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Digital Inclusive Finance and Rural Household Income: An Empirical Study

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Abstract: Based on panel data from 31 provinces, autonomous regions, and municipalities in China between 2011 and 2020, this study employs a fixed-effects model to investigate the impact mechanisms and outcomes of digital inclusive finance on rural household income. The empirical results indicate that, overall, the expansion of digital inclusive finance has significantly contributed to income growth among rural residents. A more detailed examination of sub-dimensions reveals that the breadth of coverage exerts a particularly strong positive influence, while the effects of usage depth and the level of digitalization are relatively less pronounced. This suggests that ensuring widespread access to digital financial services is more critical for enhancing rural income than merely deepening the intensity or sophistication of usage. Further analysis of regional differences demonstrates that the western region of China has experienced more substantial benefits from the development of digital inclusive finance compared to other regions. This finding underscores the importance of considering regional heterogeneity when formulating policies aimed at promoting digital financial inclusion and rural economic development. Moreover, the study highlights a clear "threshold effect" associated with rural digital infrastructure. Specifically, when digital infrastructure reaches a certain level, the marginal promoting effect of digital inclusive finance on rural income growth diminishes. This phenomenon suggests that while initial investments in digital infrastructure can substantially boost the effectiveness of digital financial services, the incremental benefits may taper off once a baseline level of infrastructure maturity is achieved. These findings provide both empirical evidence and a theoretical foundation for improving the rural financial service system, optimizing strategies for digital inclusive finance, and enhancing the income potential of rural households. The results carry particular significance for the implementation of rural revitalization strategies and the advancement of urban-rural integration, offering valuable guidance for policymakers seeking to leverage digital finance as a tool for inclusive economic growth.

Keywords: digital inclusive finance; rural household income; coverage breadth; regional heterogeneity; digital infrastructure

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1. Introduction

The rural revitalization strategy serves as the overarching guiding framework for China's "agriculture, rural areas, and farmers" (the "three rurals") in the new era, with the objective of achieving "prosperous living" directly linked to rural household income [1]. Despite ongoing efforts, the income disparity between urban and rural populations remains substantial. According to data from the National Bureau of Statistics, the per capita disposable income of rural residents reached 21,691 yuan in 2023, reflecting a real growth rate of 7.1%. Nevertheless, the urban-rural income ratio remained as high as 2.43:1, highlighting the persistent challenge of relatively low rural incomes [2].

Finance has long been recognized as a critical driver of economic development and an essential mechanism for optimizing resource allocation in modern economies [3]. Traditional financial services, constrained by limited coverage, high entry thresholds, and considerable operational costs, have often struggled to meet the diverse and growing financial demands of widespread rural regions [4]. With the rapid advancement of information technology, digital inclusive finance has emerged as a transformative solution, integrating conventional financial services with modern technological capabilities to address the inefficiencies of rural financial systems, mitigate financing difficulties, and reduce transaction costs [5].

By leveraging technologies such as the internet, big data, and cloud computing, and adhering to the principle of inclusiveness, digital inclusive finance effectively reduces transaction costs, broadens service coverage, and enhances information transparency. Consequently, a larger portion of rural households gains access to high-quality financial services, which can support income growth, investment opportunities, and overall economic participation. Digital technologies, including data-driven personalized recommendation systems, have demonstrated their effectiveness in enhancing user engagement and guiding service utilization [6]. According to the Digital Inclusive Finance Index compiled by institutions affiliated with Peking University, the index increased from 100 points in 2011 to 298.2 points in 2020. However, the rural segment of the index still lags noticeably behind urban levels, indicating that the development of digital inclusive finance in rural areas remains comparatively delayed [7].

