they integrate the implementation paths of rural revitalization and poverty alleviation, and study the integrated development level of the two strategies^[1]. Tu Shuangshuang et al. (2020) focus on the level of economic and social development, and further identify the development trend of “economic-social-space” reconstruction in Guangxi Province^[2]. Jia Jin et al. (2018) summarize the theoretical structure of the target system of the rural revitalization strategy, and refine it into “six modernizations, four rates, three governance, three styles and three dimensions”, which further enrich the connotation of rural revitalization^[3].

2.2 The functions of digital financial inclusion

Digital financial inclusion mainly has three major functions. The first is the intermediary service function. Digital financial inclusion can move the offline business of traditional financial services to online. While expanding financial coverage, it can use the scale effect of digital technology to quickly gather financial resources and reduce the cost for the public to obtain financial services (Wang Yu et al., 2022)^[4]. The second is the resource allocation function. Digital financial inclusion can combine advanced and innovative digital technology to achieve information aggregation and data sharing, accurately match investors and financing parties, providing financial services to disadvantaged groups excluded by traditional financial institutions, and then guiding financial resources flow to infrastructure, small and medium-sized enterprises, “agriculture, rural areas, farmers” and other key areas and weak links in economic development (Zhu Liping et al., 2022)^[5]. The third is the risk diversification function. Digital financial inclusion has achieved technological advantages, monitoring advantages, matching advantages by using platform-based operations, big data risk control, and intelligent intervention. Furthermore, the combination of digital financial inclusion and policies, as well as insurance subsidies and other means, can largely effectively help enterprises and residents hedge various risks and alleviate their economic difficulties (Fan Meng and Dai Jinping, 2022)^[6].

2.3 Digital financial inclusion and rural revitalization

Numerous existing studies have confirmed that digital financial inclusion can promote rural revitalization. First, at the level of prosperous industry, digital financial inclusion can promote rural revitalization by promoting agricultural transformation and upgrading, increasing agricultural output and developing agricultural insurance (Zeng Xiaoyan and Qi Huaqing, 2020)^[7]. Second, at the level of livable ecology, digital financial inclusion can promote rural revitalization through ecological environment management and improvement of residents’ quality of life and happiness (Qian Xuesong and Yuan Zhengrong, 2022)^[8]. Third, at the level of affluent life, digital financial inclusion can further promote rural revitalization by promoting the construction of social trust and the accumulation of human capital (He Jing and Li Qinghai, 2019; Ren Biyun and Liu Jiabin, 2021)^[9-10]. Fourth, at the level of effective governance, digital financial inclusion can promote rural revitalization through the diversification of governance subjects, the quality of governance capabilities, and the legalization of governance methods (Wu Benjian et al., 2020)^[11]. Fifth, at the level of civilized rural customs, digital financial inclusion can promote rural revitalization by promoting the upgrading of consumption patterns and narrowing the gap between rich and poor areas (Yi Xingjian and Zhou Li, 2018; Yang Shaoxiong and Kong Rong, 2021)^[12-13].

3. Research design

3.1 Data source

This article sets the research sample as provincial digital financial inclusion and rural revitalization panel data. The digital financial inclusion index comes from the Digital Finance Research Center of Peking University. The rural revitalization measurement indicators and other macro variables come from the China Statistical Yearbook, China Rural Statistical Yearbook, China Economic Net and other statistical databases. The research span is 2011-2020.

3.2 Variable design

3.2.1 Explained variable: rural revitalization (rural)

In order to measure the level of rural revitalization in each region more comprehensively and

objectively, this article follows the basic requirements of “Prosperous industry, Livable ecology, Affluent life, Effective governance and Civilized rural customs”. With reference to Zhang Ting et al. (2018)^[14], the following rural revitalization measurement system was constructed, totally involving 5 first-level indicators and 17 second-level indicators. At the same time, in order to ensure the scientific and robustness of the evaluation results, this article combines the entropy weight method with the TOPSIS method, and further uses the entropy weight TOPSIS method to measure the degree of rural revitalization development in each region.

