

Study on the Empowerment of Rural Revitalization through Inclusive Finance under the Digital Normal

Yi Zhang^{1, a}, Lina Xiao², Yangqing He¹, Zhiyuan Yu³, Zejiong Zhou^{3, b, *}

¹School of Finance, Anhui University of Finance and Economics, Bengbu, Anhui, 233030, China

²School of Accountancy, Anhui University of Finance and Economics, Bengbu, Anhui, 233030, China

³School of Economics, Anhui University of Finance and Economics, Bengbu, Anhui, 233030, China

^a940037124@qq.com, ^{b, *}aczzj123456@163.com

Abstract

Under the digital normal, inclusive finance has a promoting effect on rural revitalization and development. In order to study the rural revitalization enabled by inclusive finance under the digital normal, this paper selects the relevant data of 30 provinces, cities and autonomous regions except Tibet from 2011-2021, calculates the rural revitalization index through the entropy method, and conducts descriptive statistical analysis, correlation analysis, regression analysis Unit root test and robustness test are used to study the empowerment of digital inclusive finance on rural revitalization. The results indicate that: (1) the overall level of rural revitalization in China is on an upward trend year by year; (2) Digital inclusive finance has a significant promoting effect on rural revitalization; (3) The level of cultural education and financial expenditure have a promoting effect on the level of rural revitalization.

Keywords

Digital Inclusive Finance; Rural Revitalization; Entropy Method.

1. Introduction

For a long time, China's rural inclusive financial system has been weak, and the development of rural industries has been subject to a certain degree of "financial repression". Financial resources are constantly shifting to cities, and their development needs cannot be fully met. The effective supply of capital, as an important factor of production, has a significant impact on the accumulation of rural capital. Although the current situation continues to improve, the problems of effective regulatory constraints, financial risk prevention and control, overcoming financial exclusion, reducing transaction costs, and commercial sustainability in rural areas are still prominent. The main sticking point is the high cost of providing rural financial services, low efficiency of financial services, and insufficient motivation for market-oriented financial institutions to carry out financial activities. The report of the 19th National Congress of the Communist Party of China elevated rural revitalization to a strategic height for the first time, emphasizing that the "three rural" issues are fundamental issues related to the national economy and people's livelihood. We must always prioritize the handling of the "three rural" issues as the top priority of the entire Party's work, and adhere to the unwavering and unwavering principles of the "three rural" issues. Rural revitalization is a powerful measure to undertake poverty alleviation and promote high-quality socio-economic development.

In February 2022, Xi Jinping pointed out at the 24th meeting of the Central Deep Reform Commission that we must always adhere to the development concept of putting the people at

the center, and promote the construction of a highly competitive and adaptable inclusive financial system in the financial field. Rural revitalization is facing new opportunities and challenges, and inclusive finance helps to consolidate the achievements of poverty alleviation and effectively connect with rural revitalization, promoting rural revitalization to enter a new stage. Chinese path to modernization emphasizes the economic equality of all people, and adheres to the principle that the fruits of development and reform should be shared by all people. At present, China's poverty alleviation campaign has achieved comprehensive victory, and the 14th Five Year Plan has entered a year of connecting the past and the future.

Inclusive finance adheres to the service tenet of putting the people at the center, and benefits the people more fairly. It is also a responsibility to focus on customer groups that traditional financial institutions cannot serve, and provide high-quality and accessible financial services to different sectors, especially low-income groups and underdeveloped areas. Thanks to the development of digital technologies such as big data, blockchain, and cloud computing, the financial field has integrated digital technology with financial technology, and various fields of society have been greatly impacted. As a new form of business, digital inclusive finance is a system innovation, service innovation, and product innovation within the financial system. On the one hand, it greatly reduces the spatial and temporal limitations of traditional inclusive finance. Due to its low marginal cost, financial exclusion, and unique technological attributes, it helps rural areas achieve efficient resource flow and overcomes the limitations of traditional inclusive finance relying on physical network expansion, This has brought an opportunity for the allocation of financial resources in rural areas. On the other hand, it has expanded the field of financial services and provided more financial support and financing channels for behavioral entities. Digital inclusive finance promotes the unity of efficiency and fairness.

With the development of rural agriculture in China entering a new stage, the trend of "precision, intelligence," and "digitization" is gradually becoming prominent, and digital inclusive finance has gained broader online demand and broader development space.

Rural revitalization is a comprehensive revitalization with the basic connotation of industrial prosperity, ecological livability, rural civilization, effective governance, and affluent life. Combining digital inclusive finance with rural revitalization is conducive to enriching the research theory of rural development with Chinese characteristics, utilizing the digitization and inclusiveness of digital inclusive finance, thereby reducing the cost of related financial services, avoiding financial exclusion and other rural development deficiencies, and providing precise services for them. At the same time, enriching the practical application of digital inclusive finance in rural revitalization and development has certain theoretical guidance significance for further understanding the impact path of digital inclusive finance on promoting the improvement of rural revitalization and development level. On the basis of previous research, this article conducts a systematic analysis of the relationship between the two, which helps to further enrich the relevant theoretical connotations.

Digital inclusive finance services for rural revitalization meet the requirements of current socio-economic development in rural China. Under the digital normal, inclusive finance has the function of bridging the "last mile", which is conducive to expanding the supply of financial services, significantly expanding the service scope of the financial industry, effectively reducing the cost of financial services, improving the coverage of financial services, strengthening the depth of financial use, and deepening the support of digital services, In order to improve the financial environment in rural areas and assist in the development of industrial prosperity and prosperity in rural revitalization. And it helps to enhance the financial accessibility of residents in poorer or remote areas, alleviate the financing difficulties faced by the financial long tail population, and to some extent, alleviate the threshold effect of financial exclusion. It helps residents achieve prosperity by obtaining corresponding funds. At the same time, developing digital inclusive finance has become an important way to narrow the urban-rural development

gap and promote inclusive economic growth. It can be seen that studying the impact of digital inclusive finance on rural revitalization has important practical significance.

