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The Impact of Digital Financial Inclusion on Household Consumption Upgrading

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Abstract: The rapid advance of the information age has become a pivotal force driving financial sector transformation. By enhancing efficiency and reducing costs, digital financial inclusion expands access to convenient financial services, reshapes consumption patterns, and carries profound implications for the optimization of household consumption structures and sustainable economic growth. Using provincial panel data from 2015 to 2023, this study employs a two-way fixed-effects model to examine the direct effect of digital financial inclusion on household consumption upgrading. The results show a significant positive effect. Robustness checks and heterogeneity analysis further confirm its effectiveness in raising per capita consumption and reveal regional disparities, with the western area experiencing the most pronounced impact. Accordingly, strengthening top-level planning, institutional development, and the broader digital financial ecosystem is essential for fostering healthy economic and social development.

Keywords: Digital financial inclusion; Household consumption upgrading; Two-way fixed-effects model; Heterogeneity analysis

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1. Introduction

In the current context of rapid informatization, the flourishing development of digital technologies has brought about profound and far-reaching transformations in the financial industry. In particular, the rise and expansion of digital financial inclusion have created a simpler, faster, and more efficient financial service ecosystem for a broad segment of the population. These changes have not only fundamentally reshaped the landscape of traditional financial services but have also permeated all aspects of residents' daily lives, playing a crucial role—especially in facilitating the evolution of consumption patterns toward higher tiers. As incomes continue to rise and consumer attitudes progressively shift, household consumption is undergoing a deep transition from satisfying basic survival needs to pursuing a higher quality of life—a shift marked by a move from essential goods to experiential and enjoyment-oriented spending. In this context, exploring the influence of digital financial inclusion on consumption upgrading is not only significant for understanding current changes in consumer markets but also holds practical relevance for guiding financial policy design and optimization. By improving the accessibility and convenience of financial services, digital financial inclusion has substantially reduced associated costs, effectively unlocking latent consumer potential and exerting a positive driving force on the advancement of consumption structures [1].

Nevertheless, alongside its powerful role in promoting consumption upgrading, digital financial inclusion also faces a range of pressing issues and challenges, including heightened financial security risks and the potential encouragement of irrational spending. Therefore, this paper aims to conduct an in-depth analysis of both the mechanisms and the positive and negative effects of digital financial inclusion on household consumption upgrading, so as to provide theoretical foundations and practical guidance for relevant policy formulation [2]. Through this research, we hope to better understand the role of digital financial inclusion in the modern economy and society, and to offer references for enhancing the inclusiveness and sustainability of financial services.

2. Literature review

Digital financial inclusion, by virtue of its convenience and low-cost service provision, has emerged as a key force in boosting household spending power and facilitating consumption pattern transitions. For instance, Zhao thoroughly analyzed how the development path of digital financial inclusion reshapes the consumption landscape of rural residents, empirically demonstrating the positive effects of digital financial service penetration on rural spending capacity and consumption habits, thereby highlighting its core value in invigorating rural economies and unlocking consumption potential [3]. Yang *et al.* corroborated this view, revealing the mechanisms through which digital financial inclusion drives shifts in household consumption tiers upward. They stress that, as such services gain widespread acceptance, consumption patterns among both urban and rural residents show a tendency to move from basic necessities toward higher-quality and more diversified goods and services, albeit through complex and multi-faceted channels [4]. Xiwei focused on Anhui Province, using empirical case analysis to show how digital financial inclusion directly expands consumption scale by enhancing financial accessibility and credit availability in rural areas, thereby significantly improving residents' living standards and quality of life [5]. In addition, Wang and Yan, taking Zhejiang Province as an example, conducted detailed empirical analysis that further elucidates the unique contribution of digital financial inclusion to optimizing rural consumption structures, particularly in enriching product variety and elevating quality of life, thus reinforcing its critical role in diversified consumption promotion [6]. Collectively, these studies depict the complex interplay and positive impact of digital financial inclusion on consumption upgrading in rural and broader societal contexts.