3.2.2 Explanatory variable: digital financial inclusion (*dif*)

Using the China Digital Finance Development Index released by the Digital Finance Research Center of Peking University. This indicator system involves the three dimensions of digital finance coverage breadth (*dif1*), usage depth (*dif2*), and digital support service level (*dif3*). The time span is 2011-2020, and this article uses the digital financial inclusion index at the provincial level.

3.2.3 Control variables

In order to eliminate the impact of endogeneity problems caused by omitted variables, this article selects the following control variables: economic development (*gdp*, per capita GDP), government intervention (*gov*, the proportion of agricultural, forestry and water affairs expenditures in fiscal expenditures), urbanization level (*urb*, the urbanization rate), foreign trade (*fore*, measured by the total foreign investment), industrial structure (*ind*, the proportion of the increase in the secondary industry in GDP).

3.3 Model design

Based on the above theoretical analysis, this article sets up the following econometric model to verify the promotion effect of Digital financial inclusion on rural revitalization, as seen in formula (1):

$$rural_{i,t} = \alpha_0 + \alpha_1 dif_{i,t} + \alpha CV_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

Among them, $rural_{i,t}$ represents the level of rural revitalization of province i in year t . $dif_{i,t}$ represents the level of digital financial inclusion of province i in year t . $CV_{i,t}$ represents the status of each control variable indicator of province i in year t . μ_i controls province fixed effects, δ_t controls year fixed effects, and $\varepsilon_{i,t}$ is a random disturbance term.

4. Empirical Analysis

4.1 Benchmark regression results

Table 1 reports the core test results of digital financial inclusion promoting rural revitalization. In the benchmark regression, this paper adopts a progressive regression strategy. Model (1) uses ordinary least squares regression. Model (2) controls province fixed effects. Model (3) adds control variables, and model (4) further controls province fixed effects and year fixed effects. It can be seen that the coefficients of digital financial inclusion are all positive and pass the 1% significance test. We use model (4) as the benchmark regression result. In an economic significance, for every 1 percentage point increase in the digital financial inclusion index, rural revitalization development will increase by 0.194 unit. It means that digital financial inclusion can significantly promote rural revitalization. From the analysis of the control variables, the increase in the level of urbanization has significantly inhibited the development of rural revitalization. The reason may be that the migration of labor force has caused the hollowing out of rural development. Besides, the increase in the proportion of the secondary industry has significantly promoted the development of rural revitalization, because it will effectively benefit rural infrastructure construction. While the impact of economic development level, government intervention level and foreign investment on rural revitalization is not significant.

Table 1: Digital financial inclusion and rural revitalization

	(1)	(2)	(3)	(4)
	<i>rural</i>	<i>rural</i>	<i>rural</i>	<i>rural</i>
<i>dif</i>	.197*** (.012)	.485*** (.014)	.424*** (.037)	.194*** (.022)
<i>gdp</i>			.036 (.025)	.03 (.031)

<i>gov</i>			.0001	-.037
			(.129)	(.062)
<i>urb</i>			.131***	-.565***
			(.031)	(.049)
<i>fore</i>			-.009***	-.001
			(.002)	(.003)
<i>ind</i>			-.01	.057**
			(.019)	(.029)
<i>cons</i>	-.144***	-.766***	-1.394***	1.633***
	(.028)	(.031)	(.203)	(.26)
<i>province</i>	<i>NO</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>year</i>	<i>NO</i>	<i>NO</i>	<i>NO</i>	<i>YES</i>
Observations	310	310	310	310
R-squared	.689	.791	.821	.986

(*, **, *** respectively indicate significant at the statistical level of 10%, 5%, and 1%. The standard error in parentheses. The table below is the same.)

