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The Impact of Digital Financial Inclusion on Household Consumption Upgrading: Empirical Evidence from Provincial Panel Data in China

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Abstract. Whether digital financial inclusion can push household consumption toward higher-quality categories, and through what channels, remains an open empirical question in the context of domestic demand expansion. This study combines the Peking University Digital Financial Inclusion Index with provincial macroeconomic statistics to build a balanced panel covering 31 Chinese provinces over 2013-2022, and estimates two-way fixed effects models that identify the aggregate impact, its regional variation, and the underlying transmission channels. Three findings emerge. First, digital financial inclusion exerts a significant positive influence on consumption upgrading: raising the aggregate index by 1% is associated with an increase of roughly 0.23 percentage points in the share of development- and enjoyment-oriented spending, a result that survives alternative dependent-variable definitions and a one-period lag of the core regressor. Second, the effect is geographically uneven — clearly present in eastern provinces but not yet detectable in central and western ones — which indicates that turning financial supply into actual consumption behavior requires complementary conditions in income, logistics, and consumption scenarios. Third, channel tests lend preliminary support to the digital credit route but not to the payment convenience route, and coverage breadth proves to be the dominant sub-dimension. The evidence can inform more targeted digital finance policies aimed at expanding domestic demand and upgrading consumption.

Keywords: digital financial inclusion, household consumption upgrading, consumption structure, two-way fixed effects model, mechanism tests

1. Introduction

1.1. Research background

Consumption has been assigned an increasingly central role in China's economic strategy since the 18th National Congress of the Communist Party of China, and expanding domestic demand now sits at the core of the new development pattern in which the domestic cycle serves as the mainstay. Within this agenda, shifting household spending from quantitative expansion toward qualitative improvement is widely regarded as essential for unblocking economic circulation and supporting

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high-quality development. Over the same period, digital financial inclusion — exemplified by mobile payment and online credit — has grown at a remarkable pace in China, reshaping how households obtain and use financial services and opening a fresh lens through which changes in household consumption behavior can be understood.

The Peking University Digital Financial Inclusion Index offers a direct window on how rapidly and broadly this sector has expanded. The provincial mean of the aggregate index climbed from roughly 40.0 in 2011 to about 393.7 in 2023, a rise of about 9.8 times. Regional disparities narrowed sharply over the same period: in 2011 the top-ranked province (Shanghai, 80.19) scored about 4.9 times the bottom one (Tibet, 16.22), while by 2023 the leading value (Shanghai, 473.83) exceeded the lowest (Qinghai, 351.08) by a factor of only about 1.35. Rapid nationwide growth together with converging regional gaps is consistent with the convergence pattern documented by Guo et al. [1] using early waves of the index, and it further suggests that digital financial services have by now penetrated the less-developed central and western provinces, so that any influence on household consumption should no longer be viewed as an exclusively eastern phenomenon.

Scholars have already produced a sizeable literature on the economic and social consequences of digital financial inclusion. The index compiled at the provincial, city, and county levels by Guo et al. [1] supplies the foundational data for this strand of work. Building on it, Qian et al. [2] investigated how digital finance relates to economic growth; Zhang et al. [3] demonstrated that digital finance delivers significant income gains and stimulates entrepreneurship among low-income rural households, thereby fostering inclusive growth; and He et al. [4] examined its contribution to reducing multidimensional poverty. Most pertinent to the present study is the consumption literature: drawing on micro data from the China Family Panel Studies (CFPS), Yi and Zhou [5] showed that digital financial inclusion significantly raises household consumption, operating chiefly through relaxed liquidity constraints and easier payments.

Nevertheless, several margins of the literature remain open. To begin with, the overwhelming majority of studies address the level of consumption rather than its structure, leaving the transition from subsistence-oriented to development- and enjoyment-oriented spending comparatively under-explored. In addition, despite the clear regional convergence of digital financial inclusion itself, long-sample evidence on whether its consumption effects vary systematically across the eastern, central, and western regions is still lacking. Finally, whether the two canonical transmission paths — liquidity constraint relief and payment facilitation — continue to operate when the outcome is consumption upgrading, and which of them dominates, has not been settled. The present paper takes these open questions as its point of departure.