Against this backdrop, the present study aims to explore both the mechanisms and the tangible effects of digital inclusive finance on rural household income, with particular attention to the differentiated impacts of three dimensions: coverage breadth, usage depth, and digitalization level. Moreover, the analysis incorporates considerations of regional heterogeneity and the moderating influence of rural digital infrastructure. From both theoretical and practical perspectives, such an investigation holds significant value, as it deepens understanding of how digital inclusive finance can facilitate income growth among rural households, informs the construction of a more effective rural financial service system, and provides critical guidance for advancing the rural revitalization strategy.

2. Literature Review

2.1. Research on the Concept and Measurement of Digital Inclusive Finance

The essential characteristics of inclusive finance lie in fairness, inclusiveness, and efficiency. With the rapid development of information technology, traditional financial systems have increasingly merged with digital technologies, giving rise to the concept of digital inclusive finance [8]. Prior research indicates that integrating internet technology with traditional financial services enhances the efficiency of financial provision and strengthens inclusiveness [9]. Digital inclusive finance represents a new stage in the evolution of inclusive finance, characterized by the convergence of digital and conventional financial practices. International studies have further defined digital inclusive finance as the application of digital technologies to reduce costs, increase the accessibility of financial services, and simultaneously manage potential risks and challenges associated with broad financial inclusion [10]. This conceptualization aligns with domestic perspectives and provides a theoretical foundation for examining digital inclusive financial services.

Regarding measurement, authoritative research institutions have developed systems comprising 24 indicators across three dimensions: coverage breadth, usage depth, and the degree of digital support services. These indicators are systematically quantified to assess the development level of digital inclusive finance. Empirical analyses at the county level indicate that while the overall development of digital inclusive finance has improved over

time, significant regional disparities persist, and the enhancement of service quality remains relatively limited, warranting continued attention.

2.2. Research on the Economic Effects of Digital Inclusive Finance

At the macro level, existing studies suggest that the relationship between digital inclusive finance and rural revitalization may exhibit a U-shaped pattern, characterized by initial inhibitory effects followed by subsequent promotion. Other analyses emphasize that digital inclusive finance contributes to achieving common prosperity by alleviating financial constraints [11].

At the meso level, research has observed that the widespread penetration of digital inclusive finance promotes the upgrading and optimization of industrial structures. Additional evidence indicates that it facilitates the integration of rural industries [12]. From a supply-side perspective, digital inclusive finance enhances the resilience of agricultural product supply chains, thereby strengthening farmers' capacity to manage market risks-an effect that has become increasingly significant in the post-pandemic era. Collectively, these studies enrich the theoretical understanding of how digital inclusive finance fosters rural economic development and provide valuable insights for policy formulation [13].

From a micro perspective, empirical findings demonstrate that digital inclusive finance increases the likelihood of farmers engaging in entrepreneurial activities, raises household income levels, and encourages the adoption of commercial insurance products [14]. Furthermore, it has a mitigating effect on relative household poverty. International research, drawing on data from multiple countries in South Asia and Sub-Saharan Africa, corroborates that digital inclusive finance can effectively reduce poverty, with digital financial services, such as mobile payments, significantly improving the economic conditions of low-income populations. These global findings offer important references for exploring the relationship between digital inclusive finance and rural income growth.

2.3. Research on the Influencing Factors of Rural Household Income

Previous studies have indicated that certain aspects of traditional financial development may exacerbate the urban-rural income gap [15]. Other research highlights the role of rural tourism development, showing that household income increases as tourism activities expand [16]. The path of urban-rural integration has also been recognized as a key driver of rising rural per capita income. Analytical frameworks consistently emphasize that changes in rural household income serve as a core indicator for evaluating the achievement of the "prosperous living" goal within the rural revitalization strategy, thereby providing a critical lens for assessing its effectiveness.

2.4. Literature Review Summary

Despite substantial research on digital inclusive finance, several gaps remain. While the overall effects of digital inclusive finance have been widely examined, the differentiated impacts of its specific dimensions have not been fully analyzed. Regional heterogeneity is often treated superficially, and studies investigating moderating mechanisms remain limited. Moreover, empirical analyses frequently fail to address endogeneity concerns adequately. The present study aims to fill these gaps by examining the differentiated effects of the various components of digital inclusive finance on rural household income, incorporating regional disparities and the moderating role of digital infrastructure. By doing so, it seeks to improve upon existing empirical limitations and blind spots, thereby enhancing the accuracy, robustness, and policy relevance of its findings.