4.2 Dimension regression results

Table 2: Dimension test

	(1)	(2)	(3)
	<i>rural</i>	<i>rural</i>	<i>rural</i>
<i>dif1</i>	.135***		
	(.034)		
<i>dif2</i>		.082***	
		(.013)	
<i>dif3</i>			.062***
			(.009)
<i>gdp</i>	.082**	.085***	.051
	(.033)	(.031)	(.032)
<i>gov</i>	.078	-.048	-.069
	(.069)	(.066)	(.065)
<i>urb</i>	-.74***	-.587***	-.574***
	(.051)	(.053)	(.052)
<i>fore</i>	.002	-.002	.0001
	(.003)	(.003)	(.003)
<i>ind</i>	.063**	.044	.076**
	(.032)	(.03)	(.03)
<i>cons</i>	1.845***	1.424***	1.59***
	(.292)	(.276)	(.27)
<i>province</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>year</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
Observations	310	310	310
R-squared	.983	.985	.985

As a comprehensive concept, digital financial inclusion covers different structural differences. In order to refine the analysis of the relationship between digital financial inclusion and rural revitalization, this article reduces the total indicator to three dimensions: breadth coverage, depth of use, and degree of digital support services, for further estimation and analysis. The estimation results are shown in columns (1) (2) (3) of Table 2. The regression coefficients of each sub-dimension of digital financial inclusion are all positive and significant at the 1% statistical level, which means that the breadth of coverage, depth of use, and degree of digital support services of digital financial inclusion have promoted the rural revitalization process.

4.3 Robustness test

In order to ensure the robustness of the benchmark regression results, this article uses the following method to test the relationship between digital financial inclusion and rural revitalization.

First, eliminate time panel data. The development of digital financial inclusion is closely related to the country's top-level design. The introduction of macro policies will effectively help the formation of new ecology, new models, and new tools for digital financial inclusion, thereby empowering rural revitalization. In the sample time series, there is an exogenous policy impact, that is, china elevated the

development of digital financial inclusion to a national strategic level for the first time in 2013. Accordingly, this article eliminates the sample data before 2013 (inclusive) and performs regression analysis on the remaining panel data. The estimation results are shown in column (1) of Table 3. It can be seen that the digital financial inclusion index still has a significant role in promoting rural revitalization after excluding part of the time panel data, which is consistent with the benchmark regression results, thus confirming the robustness of the conclusions.

Second, eliminate regional panel data. Considering differences in economic, technological development and other factors between provinces, they may lead to differences in the enabling effect of digital financial inclusion on rural revitalization. Therefore, this article further eliminates the data from the four more developed municipalities of Beijing, Shanghai, Tianjin and Chongqing and the five relatively backward autonomous regions of Nei Mongol, Tibet, Xinjiang, Guangxi, and Ningxia, and performs regression on the panel data of the remaining regions. The estimation results are shown in column (2) of Table 3. The results show that after excluding panel data from some regions, the digital financial inclusion coefficient and significance level have no significant changes from the benchmark regression results, confirming that the core conclusion is robust.

Table 3: Robustness test

	(1)	(2)
	<i>rural</i>	<i>rural</i>
<i>dif</i>	.167***	.192***
	(.021)	(.028)
<i>gdp</i>	.015	-.019
	(.038)	(.036)
<i>gov</i>	-.005	-.082
	(.062)	(.081)
<i>urb</i>	-.506***	-.337***
	(.067)	(.066)
<i>fore</i>	-.002	-.003
	(.003)	(.004)
<i>ind</i>	.031	.081**
	(.032)	(.039)
<i>cons</i>	1.702***	1.149***
	(.386)	(.283)
<i>province</i>	YES	YES
<i>year</i>	YES	YES
Observations	217	220
R-squared	.992	.983

5. Conclusion and Enlightenment

5.1 Conclusion

In response to the practical needs of promoting the rural revitalization strategy, this article empirically explores the specific effects of digital financial inclusion on rural revitalization based on the national provincial panel data from 2011 to 2020. This study came to the following conclusions. Firstly, digital financial inclusion can significantly promote rural revitalization. Secondly, under the sub-dimensional test, the coverage breadth, depth of use and digital popularity of digital finance all have the above-mentioned positive effects. Finally, the empirical results of robustness test also further prove the correctness of the conclusions.