2. Literature Review

2.1. Research on Digital Inclusive Financing

(1) The proposal of digital inclusive finance. Jiao Jinpu (2006) first proposed the concept of inclusive finance, believing that it is the optimization and upgrading of microcredit, with the characteristics of wide coverage and relatively fair services. Ding Jie (2015) conducted research from the perspective of dynamic development and deeply analyzed the essence of digital inclusive finance. He believed that digital inclusive finance can benefit a wider range of major financial needs, which is clearly reflected in the isolation of rural long tail groups from the traditional financial system.

(2) Digital inclusive finance and digital technology innovation. Xiao and Sun Xiaojiao (2023), based on panel data from 31 provinces and cities, believe that digital inclusive finance can promote enterprise technological innovation by establishing a fixed effect analysis model, and the development of regional digital inclusive finance will promote regional digital technological innovation. Kang Weiguo, Li Zijun et al. (2022) believe that digital inclusive finance mainly promotes technological innovation of growth enterprises by relaxing financing constraints, and its impact on technological innovation is asymmetric, with different numerical ranges having different impacts on technological innovation. Yang Jun, Xiao Mingyue, et al. (2021) found that establishing a connection between survey data of Chinese small and medium-sized enterprises and digital inclusive financing data can more promote technological innovation of enterprises than exploring the depth of services and improving the digital inclusive financing rate.

(3) The importance and advantages of digital inclusive financing. Liu Xin and Han Qing (2023) established various analytical models based on panel data from various counties in China from 2014-2020. The results indicate that digital inclusive finance can promote county economic growth. With the improvement of the development level of digital inclusive finance, the consumption gap between urban and rural residents has significantly narrowed, and the development of digital inclusive finance has effectively promoted rural revitalization. Zeng Jianzhong and Li Yin (2023), based on spatial panel data from over 1500 county-level samples in China from 2014 to 2021, confirmed that the development of digital inclusive finance plays an important and positive role in promoting the transformation and upgrading of rural industries. Li Youshu et al. (2022) used a spatial plate model and used 269 prefecture level cities in China as research samples, indicating that digital inclusive finance can generate spatial spillover effects on industrial structure, and its impact on the eastern region is significantly higher than that of the central and western regions. Zhang Qingjun and Huang Ling (2021) used panel data from 80 prefecture level cities in 6 provinces in central China from 2011 to 2018 as research samples and found that the development of digital inclusive finance can significantly promote the adjustment of rural industrial structure .

2.2. Research on Rural Revitalization

(1) The definition and connotation of rural revitalization. Liao Cairong and Chen Meiqiu (2017) conducted in-depth analysis and explanation of the concept of rural revitalization from different dimensions such as time and space. Ma Yihua and Zeng Hongping (2018) discussed in detail the connotation and value of current rural revitalization in China, believing that its five development sub goals are the starting point and foundation of rural revitalization strategy. Zhang Tingting (2021) believes that coordinated development is the starting point of rural revitalization, which is of great significance for building a modern economic system and comprehensively building a moderately prosperous society. Ye Xingqing (2018) takes the

theory of national modernization as a breakthrough point and believes that comprehensively promoting rural revitalization can effectively solve the problem of urban-rural development imbalance. Wang Shanshan, Duan Juanjuan, and Wei Yao (2021) studied the relationship between rural revitalization and farmers' happiness using an orderly estimation method. Research has shown that the higher the level of rural revitalization, the higher the level of happiness of farmers, and this impact has regional heterogeneity. Sun Mingfu and Tong Wu (2022) elaborated on the theoretical basis and profound connotation of rural revitalization, and elaborated on the important strategic position and significance of promoting comprehensive rural revitalization. Sun Mingfu and Wu Tong (2022) elaborated on the theoretical basis and profound connotation of rural revitalization, and elaborated on the important strategic position and significance of promoting comprehensive rural revitalization.

(2) Measurement of the indicator system for rural revitalization. Chen Yangfen, Zhang Ting, et al. (2018) established an evaluation index system for rural revitalization using the entropy method and found significant regional differences. Yan Zhoufu and Wu Fangwei (2019) quantitatively measured the level of rural revitalization through principal component analysis based on the overall requirements of rural areas. Starting from the dimensions of the five subsystems of rural revitalization, Lv Chengchao and Cui Yue (2021) first established an evaluation system of rural revitalization indicators that includes 45 specific indicators. Then, they used the entropy method to systematically measure the level of rural revitalization in 30 provinces, cities, and autonomous regions from 2010 to 2018, and found that the level of rural revitalization in each province showed a significant upward trend. Zhou Miaomiao and Liao Heping (2022) constructed a comprehensive indicator system for rural revitalization from the perspectives of culture, industry, ecology, talent, and organizational revitalization. They measured the rural development level of 194 administrative villages in Chongqing using the entropy weight method and found that the rural revitalization level has a significant spatial spillover effect. Xu Xue and Wang Yongyu (2022) used entropy method to calculate the total index of rural revitalization and five sub standard indicators based on relevant data from 2011 to 2019. Research has found that the overall level of rural revitalization in China is showing a steady upward trend.

(3) The Motivation and Significance of Rural Revitalization. Tang Renwu and Xu Chutong (2022) studied the theoretical basis, internal logic, and implementation mode of rural revitalization to help achieve common prosperity, and found that rural revitalization is an important prerequisite for achieving the goal of common prosperity. Wang Zhizhang and Yang Zhihong (2020) used the western region as a research sample to systematically analyze the mutual promotion between poverty alleviation, difficulty solving, and rural revitalization. They measured the degree of integration between the two through the Analytic Hierarchy Process and Grey Correlation Analysis. The results showed that the integration of poverty alleviation and rural revitalization was relatively low. Wang Yongsheng, Wen Qi, and Liu Yansui (2020) believe that rural poverty alleviation and rural revitalization have the same goals and themes, and can promote each other. Li Ninghui and Long Hualou (2022) believe that poverty alleviation difficulties can solve the forefront and bottom line problems of rural revitalization.