Beyond these, several scholars have delved into the multi-dimensional effects of digital financial inclusion. Sun *et al.* contributed by carefully dissecting the underlying mechanisms through which digital financial inclusion affects household consumption. Their empirical work confirms that this model, by improving the availability and efficiency of financial services, substantially enhances the spending capacity and purchasing potential of residents, especially in rural areas [7]. Faton adopted a quantitative analytical approach, focusing on the specific effects of digital financial inclusion within rural consumption environments. Drawing on data from Hebei Province, he details how the spread of digital financial services positively influences rural residents' consumption capabilities and consumption pattern transformations, underscoring its importance for raising living standards and expanding consumption diversity [8]. Huang and

Deng investigated the mechanisms by which digital financial inclusion promotes consumption upgrading and structural changes among Chinese residents, using empirical strategies to elaborate how the diffusion of digital financial services acts as a key driver of consumption advancement [9]. Chi and Chen took a macro-level perspective, comprehensively analyzing the far-reaching impact of digital financial inclusion on overall household consumption. Based on robust quantitative data, their research reveals the role of digital financial service proliferation in guiding consumption to higher levels, and specifically explains how this process, through improved consumption convenience and encouragement of consumption variety, profoundly influences and restructures residents' consumption behavior [10].

The above studies indicate that digital financial inclusion, by enhancing financial service coverage and responsiveness, not only effectively releases the consumption potential of a wide population—including rural dwellers—but also facilitates the transformation of consumption structures and the innovation of consumption behavior patterns. Moreover, the advancement of digital financial inclusion is closely linked to improvements in residents' quality of life, subjective well-being, and overall socio-economic conditions. These findings provide important insights into the functioning of digital financial inclusion across different socio-economic backgrounds. In view of this, the present paper further investigates the specific mechanisms and pathways through which digital financial inclusion affects household consumption upgrading, and examines its differential impacts on consumption capacity and structure across various social groups.

3. Model specification

This study focuses on the impact of digital financial inclusion on household consumption upgrading. The variable definitions are summarized in **Table 1**.

Dependent variable: Household consumption upgrading index. We construct this index using the AIDS (Almost Ideal Demand System) model, which measures the proportional relationship between developmental and enjoyment-oriented consumption within total household consumption. A higher value indicates a greater tilt toward higher-quality consumption patterns. Based on data from the China Family Panel Studies (CFPS), we calculate the consumption upgrading index for each province over the period 2015–2023.

Independent variable: Digital financial inclusion index. We adopt the "China Digital Financial Inclusion Development Index" published by the Institute of Digital Finance at Peking University. This composite index integrates three core dimensions: coverage breadth, usage depth, and digitalization level. A higher value reflects a more advanced state of digital financial inclusion. We use provincial-level data for the years 2015–2023.

Mediating variable: Disposable income of all residents. We extract provincial data from the National Bureau of Statistics for the same period.

Control variables: These include urbanization level, degree of openness to foreign trade, consumption demand characteristics of the elderly population, urban-rural income disparity, and the development status of traditional finance. Data sources include the National Bureau of Statistics, the People's Bank of China, and the National Development and Reform Commission [11].

Table 1. Variable definitions

Variable type	Symbol	Variable name	Measurement
Dependent	Con	Consumption upgrading index	Weighted composite of three consumption categories
Alternative dependent	Pc	Per capita household consumption expenditure	National Bureau of Statistics
Independent	Ind	Digital financial inclusion index	Peking University Digital Financial Inclusion Index / 100
Mediator	Pi	Disposable income of all residents	National Bureau of Statistics
	Urb	Urbanization level	Urban population / total population
	Open	Degree of openness	Total imports and exports / regional GDP
Control	Od	Elderly consumption demand	Per capita healthcare expenditure / per capita consumption expenditure
	Theil	Urban-rural income gap	Theil index
	Fdi	Financial development index	(Deposits + loans) / GDP
	Ssl	Social security level	Social security and employment expenditure / general budget expenditure
Alternative control	Inf	Informatization level	Informatization index
	Gov	Government intervention	Fiscal expenditure / GDP