5.2 Enlightenment

In future development, china should pay more attention to the construction and development of digital financial inclusion, adhere to the digital and informatization development strategy, accelerate the layout of the rural digital financial inclusion industry, broaden the breadth of coverage and depth of usage of digital financial inclusion, and further enhance the availability of digital financial inclusion for rural households. At the same time, it is also necessary to further promote the innovation of digital financial inclusion instruments, to improve farmers' financial satisfaction, and increase the empowering effect of digital financial inclusion on rural households and agricultural machinery enterprises in the fields of entrepreneurship, consumption, education, and financing.

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References

- [1] Wang Zhizhang, Yang Zhihong. *The integration of poverty alleviation and rural revitalization strategies in the western region-based on micro survey data of 1,143 households in 85 villages in 10 provinces [J]. Journal of Jishou University (Social Science Edition), 2020, 41(02):71 -81.*
- [2] Tu Shuangshuang, Zheng Yuhan, Long Hualou, Wan Shimeng, Liang Xiaoli, Wang Wei. *Rural development and reconstruction pattern characteristics and revitalization paths—taking Guangxi as an example [J]. Acta Geographica Sinica, 2020, 75(02):365 -381.*
- [3] Jia Jin, Li Xuefeng, Shen Yun. *Construction and empirical analysis of indicator system for rural revitalization strategy [J]. Financial Science, 2018(11):70-82.*
- [4] Wang Yu, Liu Siyu, Zhi Senrun. *The asymmetric impact of digital inclusive financial threshold on technological innovation from a functional perspective [J]. Research and Development Management, 2022, 34 (06): 92-105.*
- [5] Zhu Liping, Yang Xubiao, Li Cheng. *Digital finance boosts the prosperity of rural industries [J]. Macroeconomic Management, 2022 (08): 42-49.*
- [6] Fan Meng, Dai Jinping. *Aging and household financial vulnerability—Research on coping paths empowered by digital finance [J]. Modern Finance and Economics (Journal of Tianjin University of Finance and Economics), 2022, 42 (11): 63-79.*
- [7] Zeng Xiaoyan, Qi Huaqing. *The impact mechanism and structural effect of digital financial development on agricultural output [J]. Guizhou Social Sciences, 2020(11):162-168.*
- [8] Qian Xuesong, Yuan Zhengrong. *Digital financial inclusion, residents' life pressure and happiness [J]. Economic Jingwei, 2022, 39(01): 138-150.*
- [9] He Jing, Li Qinghai. *Digital financial use and rural household entrepreneurial behavior [J]. China Rural Economy, 2019(01):112-126.*
- [10] Ren Biyun, Liu Jiabin. *Development of Digital financial inclusion and improvement of regional innovation level - analysis based on the perspective of internal supply and external demand [J]. Journal of Southwest University for Nationalities (Humanities and Social Sciences Edition), 2021, 42(02): 99-111*
- [11] Wu Benjian, Luo Ling, Ma Yulian. *Digital financial inclusion and rural governance modernization: mechanisms, innovation models and challenges [J]. Rural Finance Research, 2020(04):3-9.*
- [12] Yi Xingjian, Zhou Li. *Does the development of Digital financial inclusion significantly affect residents' consumption - microscopic evidence from Chinese households [J]. Financial Research, 2018(11):47-67.*
- [13] Yang Shaoxiong, Kong Rong. *Has digital financial market participation improved farmers' income? [J]. Journal of Huazhong Agricultural University (Social Science Edition), 2021, (05): 180-190+200.*
- [14] Zhang Ting, Xu Yanmei, Li Hexin. *Research on the evaluation of rural construction effectiveness and the internal influence mechanism of indicators [J]. China Population, Resources and Environment, 2018, 28(11): 37-46.*