3. Theoretical Analysis and Research Hypotheses

3.1. The Overall Impact of Digital Inclusive Finance on Rural Household Income

Digital inclusive finance influences rural household income through multiple pathways. First, it expands the coverage of financial services while lowering both the entry barriers and the costs associated with accessing these services. By promoting the development of rural industries, it creates greater opportunities for employment and entrepreneurship. Simultaneously, it enhances risk dispersion, thereby increasing the capacity of rural households to withstand various types of financial and market risks. Furthermore, improvements in market information transparency contribute to more efficient resource allocation. Based on these mechanisms, the following hypothesis is proposed:

H1: The improvement of digital inclusive finance significantly promotes the growth of rural household income.

3.2. The Differential Impact of Digital Inclusive Finance Dimensions on Rural Household Income

Digital inclusive finance comprises three key dimensions: coverage breadth, usage depth, and the degree of digitalization. It is expected that each dimension exerts a distinct impact on rural household income. Expanding coverage breadth allows a larger proportion of rural residents to access and utilize digital financial services, thereby directly promoting income growth, a relationship that is relatively straightforward. In contrast, the effects of usage depth may exhibit a lag and vary across regions, constrained by factors such as the digital literacy of rural residents. The degree of digitalization primarily affects income through more indirect channels, involving complex mechanisms that may include improvements in financial efficiency, innovation adoption, and integration with local economic activities. Accordingly, the following hypothesis is proposed:

H2: The three dimensions of digital inclusive finance exert differentiated impacts on rural household income, with coverage breadth having the most significant promoting effect.

3.3. The Moderating Role of Regional Heterogeneity

China's eastern, central, and western regions display substantial differences in economic development, industrial structure, and infrastructure levels. These disparities may result in varied effects of digital inclusive finance on rural household income across regions. In the eastern region, where the traditional financial system is relatively well developed, the marginal benefits of digital inclusive finance may be limited. Conversely, in the western region, where access to conventional financial services is more restricted, digital inclusive finance is expected to play a more compensatory role, yielding greater benefits for rural residents. On this basis, the following hypothesis is proposed:

H3: The impact of digital inclusive finance on rural household income demonstrates significant regional heterogeneity, with a more pronounced promoting effect in the western region.

3.4. The Moderating Role of Rural Digital Infrastructure

The level of rural digital infrastructure can significantly influence the effectiveness of digital inclusive finance. This relationship is not strictly linear. In regions with underdeveloped digital infrastructure, even modest improvements can substantially enhance the effectiveness of digital inclusive finance. However, in areas where digital infrastructure is already advanced, further improvements may yield diminishing returns, or even exhibit a declining trend in marginal effects. Based on this observation, the following hypothesis is proposed:

H4: Rural digital infrastructure plays a moderating role in the relationship between digital inclusive finance and rural household income, and this moderating effect may exhibit nonlinear characteristics.

4. Research Design

4.1. Data Sources and Sample Selection

This study utilizes panel data from 31 provinces, autonomous regions, and municipalities in China for the period 2011-2020. The Digital Inclusive Finance Index and its sub-dimensional indicators are derived from the China Digital Inclusive Finance Index Report, published by the Digital Finance Research Center of Peking University. Data on rural household income and related economic variables are primarily obtained from the China Statistical Yearbook, the China Rural Statistical Yearbook, and regional statistical yearbooks.

4.2. Variable Selection and Definitions

4.2.1. Dependent Variable

Rural household income (rural_income) is measured by the per capita net income of rural residents in each province. Due to differences in scale and uneven distribution, the natural logarithm is applied for analysis, denoted as ln(rural_income).