2.3. Research on the Impact of Digital Inclusive Financing on Rural Revitalization

(1) The Application of Digital Inclusive Finance in Rural Financial Services. Yang Lin (2019) proposed a financial development model of "inclusive+technology+green", indicating that the combined effect of this model can effectively improve the level of rural revitalization. Peng Yanbin (2020) used a qualitative analysis method to explore the mechanism by which the development of digital inclusive finance affects rural revitalization from a theoretical mechanism level. He systematically analyzed its current development status and difficulties,

and proposed relevant countermeasures based on this. Chen Yajun (2022) applied a spatial model and confirmed the impact of digital inclusive finance on the level of rural revitalization in China using provincial data from 2011 to 2018. He found that the development of digital HP finance can significantly promote the improvement of rural revitalization in China. Luan Xiaofei (2021) used the DEA-Tobit model to empirically analyze panel data from 10 rural revitalization demonstration counties in Guizhou Province, and found that the development of digital inclusive financing can significantly promote the level of rural revitalization. Xie Di and Su Bo (2021) used provincial panel data from 2011 to 2018 to verify the specific impact of digital inclusive financing development on the level of rural revitalization in China, and concluded that the development of digital inclusive financing has a regional heterogeneity impact on rural revitalization. Xiong Zhengde (2021) studied the relationship between provinces in China from 2005 to 2017 based on relevant data. The results indicate that digital inclusive finance can promote the development of rural economy, culture, and ecology. He Jinling et al. (2022) used relevant data from various provinces in China from 2011 to 2018 as samples and used spatial models to study the impact of digital inclusive finance on the level of rural revitalization. The results showed that digital inclusive financing not only helps to improve the level of local rural revitalization, but also generates spillover effects, promoting the economic development of surrounding rural areas.

(2) Digital inclusive financing and rural revitalization and development mutually promote and connect with each other. Tan Yanzhi, Li Yunzhong, and Ye Chengfang (2021) obtained relevant data from 30 provinces, cities, and autonomous regions in China from 2011 to 2019. They used a connectivity coordination model to measure and study the connection between digital inclusive financing and rural revitalization. Research has shown that the combination and coordination of digital inclusive financing have a significant correlation with rural revitalization. Qi Siqi (2021) established an indicator system based on panel data from 31 provinces, cities, and autonomous regions in China from 2011 to 2018, and conducted empirical research using a combination coordination model. Research has found that there is a long-term stable equilibrium relationship between digital inclusive financing and rural revitalization and development, and the impact between the two is dynamic, interactive, and bidirectional. Xu Xirui and Wang Huashu (2022) measured the development level of digital inclusive finance and rural revitalization using relevant data from 30 provinces in China from 2011 to 2018, and conducted a combination coordination analysis. The results indicate that the degree of integration and coordination between the two is gradually improving, and the development status is constantly moving towards a higher level. The development status in the eastern region is high, while the development status in the western region is low.

(3) The Application of Digital Inclusive Financing in Promoting Rural Economic Development and Industrial Upgrading. Tang Qianqian and He Qizhi (2022) conducted empirical research on the threshold of digital inclusive financing, technological innovation, and industrial structure upgrading. The results indicate that there is a non-linear relationship between digital inclusive finance and industrial structure. With the improvement of technological innovation capabilities, digital inclusive financing plays a significant role in promoting industrial structure upgrading. The research by Lin Binghua and Chen Jingna (2022) shows that digital inclusive financing can increase revenue, improve enterprise innovation level, and promote industrial structure upgrading. Xiao Zhimin and Tan Yuanyuan (2022) analyzed the impact mechanism of digital inclusive financing on industrial structure upgrading from the perspective of enterprise innovation. The results indicate that enterprise innovation plays a mediating role in it, and this result is also very effective when considering the heterogeneity of domains.

2.4. Literature Evaluation

Scholars have achieved many research results in the field of digital inclusive finance, providing a rich theoretical basis for this study. However, some blind spots have also been found when organizing literature. The research on digital inclusive finance focuses on rural revitalization, economic development, industrial upgrading, and other aspects, but there is insufficient research on strengthening the revitalization of rural inclusive finance under normal digital conditions. Therefore, this article attempts to explore the impact and spatial effects of digital inclusive finance, using ordinary board models, sub regional regression, and spatial calculations to explore the impact of digital inclusive finance on rural revitalization, and to verify its impact effects from heterogeneity and robustness detection methods, providing theoretical guidance for digital inclusive finance to help rural revitalization in the new era.

3. The Mechanism of Inclusive Finance Empowering Rural Revitalization under the Digital Normal

3.1. The Direct Impact Mechanism of Digital Inclusive Finance on Rural Revitalization

3.1.1. Industrial Prosperity

Industrial prosperity is the foundation of rural revitalization. Industrial prosperity emphasizes the cultivation of new industries, formats, and models with local characteristics, the establishment of efficient industrial chain synergy models, the promotion of upstream and downstream industrial synergy development, and the realization of modernization and large-scale development of rural industries. In terms of industrial prosperity, the development of digital inclusive finance has alleviated the problem of difficult and expensive financing for rural residents or enterprises, reduced the difficulty of obtaining rural financial services, increased the coverage of financial services in rural areas, and thus improved the level of industrial prosperity. Specifically, the assistance of digital inclusive finance to the prosperity of the industry is mainly reflected in the following aspects. Firstly, compared to traditional finance, digital inclusive finance has broken through the temporal and spatial limitations of its branches, enabling financial services to effectively penetrate into rural areas, providing corresponding financial services for rural residents' entrepreneurship and industrial development, reducing financial transaction costs, providing low-cost credit funds for various business entities in rural areas, encouraging relevant entities to innovate and start businesses, and promoting the development of emerging industries, And it can promote the expansion of production and transformation and upgrading of existing industries, thereby improving the level of industrial prosperity in the region; Secondly, compared to traditional finance, digital inclusive finance can better utilize big data technology to understand the operational status of various business entities in rural areas, analyze their financial service needs, and combine relevant credit information to provide diversified and personalized financial services for their business development, promote industrial development, and optimize industrial production structure; Finally, digital inclusive finance can also greatly reduce the operational risks of rural business entities. As most rural enterprises are in the early stages of development and have weak ability to resist market risks, they can enhance their ability to resist risks through financial service products such as credit, mortgage, or insurance. Digital inclusive finance also provides corresponding production guarantees for rural business entities through diversified financial services and products, promoting industrial scale and high-quality development, and improving the modernization level of rural industries.