1.2. Research questions

Motivated by this background and by the gaps identified above, the analysis is organized around three concrete and empirically testable questions about how digital financial inclusion relates to household consumption upgrading:

Question 1 (overall effect): Within China, does the aggregate development of digital financial inclusion exert a statistically significant positive influence on household consumption upgrading?

Question 2 (regional heterogeneity): Is the magnitude of this influence significantly different among the eastern, central, and western regions?

Question 3 (transmission mechanism): Along which routes is the effect transmitted? The analysis concentrates on two candidate routes — alleviating liquidity constraints and making payments more convenient.

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1.3. Research methods

The empirical analysis relies on a balanced provincial panel of 31 Chinese provincial-level units spanning 2013-2022; the choice of sample window is dictated by the statistical caliber of provincial consumption-structure data and by the coverage of the control variables, as explained in the data description in Section 4. Province-level macroeconomic statistics are merged with the Peking University Digital Financial Inclusion Index [1], and to limit the distortion from outliers every continuous variable is winsorized at its 1st and 99th percentiles.

As for variable construction, the outcome of interest is the household consumption upgrading rate — the fraction of development- and enjoyment-oriented expenditure in total household consumption expenditure — a measurement that follows the consumption classification adopted by Yi and Zhou [5]. The key regressor is the logarithm of the aggregate Peking University index, which summarizes provincial digital financial inclusion along coverage breadth, usage depth, and digitization level. The control set comprises economic development, urbanization, industrial structure, fiscal support, and human capital.

The identification strategy proceeds in three steps. The baseline specification is a two-way fixed effects panel model that absorbs province and year effects simultaneously, thereby netting out time-invariant interprovincial heterogeneity and common macro shocks and alleviating omitted variable concerns. Question 2 is addressed by estimating the model separately on the eastern, central, and western subsamples. Question 3 is examined through channel tests built around the digital credit and digital payment sub-indices, corresponding to the liquidity-constraint and payment-facilitation routes. Model specification, variable definitions, and robustness exercises are presented in the relevant sections that follow.

1.4. Research significance

By exploiting provincial panel data, this study seeks to characterize, in a unified framework, the aggregate effect of digital financial inclusion on household consumption upgrading, its regional variation, and the channels behind it. The contribution is twofold.

On the academic side, the analysis moves the discussion of how digital financial inclusion affects consumption beyond aggregate spending levels and into the composition of spending, while adding fresh provincial evidence on regional heterogeneity and transmission channels; in doing so it enriches the understanding of the inclusive value of digital finance and complements existing work on what drives consumption upgrading.

On the policy side, the results speak to the practical issue of making digital finance serve domestic demand expansion and consumption upgrading more precisely. Should the effect prove to be regionally uneven, digital finance initiatives in less-developed areas would need to proceed in tandem with supporting conditions such as income, logistics, and consumption scenarios; should the effect be transmitted chiefly through liquidity-constraint relief, the orderly development of digital consumer credit would carry immediate policy relevance. The empirical exercises below supply evidence bearing on both judgments.

2. Literature review

As the new development pattern advances and domestic demand expansion gains strategic priority, the deep fusion of digital technology with inclusive finance has turned digital financial inclusion into a significant lever for unlocking household consumption potential and supporting high-quality

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growth. Prior work indicates that the joint development of the digital economy and inclusive finance markedly boosts economic and inclusive growth [2, 3], and the question of how digital financial inclusion bears on household consumption upgrading has accordingly drawn considerable scholarly interest. Taking digital financial inclusion and household consumption upgrading as the core search terms, this paper reviews representative studies published in core journals indexed by the China National Knowledge Infrastructure since 2018. The reviewed work can be grouped into two strands — one concerned with effects and mechanisms, the other with methods and measurement — and each is discussed in turn.