4.2.2. Independent Variables

Digital Inclusive Finance Index (dfi_index) represents the comprehensive level of digital inclusive finance development across regions.

Sub-dimensional indicators of digital inclusive finance include coverage breadth (coverage), usage depth (depth), and degree of digitalization (digitalization).

4.2.3. Moderating Variables

Regional factor (region): Following conventional geographic classifications, the 31 provinces are grouped into three regions:

1) Eastern region: Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan.
2) Central region: Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan.
3) Western region: Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang.

Rural digital infrastructure is proxied by the road hardening rate in villages. Based on the annual median, provinces are divided into high- and low-level groups. This classification reflects the status of digital infrastructure while also introducing a segmented pattern for analysis.

4.2.4. Control Variables

To account for other factors potentially affecting rural household income, the following control variables are included:

1) Rural consumption level (consumption): proxied by the number of cars per 100 households, reflecting consumption capacity and living standards.
2) Rural living conditions (living_condition): measured by per capita housing area of rural residents, reflecting basic living conditions.
3) Rural medical level (medical_level): measured by the number of health technicians per 1,000 rural residents, reflecting healthcare service availability.
4) Urban-rural income gap (income_gap): measured by the ratio of urban to rural household income, reflecting imbalances in development.
5) Rural quality of life (life_quality): proxied by the Engel coefficient of rural households, reflecting overall living standards.

4.3. Model Construction

To examine the impact of digital inclusive finance on rural household income, four fixed-effects panel models are constructed as follows:

Model 1: Testing the impact of the overall Digital Inclusive Finance Index:

$$ln(rural\_income_{it}) = \alpha_0 + \alpha_1 dfi\_index_{it} + \sum \beta_k \, control\_kit + \mu_i + \lambda_t + \epsilon_{it}$$

Model 2: Testing the differentiated impacts of sub-dimensions:

$$ln(rural\_income_{it}) = \beta_0 + \beta_1 coverage_{it} + \beta_2 depth_{it} + \beta_3 digitalization_{it} + \sum \gamma_k \, control\_kit + \mu_i + \lambda_t + \epsilon_{it}$$

Model 3: Testing the moderating effect of regional heterogeneity:

$$ln(rural\_income_{it}) = \delta_0 + \delta_1 dfi\_index_{it} + \delta_2 (dfi\_index_{it} \times region_{it}) + \sum \theta_k \, control\_kit + \mu_i + \lambda_t + \epsilon_{it}$$

Model 4: Testing the moderating effect of rural digital infrastructure:

$$ln(rural\_income_{it}) = \eta_0 + \eta_1 dfi\_index_{it} + \eta_2 (dfi\_index_{it} \times infra\_level_{it}) + \sum \rho_k \, control\_kit + \mu_i + \lambda_t + \epsilon_{it}$$

Where:

1) i denotes province, t denotes year.
2) $ln(rural\_income_{it})$ is the natural logarithm of rural per capita net income.
3) dfi_index_{it} is the Digital Inclusive Finance Index.
4) $coverage_{it}$, $depth_{it}$, $digitalization_{it}$, represent coverage breadth, usage depth, and degree of digitalization, respectively.
5) $region_{it}$ is the regional dummy variable.
6) $infra\_level_{it}$ is the digital infrastructure dummy variable.
7) $control\_kit$ denotes control variables.
8) μ_i is the individual fixed effect.
9) λ_t is the time fixed effect.
10) ϵ_{it} is the random error term.

5. Empirical Results and Analysis

5.1. Descriptive Statistics

First, descriptive statistical analysis was conducted for the main variables, with results summarized in Table 1.

Table 1. Descriptive Statistics of Main Variables.