3.1.2. Ecological Livability

Ecological livability is the key to rural revitalization. Ecological livability refers to providing farmers with an ecological, production, and living environment that is suitable for their survival and development. A good ecological environment is the greatest advantage and precious wealth of rural areas. Firstly, digital inclusive finance can support the development of low-carbon environmental protection industries by increasing credit support or providing financing incentives, thereby driving the development of emerging green industries in rural areas and promoting the development of green industries; Secondly, digital inclusive finance can integrate the concept of green finance into financial services, combine finance with ecological protection, play the role of financial investment attraction, guide social capital to flow into resource conservation technology development and green industries, strengthen the environmental protection concept of rural business entities, and promote production technology innovation in industries such as "three highs and one surplus", gradually develop and apply green environmental protection technologies in production, Transform and upgrade to low-carbon and environmentally friendly industries to achieve green development of the industry; Finally, digital inclusive finance can also improve the efficiency of pollution control, increase the intensity of pollution control supervision, and promote the development of agricultural production towards greenery and sustainability through its advantages in digital technology. In summary, the development of digital inclusive finance can greatly promote the development of China's rural economy towards a green and high-quality direction, improve the ecological environment, and build ecologically livable rural areas.

3.1.3. Affluence in Life

Prosperity in life is fundamental to rural revitalization. Digital inclusive finance, through its big data and blockchain digital technologies, has improved the penetration and availability of financial services in rural areas. Through relatively low financial transaction costs, it provides financial support for rural business entities, supports the expansion of agricultural and related rural industries, optimizes industrial structure, and improves production efficiency, Digital inclusive finance can enhance the entrepreneurial enthusiasm of rural residents through market information sharing and reducing information asymmetry, thereby providing impetus for rural villagers to innovate and start businesses, develop the economy, and increase income. Secondly, digital inclusive finance can understand the financial needs and preferences of rural areas through big data technology, provide diverse and rich financial products and services, improve the efficiency of financial resource allocation in rural areas, and help rural residents optimize asset allocation. By expanding income channels and optimizing income structure through financial management, income levels can be improved, economic development in rural areas can be promoted, and poverty alleviation achievements can be consolidated, Narrowing the gap between urban and rural economic development and achieving common prosperity. Thirdly, digital inclusive finance, through its role in guiding capital flow, is conducive to improving capital allocation efficiency, promoting coordinated development among various industries, forming a complete and efficient industrial chain, promoting the integrated development of industries in rural areas, and thus forming new formats and development models. In summary, digital inclusive finance can directly promote the development of rural economy, effectively increase the income of rural residents, improve their quality of life, and promote the realization of common prosperity.

3.2. Indirect Impact Mechanism of Digital Inclusive Finance on Rural Revitalization

3.2.1. Rural Civilization

Rural civilization is the guarantee of rural revitalization. Firstly, excellent culture is the key to cultivating rural civilization, and the foundation of cultural development is economic

development. Digital inclusive finance, through its digital technology and inclusive financial services, effectively promotes the economic development of rural areas, laying a material foundation for cultural development. Through the dividends brought by digital inclusive finance, rural areas rapidly develop their economy, increase income levels, and improve quality of life, the increasing demand for spiritual civilization among rural residents will strengthen cultural construction in rural areas, create a good cultural atmosphere, improve the cultural literacy of rural residents, and cultivate a good rural atmosphere. Secondly, digital inclusive finance can integrate finance into social governance through information technology, continuously improve the credit information management system through big data networks, guide rural residents and relevant business entities to form an honest and trustworthy awareness through credit ratings, and create a good rural culture. Show the rural style. Finally, financial institutions can also cooperate with the government to expand financial education channels and content through digital technology, guide rural residents to enhance their understanding and application ability of digital financial products, cultivate residents' financial awareness, improve rural residents' financial literacy, and build a new era of new rural areas. In summary, digital inclusive finance can promote the construction of rural culture from multiple aspects, indirectly promoting the emergence of rural revitalization.

3.2.2. Effective Governance

Digital countryside is a strategic direction for rural revitalization and an important part of building a digital China. To achieve rural revitalization, the first step is to enhance rural governance capabilities. Efficient governance is the fundamental guarantee for achieving rural industrial development, rural civilization, ecological optimization, and abundant living. Digital inclusive finance organically combines digital technology with finance, which can promote the popularization of rural financial services while bringing advanced information technologies such as big data and the internet to rural areas, and providing technical support for digital rural governance. Due to the development of digital inclusive finance, financial institutions can deeply cooperate with basic autonomous organizations in rural areas, provide an information platform for the governance of autonomous organizations, promote the digitization, standardization, and convenience of village autonomy work, and improve the efficiency of village autonomy work. Secondly, digital inclusive finance utilizes technologies such as blockchain, big data, and artificial intelligence to build an open platform for rural autonomy, improve transparency in village affairs, and achieve sunshine village affairs. Finally, digital inclusive finance, due to its advantages in combining digitization and finance, can guide rural residents to form good moral character of honesty and trustworthiness by constructing a credit rating system. While cultivating good village culture, it is conducive to promoting rural moral governance and improving the governance level of rural autonomous organizations.

4. Empirical Research

4.1. Calculation of Rural Revitalization Level

This section uses the entropy method to develop and calculate a set of indicator systems to measure the level of rural revitalization and development, laying a research foundation for the next in-depth analysis of the empowering role of inclusive finance in rural revitalization under the digital normal.