To rigorously examine the specific mechanisms through which digital financial inclusion affects consumption structure upgrading, we select an appropriate empirical model for regression analysis. Given that our data are panel-structured, combining cross-sectional and time-series features, panel data models are well suited. The main candidates include individual fixed-effects, random-effects, and pooled models, which differ primarily in their treatment of unobserved individual heterogeneity. Individual effects refer to time-invariant or time-varying characteristics such as geographic location, cultural norms, and policy environments that may correlate with explanatory variables[12]. Ignoring these could lead to omitted-variable bias or heteroskedasticity, undermining estimation efficiency and inference validity. Based on our data characteristics, we adopt the individual fixed-effects model. The specification is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \sum_{k=2}^{k} \beta_k z_{kit} + a_i + a_t + \varepsilon_{it} \tag{1}$$

Wheredenotes the consumption upgrading index for province in year ; is the digital financial inclusion index for the same province and year; represents the -th control variable; captures provincespecific unobserved fixed effects; denotes year fixed effects controlling for common timevarying trends; and is the idiosyncratic error term. Here, is the intercept,measures the direct effect of digital financial inclusion on consumption upgrading, and captures the effects of controls.

4. Empirical analysis

4.1. Correlation analysis

To explore pairwise associations among variables, we conduct correlation analysis; results are summarized in **Table 2**.

Table 2. Correlation matrix

	con	ind	urb	open	od	theil	fdi	lnpi
con	1							
ind	-0.0736	1						

urb	-0.187**	0.519***	1					
open	-0.461***	0.375***	0.728***	1				
od	0.387***	0.146*	0.106	-0.361***	1			
theil	0.100	-0.0819	-0.0429	-0.196**	0.215***	1		
fdi	-0.344***	0.309***	0.378***	0.518***	-0.193**	-0.0063	1	
lnpi	-0.253***	0.787***	0.878***	0.763***	-0.0439	-0.124*	0.459***	1

$^{*}P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$

As shown, elderly consumption demand exhibits a significant positive correlation with consumption upgrading, while the degree of openness and social security levels appear negatively related. Notably, the bivariate correlation between digital financial inclusion and the consumption upgrading index does not show strong significance, suggesting a relatively weak linear association. Moreover, most correlation coefficients lie below 0.8, providing preliminary evidence against severe multicollinearity.

4.2. Multicollinearity test

To rigorously rule out potential multicollinearity, we compute Variance Inflation Factors (VIF); results are presented in **Table 3**.

Table 3. Multicollinearity diagnostics

Variable	VIF	1/VIF
open	4.100	0.244
urb	3.460	0.289
od	1.780	0.561
ind	1.450	0.691
fdi	1.430	0.701
theil	1.100	0.910
Mean	VIF	2.220

With all VIF values well below the conventional threshold of 5, we conclude that multicollinearity does not seriously affect our regression estimates.

4.3. Baseline regression

We estimate the two-way fixed-effects model; results are reported in **Table 4**.

Table 4. Baseline regression results

	(1)	(2)
	con	con
ind	0.260***	0.304***
	(3.34)	(5.64)
urb		1.045**
		(2.59)
open		-0.092
		(-1.41)
od		3.474***
		(4.06)
theil		0.550***

		(3.70)
fdi		0.058^{***}
		(3.20)
_cons	1.193^{***}	-0.101
	(5.27)	(-0.33)
id	Yes	Yes
year	Yes	Yes
N	279	279
r2	0.840	0.885
r2_a	0.814	0.864

$^{*}P < 0.1$, $^{**}P < 0.05$, $^{***}P < 0.01$

The estimated coefficient on the digital financial inclusion index is 0.304, significant at the 1% level. This implies that a one-unit increase in the digital financial inclusion index is associated with a 0.304-unit rise in the consumption upgrading index, confirming a significant positive effect.