Variable	Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
Total Index	16.22	147.88	223.54	216.24	293.72	431.93
Coverage Breadth (Primary Indicator)	1.96	121.81	197.23	196.67	275.78	397.00
Usage Depth (Primary Indicator)	6.76	138.88	203.02	211.12	284.91	488.68
Degree of Digitalization (Primary Indicator)	7.58	234.72	323.25	290.14	384.44	462.23
Per Capita Net Income of Farmers	42072	217944	401690	399613	537927	1229659

Growth Rate of Farmers' Per Capita Income	57.0	323.0	423.0	433.1	542.8	792.0
Rural Revitalization Index	0.000	2.000	3.000	2.823	4.000	9.000

The data in Table 1 indicate that the mean value of the Digital Inclusive Finance (DIF) Total Index is 216.24, with a minimum of 16.22 and a maximum of 431.93, demonstrating substantial regional disparities in DIF development across China. Examining the three core dimensions, the mean value of the degree of digitalization is the highest (290.14), followed by usage depth (211.12), while coverage breadth lags behind with a mean of 196.67.

Between 2011 and 2020, both the DIF Total Index and rural per capita income exhibited steady growth, showing closely aligned trajectories. Particularly after 2016, accelerated development of digital inclusive finance coincided with an expansion in rural income growth, suggesting a positive and deepening relationship. These observations indicate that the performance of DIF has strengthened consistently, rather than being driven by a single factor.

5.2. Overall Impact of Digital Inclusive Finance on Rural Household Income

To test Hypothesis H1, the relationship between the DIF Total Index and rural household income was estimated. As shown in Table 2, Column (1), the Hausman test ($\chi^2 = 253.97$, $p < 0.001$) confirmed that the fixed-effects model is superior to the random-effects model. Heteroskedasticity and serial correlation were detected (BP = 33.799, significant), necessitating the use of robust standard errors to ensure valid inference.

Table 2. The Impact of Digital Inclusive Finance on Rural Household Income.

Variable	(1) Overall Impact	(2) Dimension Decomposition	(3) Regional Differences	(4) Infrastructure Moderation
Total Index	0.001***		0.001***	0.001***
	(0.00004)		(0.00005)	(0.00004)
Coverage Breadth (Primary Indicator)		0.001***		
		(0.0001)		
Usage Depth (Primary Indicator)		-0.00003		
		(0.0001)		
Degree of Digitalization (Primary Indicator)		-0.00005		
		(0.00003)		
infra_level (High)				0.061***
				(0.018)
Cars per 100 Households	0.0001	0.0001	0.0002	0.0004
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Per Capita Housing Area of Rural Residents	-0.00001	0.00002	0.0001	-0.00001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Health Technicians per 1,000 Rural Residents	-0.0001	-0.00002	-0.0001	0.0001
	(0.0003)	(0.0002)	(0.0003)	(0.0003)

Urban-Rural Income Ratio	-0.028***	-0.025***	-0.027***	-0.026***
	(0.003)	(0.003)	(0.003)	(0.003)
Engel Coefficient of Rural Residents	0.006	0.006	0.007	0.005
	(0.006)	(0.006)	(0.006)	(0.006)
Total Index × Central Region			-0.00004	
			(0.00005)	
Total Index × Western Region			0.0001*	
			(0.00004)	
Total Index × infra_level (High)				-0.0002***
				(0.00005)
Observations	310	310	310	310
R^2	0.910	0.919	0.913	0.916
Adjusted R^2	0.899	0.908	0.900	0.905
F-statistic	462.384***	384.012***	353.732***	370.856***

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

Column (1) shows that the coefficient of the DIF Total Index is 0.001, significantly positive at the 1% level. This indicates that each unit increase in the index raises rural household income (log-transformed) by approximately 0.1%, verifying Hypothesis H1. The result demonstrates that DIF promotes rural income through expanded service coverage, lower transaction costs, and enhanced resource allocation.

The urban-rural income ratio shows a significantly negative effect (-0.028), indicating that widening income gaps constrain rural income growth. Other control variables, including car ownership, housing area, medical personnel, and Engel coefficient, are not statistically significant after accounting for fixed effects, suggesting a limited role in this context.