Based on relevant national policy documents and the relevant research achievements of previous scholars, this article draws on the research results of the "Rural Revitalization Strategic Plan (2018)" released by the government in 2018. Taking into account the scientific and available data, a rural revitalization level evaluation system is constructed from five indicators: industrial prosperity, ecological livability, rural civilization, effective governance,

and affluent living. Use entropy method to measure the level of rural revitalization in various provinces, cities, and autonomous regions.

This part of indicator construction data mainly comes from: China Statistical Yearbook, China Rural Statistical Yearbook, China Urban and Rural Construction Statistical Yearbook and China Education Statistical Yearbook. Considering the update speed of rural data and the scientificity and scientificity of the data, only relevant data from 2011 to 2021 are selected, and some missing data are filled with the moving average method.

The calculation results are as follows:

Table 1. Rural Revitalization Index of Each Province, City, and Autonomous Region

Rgion	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Beijing	0.32	0.29	0.31	0.30	0.36	0.39	0.38	0.38	0.45	0.43	0.43
Tianjin	0.26	0.28	0.30	0.31	0.34	0.37	0.36	0.36	0.41	0.32	0.35
Hebei	0.30	0.31	0.32	0.33	0.34	0.35	0.38	0.38	0.38	0.42	0.38
Shanxi	0.27	0.28	0.32	0.32	0.32	0.32	0.34	0.34	0.33	0.35	0.34
Inner Mongolia	0.25	0.27	0.30	0.31	0.32	0.33	0.40	0.40	0.38	0.44	0.45
Liaoning	0.23	0.25	0.28	0.28	0.29	0.30	0.32	0.33	0.32	0.34	0.32
Jilin	0.28	0.29	0.31	0.33	0.33	0.34	0.39	0.39	0.39	0.47	0.50
Heilongjiang	0.31	0.32	0.34	0.35	0.36	0.36	0.41	0.42	0.42	0.49	0.51
Shanghai	0.34	0.34	0.38	0.38	0.41	0.38	0.39	0.40	0.40	0.40	0.37
Jiangsu	0.36	0.38	0.39	0.40	0.40	0.39	0.44	0.43	0.42	0.46	0.49
Zhejiang	0.30	0.32	0.34	0.34	0.34	0.35	0.41	0.42	0.36	0.43	0.45
Anhui	0.23	0.24	0.28	0.29	0.30	0.31	0.34	0.35	0.34	0.38	0.40
Fujian	0.29	0.30	0.32	0.33	0.33	0.34	0.335	0.37	0.34	0.38	0.40
Jiangxi	0.25	0.27	0.28	0.29	0.29	0.31	0.35	0.36	0.34	0.37	0.38
Shandong	0.41	0.40	0.43	0.43	0.45	0.46	0.49	0.49	0.47	0.50	0.47
Henan	0.31	0.32	0.34	0.36	0.37	0.37	0.38	0.40	0.40	0.41	0.42
Hubei	0.25	0.26	0.29	0.30	0.31	0.31	0.36	0.36	0.34	0.38	0.36
Hunan	0.27	0.26	0.30	0.32	0.35	0.34	0.38	0.39	0.37	0.40	0.42
Guangdong	0.24	0.25	0.28	0.28	0.27	0.29	0.35	0.35	0.33	0.38	0.40
Guangxi	0.19	0.21	0.24	0.25	0.26	0.26	0.29	0.31	0.30	0.34	0.32
Hainan	0.22	0.24	0.28	0.28	0.28	0.27	0.32	0.33	0.29	0.32	0.35
Chongqing	0.21	0.22	0.24	0.24	0.24	0.25	0.28	0.29	0.28	0.28	0.31
Sichuan	0.29	0.30	0.31	0.32	0.33	0.33	0.37	0.38	0.36	0.36	0.38
Guizhou	0.17	0.19	0.21	0.22	0.24	0.24	0.28	0.31	0.30	0.34	0.34
Yunnan	0.16	0.16	0.19	0.21	0.22	0.23	0.28	0.29	0.27	0.32	0.34
Shaanxi	0.23	0.23	0.26	0.25	0.25	0.26	0.30	0.32	0.35	0.35	0.36
Gansu	0.19	0.20	0.23	0.22	0.23	0.24	0.27	0.29	0.28	0.32	0.33
Qinghai	0.14	0.16	0.16	0.17	0.17	0.16	0.17	0.21	0.22	0.21	0.24
Ningxia	0.19	0.20	0.23	0.24	0.25	0.25	0.29	0.30	0.29	0.29	0.33
Xinjiang	0.23	0.24	0.27	0.27	0.27	0.27	0.32	0.34	0.32	0.37	0.37

4.2. Sample Selection and Variable Selection

4.2.1. Sample Selection

This article selects the digital inclusive finance index of 30 provinces, cities, and autonomous regions except Tibet as the explanatory variable, as well as the rural revitalization index of each province, city, and autonomous region as the dependent variable. The data is sourced from the calculation of the Digital Finance Research Center of Peking University and the entropy method mentioned earlier.

4.2.2. Variable Selection

(1) Dependent variable. The rural revitalization index (Rural) of 30 provinces, cities and autonomous regions from 2011-2021 calculated above.

(2) Core explanatory variables. Digital Inclusive Finance Index (Dif). This data is measured using the Digital Inclusive Finance Index (Dif) released by the Peking University Data Research Center in August 2022. For the convenience of subsequent analysis, it has been reduced by a factor of one thousand.

(3) Control variables. Open level. The amount of foreign trade is a part of GDP and will affect the level of rural economic development. Fiscal expenditure level (Cov). The level of government financial expenditure reflects the construction of rural infrastructure. Education level (Edu). The level of cultural education reflects the supportive role of educational level in rural revitalization. Economic development level (Ed). This variable can most intuitively reflect the economic development situation of a certain region. Industrial structure (Indus). This indicator can reflect the degree of rationalization of regional industrial structure and the level of rural revitalization and development from the perspective of industrial structure optimization.