Among controls, urbanization shows a coefficient of 1.045 (significant at 5%), indicating that a 1% increase in urbanization raises the consumption upgrading index by approximately 104.5% (a strong positive driver). This likely reflects that urbanization facilitates industrial development, resource mobility across urban-rural areas, employment growth, and income gains, thereby promoting consumption upgrading. Elderly consumption demand yields a coefficient of 3.474 (significant at 1%), suggesting that digital financial inclusion reduces transaction costs for healthcare and other developmental expenditures for the elderly, which in turn stimulates overall daily spending.

4.4. Mediation effect

Incorporating a mediator helps uncover underlying mechanisms and integrates existing theoretical insights. We introduce disposable income of all residents as a mediating variable; results are shown in **Table 5**.

Table 5. Mediation effect through disposable income

	(1)	(2)
	lnpi	con
ind	0.083^{***}	0.229^{***}
	(2.94)	(4.71)
urb	1.238^{***}	-0.081
	(6.60)	(-0.15)
open	0.018	-0.108^{*}
	(0.80)	(-1.84)
od	0.797^{*}	2.750^{***}
	(1.84)	(3.80)
theil	0.055	0.500^{***}
	(0.76)	(4.05)
fdi	-0.031^{***}	0.086^{***}
	(-2.98)	(5.40)
lnpi		0.909^{**}
		(2.51)
_cons	9.207^{***}	-8.469^{**}

	(50.00)	(-2.46)
id	Yes	Yes
year	Yes	Yes
N	279	279
r2	0.996	0.909
r2_a	0.995	0.892

$^{*}P < 0.1$, $^{**}P < 0.05$, $^{***}P < 0.01$

The coefficient of digital financial inclusion on disposable income is 0.083 (1% significance), indicating a positive effect on raising residents' income. The coefficient of disposable income on consumption upgrading is 0.229 (also 1% significant), suggesting that higher income significantly promotes consumption upgrading. Together, these results confirm a significant mediating role of disposable income.

4.5. Robustness checks

We perform robustness tests by (i) replacing the dependent variable with per capita consumption expenditure and (ii) adding three additional controls: social security level, informatization level, and government intervention. **Table 6** presents the results.

Table 6. Robustness results with alternative dependent variable and added controls

	(1)	(2)
	lnpc	con
ind	0.177***	0.314***
	(4.42)	(6.05)
urb	2.208***	1.316***
	(8.46)	(3.11)
open	-0.006	-0.060
	(-0.11)	(-0.87)
od	0.382	3.676***
	(0.59)	(4.40)
theil	-0.173	0.549***
	(-1.51)	(3.86)
fdi	-0.019	0.047***
	(-1.38)	(2.81)
inf		0.275*
		(1.71)
gov		0.283
		(0.94)
ssl		0.305
		(0.88)
_cons	8.008***	-0.423
	(33.07)	(-1.16)
id	Yes	Yes
year	Yes	Yes

N	279	279
r2	0.991	0.888
r2_a	0.989	0.865

$^{*}P < 0.1$, $^{**}P < 0.05$, $^{***}P < 0.01$

After these modifications, the coefficients on digital financial inclusion remain positive and significant at the 1% level for both alternative specifications (0.177 for per capita consumption, 0.314 for the consumption upgrading index). These findings align closely with the baseline results, confirming the robustness of our main conclusions.

4.6. Heterogeneity analysis

Given China's vast territory and regional disparities in economic development, resource endowments, and industrial structures, we examine whether the effect of digital financial inclusion varies across regions. We divide 31 provinces into eastern, central, and western groups based on geographic location (see **Table 7**).