5.3. Differential Impacts of DIF Dimensions on Rural Household Income

To test Hypothesis H2, the three DIF dimensions were analyzed (Table 2, Column (2)). Coverage breadth has a significant positive effect (0.001, $p < 0.01$), while usage depth (-0.00003) and digitalization (-0.00005) are not significant. This confirms H2: coverage breadth exerts the strongest positive effect, whereas the other dimensions are weaker. Broad coverage directly improves access to digital financial tools, reducing transaction costs, while deeper usage and higher digitalization require preconditions such as literacy and infrastructure, which remain underdeveloped in rural areas. Model 2 achieves a higher R^2 (0.919) than Model 1 (0.910), highlighting the explanatory advantage of dimension decomposition.

5.4. Regional Heterogeneity Analysis

To test Hypothesis H3, regional differences were examined (Table 2, Column (3)). The interaction term for the Central Region is not significant (-0.00004), while that for the Western Region is positive and significant at 10% (0.0001), indicating stronger effects of DIF on rural income in western provinces. A one-unit increase in DIF raises income by 0.1% in the east and 0.2% in the west, supporting H3. This reflects weaker traditional financial systems and greater marginal benefits of DIF in the west, suggesting targeted regional policies.

5.5. Moderating Effect of Rural Digital Infrastructure

To test Hypothesis H4, the moderating role of rural digital infrastructure was analyzed (Table 2, Column (4)). High infrastructure has a direct positive effect on income (0.061, approximately 6.3% increase), while the interaction term with DIF is negative (-0.0002, $p < 0.01$), indicating diminishing marginal returns. In low-infrastructure regions, DIF raises income by 0.1%, but in high-infrastructure areas, the effect is only 0.04%. This confirms H4 and highlights the importance of combining DIF expansion with infrastructure development.

5.6. Robustness Tests

5.6.1. Model Selection Test

The Hausman test ($\chi^2 = 253.97$, $p < 0.001$) confirmed the superiority of fixed-effects models, controlling for region-specific time-invariant factors.

5.6.2. Tests for Heteroskedasticity and Serial Correlation

Breusch-Pagan test (BP = 33.799, $p < 0.001$) indicated heteroskedasticity, and Breusch-Godfrey/Wooldridge test ($\chi^2 = 48.609$, $p < 0.001$) revealed serial correlation. Robust standard errors (HC1) were applied, confirming the stability of DIF's positive effect (coefficient ~0.001, $t = 16.546$, $p < 0.001$).

5.6.3. Robust Estimation Results

The DIF Total Index coefficient remained positive (0.00057), while the urban-rural income ratio remained negative (-0.028, SE = 0.0047), demonstrating robustness across specifications.

5.6.4. Multicollinearity Test

Correlation and VIF tests showed acceptable levels, indicating no severe multicollinearity among explanatory variables.

5.6.5. Model Fit

Adjusted R^2 values exceeded 0.90 across models (Model 1: 0.899, Model 2: 0.908, Model 3: 0.900, Model 4: 0.905), with highly significant F-statistics ($p < 0.001$), confirming strong explanatory power and statistical validity.

Overall, empirical results are reliable and stable, providing a solid statistical foundation for the study's conclusions.

6. Research Conclusions and Policy Recommendations

6.1. Research Conclusions

This study employs panel data covering 31 provincial-level administrative regions in China from 2011 to 2020 and applies a fixed-effects model to empirically examine the impact of digital inclusive finance (DIF) on rural household income, while assessing its practical performance. Several key findings are summarized as follows:

First, the overall development of digital inclusive finance has a significantly positive effect on rural household income. Specifically, a one-unit increase in the DIF Total Index corresponds to an average increase of approximately 0.1% in rural income. This indicates that DIF plays a crucial role in raising rural income by expanding financial service coverage, reducing transaction costs, and facilitating efficient resource allocation. The combined effects of these mechanisms have gradually materialized, producing tangible benefits for rural households.