Table 2.Variable names and meanings

Variable type	Variable names	Variable meanings	Construction method
Dependent variable	RURAL	Rural revitalization index	Calculated by entropy method
Explanatory variable	DIF	Digital Inclusive Finance Index	Peking University Digital Inclusive Finance Index
	Breath	Coverage breadth	
	Depth	Use depth	
	Digit	Digitization level	
Control variable	Open	Level of opening up to the outside world	Total import and export volume/GDP
	Gov	Government expenditure level	Government general budget expenditure/GDP
	Edu	Cultural and educational level	Education expenditure
	Ed	Economic development level	Per capita GDP
	Indus	Industrial structure	Value added of the tertiary/secondary industry

4.3. Descriptive Statistics, Correlation Analysis, and Unit Root Test

4.3.1. Descriptive Statistics

Descriptive statistics of each variable in 30 provinces, cities and autonomous regions from 2011-2021 are as follows.

Table 3.Descriptive Statistical Results

Variable	Observations	Mean	S.D.	Max	Min
Rural revitalization index	300	0.31615	0.06903	0.49726	0.14002
Digital Inclusive Finance Index	300	0.21724	0.09696	0.43193	0.01833
Coverage breadth	300	1.9188	0.6413	3.3564	0.7545
Use depth	300	1.7415	0.5912	2.7239	0.5953
Digitization level	300	2.3455	0.6152	3.0584	0.8728
Extent of openness to the outside world	300	0.0291	0.0621	0.3617	0.0005
Fiscal expenditure level	300	0.2287	0.1774	1.9675	0.1202
Cultural and educational level	300	47.7426	16.3659	98.0932	18.8784
Economic development level	300	10.84064	0.43613	12.01303	9.70582
Industrial structure	300	0.44240	0.15931	1.80612	0.00001

From the table, it can be seen that the average value of the rural revitalization index is 0.31615, the maximum value is 0.49726, and the minimum value is 0.14002. The large difference between the two indicates that there is still a significant gap in the development level of rural revitalization in various provinces, cities, and autonomous regions. The average value of the digital inclusive finance index is 0.21724, the maximum value is 0.43193, and the minimum value is 0.01833. From the statistical data of its coverage, depth of use, and degree of digitization, There is an asymmetry and imbalance in the level of rural revitalization and the development of digital inclusive finance in various regions of China.

4.3.2. Data Standardization Processing

In a multi indicator evaluation system, due to the nature of each evaluation indicator, it usually has different dimensions and orders of magnitude. In order to ensure the reliability of the results, it is necessary to standardize the original data. This article adopts the maximum minimum method to standardize the raw data to the interval [0,1], so that various variables can be compared.

Assuming the given number of indicators is K, they are X_1, X_2, \dots, X_K , where $X_i = \{X_{1i}, X_{2i}, \dots, X_{ni}\}$. Assuming that the standardized values of various indicator data are Y_1, Y_2, \dots, Y_K , where $Y_i = \{y_1, y_2, \dots, y_n\}$, the following formula is used for processing:

$$Y_{ij} = [X_{ij} - \min\{X_{1i}, X_{2i}, \dots, X_{ni}\}] / [\max\{X_{1j}, X_{2j}, \dots, X_{nj}\} - \min\{X_{1j}, X_{2j}, \dots, X_{nj}\}]$$

4.3.3. Correlation Analysis

Next, we will conduct a correlation test on each variable to analyze its correlation.

Table 4. Correlation Test

Variables	RURAL	DIF	Open	Gov	Edu	Ed	Indus
RURAL	1.000						
DIF	0.408***	1.000					
Open	0.289*	0.379***	1.000				
Edu	0.070*	0.078*	0.043*	0.112*	1.000		
Ed	0.089**	0.131**	-0.125**	0.682***	-0.203*	1.000	
Indus	0.242**	0.471***	0.657***	-0.201*	-0.006	0.084	1.000

Note: ***p<0.01, **p<0.05, *p<0.1.

The overall index of digital inclusive finance has passed the significance test of 1%, indicating that digital inclusive finance can empower rural revitalization. Similarly, the two variables of economic development level and industrial structure have passed the significance test of 5%, so these two variables also have a promoting effect on the improvement of rural revitalization level.

4.3.4. Unit Root Test

Table 5. Unit Root Test Results

	Adjusted	p-value
RURAL	-5.5529	0.0000
DIF	-6.7726	0.0000
Open	-10.5244	0.0000
Gov	-7.6768	0.0000
Edu	-8.3197	0.0000
Ed	-7.8305	0.0000
Indus	-4.2195	0.0007

Perform a stationarity test on the data using the LLC unit test method, and the results are shown below. As can be seen from the table, if all p-values are less than 0.01, the null hypothesis of variable instability can be rejected. Therefore, the data used in this article's regression has passed the unit root test and the data sequence is stable.

4.4. Research on the Impact of Inclusive Finance on Rural Revitalization under the Digital Normal

4.4.1. Model Settings

Based on relevant data from 30 provinces, cities, and autonomous regions from 2011 to 2021, the following model is constructed to study the impact of digital inclusive finance on rural revitalization

$$RURAL_{it} = \alpha_0 + \alpha_1 DIF_{it} + \sum \alpha_k Control_{it} + \gamma_i + \xi_t + \sigma_{it}$$

Among them, $RURAL_{it}$ is the rural revitalization index, DIF_{it} is the digital inclusive finance index, and $Control$ represents the control variable, γ_i represents the differences between autonomous regions of different provinces and cities, ξ_t is used to identify differences at different time points, σ_{it} represents a random perturbation term.

4.4.2. Analysis of Regression Results

Based on the selection of the previous model and the selection of variables, using STATA econometric software, the following table shows the regression results of the impact of the digital inclusive finance index on rural revitalization. From the data in the table, it can be seen that the model is significant overall and has good goodness of fit.

Table 6. Regression Results of the Total Index of Digital Inclusive Finance on the Impact of Rural Revitalization

Variables	Model(1) Without control variables	Model(2) Adding control variables
DIF	2.44*** (4.72)	2.47*** (4.68)
Open		-0.027 (-1.016)
Gov		0.034** (0.018)
Edu		0.320** (0.0155)
N	300	300
Adj.R2	0.8810	0.8767

Note: *** p<0.01, ** p<0.05; the value of t is in parentheses.