Table 7. Regional classification

Eastern region	**Central region**	**Western region**
Beijing, Jiangsu, Zhejiang, Shanghai, Hebei, Liaoning, Tianjin, Guangdong, Shandong, Fujian, Hainan	Jilin, Heilongjiang, Hubei, Hunan, Anhui, Shanxi, Henan, Jiangxi	Tibet, Ningxia, Xinjiang, Shaanxi, Chongqing, Qinghai, Gansu, Sichuan, Guizhou, Inner Mongolia, Guangxi, Yunnan

Regressions for each sub-sample are reported in **Table 8**.

Table 8. Regional heterogeneity in the effect of digital financial inclusion on consumption upgrading

	(1)	(2)	(3)
	con	con	con
ind	0.353**	0.380**	0.459***
	(3.05)	(2.65)	(6.25)
urb	0.765	-1.309	-0.745
	(1.13)	(-0.73)	(-0.49)
open	-0.052	-0.267	-0.144
	(-0.65)	(-1.21)	(-1.49)
od	2.857	4.797***	1.799
	(1.78)	(4.41)	(1.40)
theil	0.860***	0.517**	0.372
	(4.71)	(2.44)	(1.28)
fdi	0.049**	0.142**	0.052**
	(2.57)	(3.12)	(2.24)
_cons	-0.226	0.746	0.797
	(-0.31)	(0.72)	(0.95)
id	Yes	Yes	Yes
year	Yes	Yes	Yes
N	99	72	108
r2	0.917	0.934	0.873
r2_a	0.890	0.907	0.835

$^{*}P < 0.1$, $^{**}P < 0.05$, $^{***}P < 0.01$

The coefficients for the eastern and central regions are 0.353 and 0.380, respectively, both significant at 5%. These modest effects may be attributable to the already advanced financial infrastructure and higher adoption rates in these areas, leaving less room for marginal improvement. In contrast, the western region exhibits a coefficient of 0.459, significant at 1%, indicating a stronger positive impact. This likely stems from the region's relatively underdeveloped economic base, where digital financial inclusion can produce more pronounced socioeconomic benefits, thereby exerting a greater boost to consumption capacity and structural upgrading. Overall, the regional analysis reveals significant heterogeneity, with the western area benefiting the most from digital financial inclusion in terms of consumption upgrading.

5. Conclusion

This study aims to provide an indepth understanding of the mechanisms through which digital financial inclusion facilitates household consumption structure upgrading. Using a rigorous empirical model and data from the China Family Panel Studies (CFPS) covering 31 provinces over 2015–2023, we find robust evidence that digital financial inclusion exerts a significant positive effect on accelerating consumption upgrading.

First, the constructed consumption upgrading index reveals substantial interprovincial variation, mirroring China's unbalanced regional development. Economically advanced areas such as Beijing and Shanghai show higher index values, while less developed regions like Shanxi and Henan lag behind. This implies that consumption upgrading is influenced not only by individual income but also by regional economic conditions. Second, robustness checks—whether by altering the control set or changing the dependent variable—consistently confirm the stability of the positive effect. Third, the baseline regression shows that a oneunit increase in the digital financial inclusion index raises the consumption upgrading index by about 0.304 units, underscoring its meaningful contribution. This suggests that digital financial inclusion, by offering convenient services, lowering transaction costs, and improving credit accessibility, effectively stimulates consumption upgrading. Moreover, control variables such as urbanization, elderly consumption demand, and social security also exhibit significant positive impacts, consistent with expectations.

In summary, our empirical findings strongly support the theoretical prediction that digital financial inclusion plays a beneficial role in promoting household consumption upgrading. These conclusions carry both theoretical value and practical implications for understanding how digital financial inclusion can accelerate the transformation of consumption structures. As digital technologies continue to evolve and financial innovation advances, digital financial inclusion is expected to become even more instrumental in raising consumption levels and steering the economy toward higherquality development.

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