On effects and mechanisms, the literature has developed a framework in which macro- and micro-level evidence mutually reinforce one another, and attention has gradually shifted from establishing that a positive effect exists toward understanding its heterogeneity and transmission. Province-level panel studies broadly agree that digital financial inclusion shifts the consumption structure away from subsistence spending toward development- and enjoyment-oriented categories [6, 7]. Nor is the effect purely local: Zhang and Hu [8] document significant positive spatial spillovers and find that coverage breadth matters more than usage depth or digitization. Household-survey evidence sharpens the mechanism: two core channels — relief of liquidity constraints and facilitation of payments — were established early on [5]; An et al. [9] subsequently broadened the framework to include indirect routes such as price effects and improved social security; and Jin and Sun [10], using the QUAIDS model, traced out how consumption-structure responses differ across income groups. It should also be recognized that the dividends of digital finance are unevenly distributed, since the digital divide can prevent low-income households from fully sharing in the inclusive gains [4]. A broad consensus thus holds that the effect is inclusive — empowering central and western regions, rural areas, and low-income groups most strongly — yet studies that examine several transmission channels jointly, or test channels within a spatial framework, remain scarce.

With respect to methodology and measurement, the field is marked by diverse choices and steadily improving identification. Two-way fixed effects and dynamic panel specifications estimated on balanced provincial panels form the standard toolkit [6]; mediation models are commonly used to decompose transmission channels, and spatial econometric specifications have been introduced to capture the spatial spillovers of the consumption-upgrading effect [8], thereby correcting the traditional panel's neglect of spatial dependence. Micro-level work typically exploits household surveys: An et al. [9] bring in the AIDS framework, whereas Jin and Sun [10] rely on the QUAIDS specification to describe consumption structure, allowing finer dissection of inter-group differences. On measurement, the index produced by the Institute of Digital Finance at Peking University builds an indicator system on coverage breadth, usage depth, and digitization level at the provincial, city, and county tiers, supplying a standardized core regressor for the field [1]. Each approach has its own applicable setting and limits; even so, designs that integrate heterogeneity analysis with channel testing in a single systematic framework are uncommon, and the standardization of channel-testing procedures in part of the literature still leaves room for unification.

Taken as a whole, the existing studies examine the link between digital financial inclusion and household consumption upgrading from the perspectives of effects and channels as well as methods and measurement, providing a firm basis for the design and logic of the present paper; three extensions nevertheless remain possible. Regarding perspective, prior work centers on channels such as liquidity constraints and payment facilitation while devoting limited attention to the spatial heterogeneity of the effect. Regarding design, an integrated empirical framework combining two-way fixed effects identification, heterogeneity analysis, and channel tests is still wanting. Regarding content, the interplay among multiple influence channels deserves deeper treatment. Accordingly,

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this paper estimates a two-way fixed effects model on Chinese provincial panel data, evaluates the effect of digital financial inclusion on household consumption upgrading, and tests it along the two dimensions of heterogeneity and channels, thereby addressing the gaps just described.

3. Theoretical analysis and research hypotheses

Although the positive influence of digital financial inclusion on household consumption upgrading is well documented, the channels behind it still call for systematic theoretical clarification. Beginning from the definition of the core concepts, the present section derives the relevant transmission routes from classical consumption and finance theories and then states the hypotheses to be tested.

Digital financial inclusion is understood here as a financial service model that merges digital technology with the inclusive finance philosophy: drawing on big data, mobile internet, and related technologies, it cuts service thresholds and operating costs so that groups long excluded from formal finance gain access to affordable services. Its measurement follows the framework of Guo et al. [1], with coverage breadth, usage depth, and digitization level as the three dimensions. Household consumption upgrading denotes the transition of household spending from a subsistence-dominated pattern toward one led by development- and enjoyment-oriented categories; its core symptom is a rising share of development- and enjoyment-oriented expenditure in total consumption, and it is characterized in this paper at both the level and the structure of consumption.

Three classical theories underpin the analytical framework. Liquidity constraint theory argues that current income and available funds bind household spending, so that when constraints bind, development- and enjoyment-oriented spending tends to be cut first; applied to the present context, digital financial inclusion can loosen the budget constraint by widening access to small-value credit and lowering entry thresholds, thereby rendering consumption upgrading feasible. Transaction cost theory holds that the time and fee costs attached to financial services dampen consumption; by reducing frictions through services such as mobile payment, digital financial inclusion raises payment convenience and releases consumption potential. Precautionary saving theory attributes elevated saving and compressed current consumption to uncertainty over future income and expenditure; through its risk-sharing functions, digital financial inclusion can strengthen households' capacity to smooth risk, temper precautionary motives, and lift current consumption upgrading.