Based on the regression results, the following analysis can be conducted on the empowerment of rural revitalization by digital inclusive finance:

(1) Digital inclusive finance has a significant empowering effect on rural revitalization. It passed the significance test at a 5% level. Digital inclusive finance plays a significant role in promoting industrial prosperity, ecological livability, rural civilization, effective governance, and prosperity. As a combination of finance and digital technology, digital inclusive finance has the characteristics of sharing, convenience, low cost, and low threshold, which is necessary for serving rural revitalization.

(2) The level of fiscal expenditure has a significant empowering effect on rural revitalization. It passed the significance test at a 5% level. And the larger the fiscal expenditure, the better the rural revitalization and development. All financial departments adhere to the priority

development of agriculture and rural areas, strengthen investment guarantees for rural revitalization, and provide strong support for comprehensively promoting rural revitalization. (3) The level of cultural education has a significant empowering effect on rural revitalization. It passed the significance test at a 5% level. The more education expenditure, the better rural revitalization and development. Culture and education are the soul and root of rural revitalization, and the level of culture and education constantly affects the construction of rural culture and civilization. The report of the 20th National Congress of the Communist Party of China proposes that Yao's words become the endogenous driving force of rural revitalization.

4.4.3. Robustness Testing

This article considers that there is a certain time lag in the empowerment of rural revitalization by digital inclusive finance. Therefore, digital inclusive finance and control variables are lagged for one period and the rural revitalization index is regressed. The results are as follows.

Table 7. Robustness Test

	(1) RURAL	(2) RURAL
DIF_1	3.1615*** (5.82)	3.3101** (6.12)
Open_1		0.1449 (1.17)
Gov_1		0.0767* (0.90)
Edu_1		0.4066 (1.84)
N	99	99
R2	0.8925	0.8943

Note: *** represents significant at the 1% level, and ** represents significant at the 5% level; The value of t is in parentheses.

The results show that DIF_ The coefficients for rural revitalization are 3.1615 and 3.3101, both below 5%, indicating that digital inclusive finance with a lag of one period still has a positive promoting effect on rural revitalization. This model is robust. Although the calculation results are slightly different from the previous text, the general direction of change is the same, which can also confirm the previous conclusion.

5. Conclusion and Suggestions

5.1. Research Conclusion

This paper mainly uses the data of 30 provinces, cities and autonomous regions (except Tibet) in China from 2011-2021 as the original data to explore the enabling role of inclusive finance in rural revitalization under the digital normal. Firstly, the entropy method is used to calculate the rural revitalization index, followed by a statistical description of each variable, followed by data standardization processing; Secondly, using STATA for data analysis, first correlation analysis, and then unit root test; Secondly, regression analysis and robustness testing were conducted under the set model to study the empowerment of inclusive finance in rural revitalization under the digital normal.

In summary, the main research conclusions of this article are: (1) The development of digital inclusive finance can promote the improvement of rural revitalization level. Therefore, in order to better improve the level of rural revitalization, it is necessary to pay attention to the development of digital inclusive finance. The three dimensions of digital inclusive finance have

a positive promoting effect on rural revitalization, so it is necessary to increase the promotion and popularization of rural digital inclusive finance from its coverage, usage, and digitization level; (2) The overall level of rural revitalization in China is showing an increasing trend year by year; (3) The level of cultural education and fiscal expenditure has a positive promoting effect on rural revitalization, and digital inclusive finance can drive rural revitalization and development by optimizing industrial structure.

5.2. Suggestions

5.2.1. Strengthen the Construction of Digital Inclusive Financial Infrastructure in Rural Areas

Financial infrastructure is a guarantee for the development of digital inclusive finance, and also a foundation for ensuring that digital inclusive financial services take root. Actively promoting innovative development of digital inclusive finance and promoting rural revitalization, we should continue to strengthen the construction of a new generation of digital infrastructure in rural areas. At the same time, rural commercial banks can connect credit business with external data platforms, promote the effective integration of finance and modern technology in rural areas, establish scientific and effective credit evaluation standards, and more targeted credit plans for agricultural enterprises, enhance digital inclusive financial service capabilities, and promote rural revitalization. In addition, rural financial institutions should be guided by market demand in terms of loan thresholds, rural credit scale, and loan procedures to promote the organic integration of digital inclusive finance and rural revitalization needs, promote the standardized development of digital inclusive finance in rural financial markets, alleviate financing constraints on farmers and small and medium-sized agricultural enterprises, and gather new drivers of economic growth through digital technology, Accelerate the formation of a new rural e-commerce model that deeply integrates with digital technology, and efficiently and orderly promote rural revitalization.

5.2.2. Reasonably Allocate Financial Resources to Ensure Their Scientific and Orderly Flow

In response to the negative externalities of digital inclusive finance on the revitalization of neighboring rural areas, it is necessary to allocate financial resources reasonably and introduce incentive compatible supervision mechanisms to ensure the scientific and orderly flow of financial resources. By introducing talents and establishing a "dual channel" mechanism of technology and funds, the development experience of digital inclusive finance can flow into surrounding areas, improve the spatial allocation efficiency of resource elements, eliminate the negative impact of excessive accumulation of talents, capital, and other factors on rural revitalization in certain areas, and promote rural revitalization. In addition, boundary effects and geographical attenuation characteristics make it difficult for digital inclusive finance to have an impact on rural revitalization in further regions. On the one hand, it is necessary to actively promote the construction of data standardization, reduce ambiguity and misinterpretation caused by information transmission across regions, and enable digital inclusive finance to still exert spatial spillover effects on rural revitalization at a greater distance; On the other hand, we can accelerate the construction of a unified national market, deepen cooperation awareness, actively build a digital inclusive financial alliance between regions, promote the smooth flow of financial elements on a wider range, and expand the spatial spillover distance of digital inclusive finance for rural revitalization.