Second, the three dimensions of DIF exert heterogeneous impacts on rural household income. Coverage breadth demonstrates the most significant effect, with each unit increase associated with an approximate 0.1% rise in rural income. In contrast, usage

depth and degree of digitalization have less pronounced effects. This finding suggests that, under current conditions, broadening DIF coverage to enable more rural households to access and utilize basic digital financial services is more effective in raising rural incomes.

Third, the impact of DIF on rural income exhibits distinct regional heterogeneity. The effect is particularly strong in the western region. For instance, a one-unit increase in the Total Index raises rural income in the west by about 0.2%, compared with roughly 0.1% in the east. This disparity likely reflects differences in the development of traditional financial infrastructure, with western provinces benefiting more from DIF as it fills service gaps and generates higher marginal improvements.

Fourth, rural digital infrastructure moderates the relationship between DIF and rural household income, exhibiting a "threshold effect." In areas with underdeveloped digital infrastructure, the income-enhancing effect of DIF is more pronounced. Conversely, in regions with well-established digital infrastructure, this positive effect is diminished. This pattern may result from stronger economies and more comprehensive financial systems in better-equipped regions, leaving less room for incremental gains from DIF.

6.2. Policy Recommendations

Based on these conclusions, the following policy recommendations are proposed:

Strengthen the Digital Inclusive Finance System to Support Rural Income Growth

The DIF service framework should be enhanced, emphasizing financial technology innovation to design products and services tailored to rural needs. Financial literacy campaigns and digital skills training should be strengthened to improve rural residents' ability to use digital financial services effectively. Enhancing both willingness and capacity for active participation and deeper usage is essential. Given the current gap between technology and rural demand, disseminating basic knowledge and skills is critical, while cultivating usage stickiness is key to long-term effectiveness.

Develop Differentiated Strategies for DIF

Priority should be given to broadening coverage, ensuring that more rural residents can access basic digital financial services. In regions with more mature conditions, improvements in service depth and digitalization should be promoted simultaneously. Additionally, financial products adapted to rural realities, such as credit, insurance, and wealth management, should be developed to meet diverse household needs.

Promote Regional Coordination and Narrow Development Gaps

DIF development in the western region requires urgent support due to its particularly strong impact on rural income. As eastern, central, and western regions have distinctive characteristics, differentiated development strategies should be adopted to promote rural revitalization and income growth. Enhanced inter-regional cooperation and knowledge sharing can facilitate more balanced nationwide development of DIF.

Coordinate the Development of Digital Infrastructure and DIF

In areas with weak digital infrastructure, investment should be increased to improve network coverage and communication facilities, creating an enabling environment for DIF. In regions with stronger infrastructure, emphasis should shift toward deepening service development and promoting innovative applications, providing differentiated and customized services to meet the diverse needs of rural households. This approach enhances the likelihood of fulfilling rising expectations for diversified financial services.

Strengthen Risk Prevention to Safeguard the Healthy Development of DIF

Measures for data security management, privacy protection, and fraud prevention should be reinforced, alongside the establishment of robust regulatory and early-warning systems. Financial risk-awareness education for rural residents should be enhanced to improve their ability to identify and respond to risks, mitigating potential economic losses from information asymmetry. These safeguards are essential for the sustainable development of DIF.

6.3. Research Limitations and Future Prospects

This study has several limitations. The research period (2011-2020) is relatively short, limiting the ability to fully capture long-term effects. Data availability imposed constraints, restricting analysis of more detailed income classifications and structures. Moreover, the study did not extensively explore micro-level mechanisms or transmission channels, and the consideration of moderating variables was limited.

Future research could incorporate longer time-series data, investigate micro-level mechanisms and transmission pathways in more depth, and include additional moderating variables. By integrating emerging technologies such as big data and artificial intelligence, future studies could conduct more refined analyses and provide more actionable policy recommendations for leveraging DIF to support rural revitalization.

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