Building on these theories, three channels connect digital financial inclusion to household consumption upgrading. The first operates by easing liquidity constraints. Within the traditional financial system, spending is bound by current income and disposable funds, and development- and enjoyment-oriented categories are usually the first casualties when constraints tighten. Supported by big-data risk control, digital financial inclusion substitutes online services for physical branches, lowers the entry bar for consumer credit, and lengthens the service radius, enabling households formerly shut out of formal credit to obtain small loans and consumer finance conveniently; the resulting relaxation of budget constraints releases pent-up demand for development- and enjoyment-oriented goods and improves the consumption structure [5]. The second channel works through lower transaction costs. Cash-based payment and offline shopping carry substantial time costs and frictions that hold back consumption. By spreading mobile payment and scenario-embedded financial services, digital financial inclusion shortens the payment process, economizes on transaction time, and cuts the cost of consuming [8], which raises how often and how conveniently households consume and encourages outlays on development- and enjoyment-oriented items. The third channel runs through household income. Uncertainty about earnings and expenses strengthens the desire to save and crowds out current spending. Digital financial inclusion, on the one hand,

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eases the creation of small, medium, and micro enterprises, adds employment, diversifies income sources, and improves income expectations; on the other hand, products such as digital insurance and inclusive wealth management bolster households' ability to withstand risk, which weakens precautionary saving and reinforces the capacity to consume [3].

On the basis of this reasoning, three hypotheses are advanced:

H1: The development of digital financial inclusion exerts a significant positive influence on household consumption upgrading.

H2: The strength of this consumption-upgrading effect varies across regions and is expected to be larger in central and western China, where traditional financial provision is relatively weak.

H3: The effect operates through channels that include the easing of liquidity constraints and the reduction of transaction costs.

One caveat is in order: the income channel acts on household earnings, which at the provincial level can hardly be disentangled from overall economic development. The channel tests below therefore concentrate on the liquidity-constraint and transaction-cost routes, proxied by the digital credit and digital payment sub-indices, while the income route is deferred to future work using micro-level data.

4. Methodology

4.1. Model specification

To evaluate this impact empirically, the following two-way fixed effects specification is constructed:

$$Upgrade_{it} = \alpha + \beta \cdot lnDFI_{it} + \gamma \cdot X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where i indexes provinces and t indexes years. The outcome Upgrade is the household consumption upgrading rate; lnDFI, the core regressor, is the natural logarithm of the aggregate Peking University Digital Financial Inclusion Index; X collects the controls, namely economic development (lnpgdp), urbanization (urban), industrial structure (ind), fiscal support (gov), and human capital (edu); μ captures province fixed effects, absorbing time-invariant provincial attributes such as consumption culture and geographic endowments; λ captures year fixed effects, absorbing common shocks arising from macroeconomic fluctuations and nationwide policies; and ε is the disturbance. Standard errors are clustered at the province level throughout.

4.2. Variable definitions

The definitions and measurements of all main variables are summarized in Table 1.

Table 1. Variable definitions and measurements

Variable type	Symbol	Definition and measurement
Dependent variable	upgrade	Consumption upgrading rate = (transport and communication + education, culture and recreation + other articles and services) / per capita total consumption expenditure
Dependent variable (robustness)	upgrade2	Share of development- and enjoyment-oriented consumption (broad measure): subsistence = food, tobacco and alcohol; clothing; residence; development = transport and communication; education, culture and recreation; health care; enjoyment = household articles and services; other articles and services. upgrade2 = (development + enjoyment) / total expenditure

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Table 1. (continued)