5.2.3. Strengthen Knowledge Popularization and Improve the Financial Awareness Level of Rural Residents

The rapid development of digital inclusive finance has put forward higher requirements for the financial literacy of rural residents. Firstly, relevant departments should increase their

attention to financial education, incorporate financial education into rural public education plans, provide policy guidance to transport financial education resources to rural and remote areas, and effectively improve the financial literacy of rural residents. Secondly, regular lectures on digital inclusive finance knowledge and related risk prevention activities are carried out, and the financial knowledge and risk level contained in digital inclusive finance are disseminated to rural residents through offline distribution of brochures and online lectures, to enhance their familiarity with digital inclusive finance and help them cross the digital divide and enjoy convenient services. Finally, potential risks of digital inclusive finance should be avoided, such as early warning of market risks, credit risks, etc., and comprehensive and multi-dimensional promotion through various forms such as posters and mass media to prevent rural financial consumers from being misled by financial fraud.

5.2.4. Adapt to Local Conditions and Formulate Differentiated Policies to Serve Rural Revitalization

Develop differentiated policies for digital inclusive financial services for rural revitalization based on the development characteristics of different regions. In the eastern region, it is necessary to accelerate the continuous innovation of digital technology in rural areas and further improve the development level of digital inclusive finance. At the same time, it is necessary to establish a spatial circulation path for data, finance, and other elements, improve the coordination mechanism for digital inclusive finance, establish efficient information interconnection channels, and achieve direct connection and shared use of data, technology, and other elements, so that the development dividends of digital inclusive finance can better benefit surrounding areas and central and western regions, and empower rural revitalization. For the central and western regions, it is necessary to accelerate the improvement of "new infrastructure", promote the equalization of public infrastructure between regions, change the imbalance in the development of digital inclusive finance between regions, narrow the gap in the development of digital inclusive finance between regions, reduce the learning costs of traditional financial institutions, and weaken the siphon effect on knowledge, technology, and capital in surrounding areas, promoting comprehensive rural revitalization. In addition, for regions with negative spatial spillover effects, we should actively learn from the development experiences of other regions, break down barriers to spatial flow of resources, factors, and other factors, promote the sharing of digital inclusive financial infrastructure and data resources, and comprehensively and efficiently promote the implementation of rural revitalization strategies.

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References

- [1] Cui Xiaoli Jiao Jinpu: The conditions for financial institutions to exit the mechanism are basically mature [N] Securities Daily, 2006-04-30 (A01).
- [2] Chen Xiao, Sun Xiaojiao, Wang Guofeng. Digital Inclusive Finance, Digital Innovation, and Economic Growth: An Empirical Study Based on Provincial Panel Data [J]. Economic Issues, 2023 (06): 34-40. DOI: 10.16011/j.cnki.jjwt.2023.06.004.
- [3] Kang Weiguo, Li Zijun. Digital Inclusive Finance and Technological Innovation: A New Perspective from the Enterprise Life Cycle [J]. Macroeconomic Research, 2022 (12): 21-42.
- [4] Liu Xin, Han Qing. The Impact of Digital Inclusive Finance on County Economic Growth: From the Perspective of Traditional Finance and Industrial Structure Upgrading [J]. China Circulation Economy, 2023,37 (04): 107-115.

- [5] Zhang Qingjun, Huang Ling. Can the establishment of a green finance reform and innovation pilot zone promote enterprise technological innovation? [J] Economic System Reform, 2023 (01): 182-190.
- [6] Wei Yao, Wang Shanshan. Research on the Linkage Mechanism between Local Government Debt Risk and Financial Risk [J]. Journal of Xinyang Normal University (Philosophy and Social Sciences Edition), 2015,35 (04): 50-54+65.
- [7] Sun Mingfu, Wu Tong. Comprehensive Deployment and Systematic Strategy for Rural Revitalization in the New Era [J]. Journal of Central South University for Nationalities (Humanities and Social Sciences Edition), 2022,42 (10): 12-19+181.
- [8] Zhou Miaomiao, Liao Heping, Li Tao, et al. Measurement of Rural Development Level and Spatial Pattern in Poverty Alleviation Counties: A Case Study of Chengkou County, Chongqing [J]. Journal of Southwest University (Natural Science Edition), 2022,44 (05): 23-34.
- [9] Xu Xue, Wang Yongyu. The spatiotemporal pattern and influencing factors of the coordinated development of new urbanization and rural revitalization [J]. Statistics and Decision, 2023,39 (05): 50-55.
- [10] Wang Yongsheng, Wen Qi, Liu Yansui. Research on the Effective Connection between Rural Revitalization and Precision Poverty Alleviation in Poor Areas [J]. Geographic Science, 2020,40 (11): 1840-1847.
- [11] Li Ninghui, Long Hualou. The Connotation, Mechanism, and Model of Effectively Linking the Achievements of Consolidating and Expanding Poverty Alleviation with Rural Revitalization [J]. Economic Geography, 2022, 42(04):1-7+18.
- [12] Xiong Zhengde, Gu Xiaoqing, Wei Wei. Research on the Impact of Inclusive Financial Development on Rural Revitalization in China: An Empirical Analysis Based on the C-D Production Function [J]. Hunan Social Sciences, 2021 (01): 63-71.
- [13] He Jinling, Wu Bifan, Zhang Zhiwen. Research on the spatial spillover effect of digital inclusive finance supporting rural revitalization and development [J]. Fujian Finance, 2022 (07): 26-35.
- [14] Tan Yanzhi, Li Yunzhong, Ye Chengfang. Evaluation and Coupling Synergy Analysis of Provincial Digital Inclusive Finance and Rural Revitalization [J]. Economic Geography, 2021,41 (12): 187-195+222.
- [15] Tang Qianqian, He Qizhi. Digital Inclusive Finance, Technological Innovation, and Industrial Structure Upgrading [J]. Journal of Changchun University of Technology (Social Science Edition), 2022,35 (03): 97-104.
- [16] Lin Binghua, Chen Jingna. The Industrial Structure Upgrading Effect and Spatial Differences of Digital Inclusive Finance [J]. Fujian Forum (Humanities and Social Sciences Edition), 2022 (05): 76-86.