Dependent variable (robustness)	lnconsume	Consumption level: logarithm of per capita household consumption expenditure
Core explanatory variable	lndfi	Logarithm of the aggregate Peking University Digital Financial Inclusion Index
Mechanism variables	lncredit / lnpayment	Logarithms of the digital credit sub-index and the digital payment sub-index, respectively
Control variable	lnpgdp	Economic development: logarithm of per capita GDP
Control variable	urban	Urbanization: urban permanent residents / year-end permanent residents
Control variable	ind	Industrial structure: value added of the tertiary industry / value added of the secondary industry
Control variable	gov	Fiscal support: local general public budget expenditure / GDP
Control variable	edu	Human capital: enrolled students in regular institutions of higher education / total population

Note: All continuous variables have been winsorized at the 1st and 99th percentiles so as to limit outlier influence.

4.3. Data and sample

Data on digital financial inclusion are drawn from the sixth wave (2011-2023) of the Peking University Digital Financial Inclusion Index, published by the Institute of Digital Finance at Peking University; the index rests on three first-level dimensions — coverage breadth, usage depth, and digitization level — and additionally reports business sub-indices covering payment, credit, and related activities [1]. Figures on household consumption and the macroeconomic controls are taken from the China Statistical Yearbook together with the provincial series available through the National Data portal of the National Bureau of Statistics of China. Because the eight-category breakdown of household consumption by province has been officially released only since the 2013 integration of urban and rural household surveys, while the control variables extend only through 2022, the analysis window is fixed at 2013-2022. The result is a balanced panel of 31 provincial-level units in mainland China (Hong Kong, Macao, and Taiwan excluded) with 310 province-year observations.

5. Results

5.1. Descriptive statistics

Descriptive statistics for the main variables appear in Table 2. The consumption upgrading rate (upgrade) averages 0.2659 — in other words, development- and enjoyment-oriented spending under the narrow definition adopted here represents roughly 26.6% of total consumption expenditure — and ranges from 0.1891 to 0.3417, pointing to wide dispersion in consumption structure both across provinces and over time and hence to ample identifying variation. The log of the aggregate digital financial inclusion index averages 5.5804 with a standard deviation of 0.3101, which mirrors the sizable interprovincial gaps in digital finance development.

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Table 2. Descriptive statistics of the main variables

Variable	Obs.	Mean	Std. dev.	Min	Max
upgrade	310	0.2659	0.0265	0.1891	0.3417
upgrade2	310	0.4102	0.0388	0.2652	0.4836
lnconsume	310	9.7795	0.3593	9.0175	10.6837
lndfi	310	5.5804	0.3101	4.8551	6.0991
lncredit	310	5.0663	0.4696	3.3731	5.6796
lnpayment	310	5.3589	0.3775	4.1550	5.9014
lnpgdp	310	10.9354	0.4284	10.1552	12.0749
urban	310	0.6049	0.1223	0.3147	0.8931
ind	310	1.4209	0.7346	0.7156	5.0221
gov	310	0.2910	0.2013	0.1200	1.2727
edu	310	0.0214	0.0065	0.0092	0.0439

5.2. Baseline regression results

The baseline estimates are presented in Table 3. When only the core regressor enters the specification (column 1), the lndfi coefficient equals 0.2919 and is significant at the 1% level; with the complete control set added (column 2), it falls slightly to 0.2285 yet remains significant at 1%. Digital financial inclusion is therefore shown to significantly foster household consumption upgrading even after province and year fixed effects and the relevant socioeconomic covariates are accounted for, lending support to hypothesis H1. Economically, each 1% rise in the aggregate index corresponds to an increase of about 0.23 percentage points in the consumption upgrading rate — a non-trivial magnitude relative to the average provincial growth of digital finance over the sample window. Among the controls, urbanization carries a coefficient of 0.3491 and is significant at the 5% level, consistent with the view that the consumption scenarios created by urban population agglomeration further encourage structural upgrading; none of the remaining controls attains conventional significance.

Table 3. Baseline regression results

Variable	(1) Without controls	(2) With controls
lndfi	0.2919***	0.2285***
	(4.76)	(4.18)
lnpgdp		-0.0457
		(-1.57)
urban		0.3491**
		(2.42)
ind		0.0075
		(0.55)

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Table 3. (continued)

gov		-0.0360
		(-0.64)
edu		0.0170
		(0.05)
Province fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Within R-squared	0.252	0.323
Observations	310	310

*Notes: Parentheses report t-statistics computed from province-level clustered robust standard errors; ***, **, and * mark significance at the 1%, 5%, and 10% levels, respectively. Identical conventions apply in subsequent tables.*

5.3. Robustness checks

Three exercises assess the robustness of this conclusion; the results appear in Table 4. The first replaces the outcome measure: under the broader definition of development- and enjoyment-oriented consumption, which additionally counts health care and household articles and services (upgrade2), the lndfi coefficient is 0.2741 and significant at 1%. The second substitutes the consumption level for the consumption structure: taking log per capita household consumption expenditure (lnconsume) as the outcome yields a coefficient of 0.3134, significant at the 10% level, which implies that digital financial inclusion enlarges not only the quality but also the scale of consumption. The third addresses timing: once the core regressor is lagged one period (L.lndfi), the coefficient is 0.1317 and significant at 5%, which to some extent rules out contemporaneous reverse causality. Every check is consistent with the baseline finding.

Table 4. Robustness checks

Variable	(1) Broad measure	(2) ln(consumption)	(3) Lagged regressor
lndfi	0.2741***	0.3134*	
	(4.81)	(2.04)	
L.lndfi			0.1317**
			(2.51)
Control variables	Yes	Yes	Yes
Province/year fixed effects	Yes	Yes	Yes
Within R-squared	0.304	0.402	0.161
Observations	310	310	279

5.4. Heterogeneity analysis

Table 5 presents estimates obtained separately for the eastern, central, and western subsamples. The lndfi coefficient is 0.2197 in the east and significant at the 10% level; it stays positive but loses significance in the central (0.0166) and western (0.0816) samples. This pattern departs from the

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direction posited in hypothesis H2: at present, the consumption-upgrading effect of digital financial inclusion is concentrated in the eastern region. One reasonable interpretation is that upgrading requires more than the mere supply of finance — it also hinges on complementary conditions such as income levels, logistics networks, and consumption scenarios. Because eastern China enjoys a more mature digital infrastructure and consumption ecosystem, the service capacity of digital finance translates smoothly into consumption behavior there; in the central and western regions, by contrast, digital financial inclusion is still in the coverage-expansion stage, and gains in financial availability have yet to feed through to the consumption structure. The lesson is that the regional payoff of digital finance policy rests heavily on the supporting environment, an observation with direct bearing on policy design.

Table 5. Heterogeneity analysis by region

Variable	(1) Eastern	(2) Central	(3) Western
lndfi	0.2197*	0.0166	0.0816
	(1.81)	(0.17)	(1.31)
Control variables	Yes	Yes	Yes
Province/year fixed effects	Yes	Yes	Yes
Within R-squared	0.464	0.221	0.058
Observations	110	80	120

5.5. Mechanism tests

The theoretical discussion identifies two candidate routes through which digital financial inclusion may lift household consumption upgrading: relieving liquidity constraints and cutting transaction costs. Adopting the testing logic recommended by Jiang [11], this paper regards the effect of digital financial inclusion on a channel variable, together with the movement of the baseline coefficient once that variable enters the regression, as evidence that the channel operates. The two routes are proxied respectively by the digital credit sub-index (lncredit) and the digital payment sub-index (lnpayment); Table 6 reports the results.

Regarding the liquidity-constraint route, column (1) places the lndfi coefficient on lncredit at 2.7123, significant at the 1% level — digital financial inclusion clearly expands digital credit provision. When lndfi and lncredit enter together in column (2), the lncredit coefficient is positive (0.0165), while the lndfi coefficient drops from its baseline value of 0.2285 to 0.1838 but stays significant at 1%. A decline of roughly one fifth in the core coefficient indicates that improved credit availability absorbs part of the transmission, giving preliminary support to the liquidity-constraint channel.

Regarding the transaction-cost route, the lndfi coefficient on lnpayment in column (3) is 1.0456 and significant at 1%; in column (4), however, the added lnpayment term enters with an insignificant coefficient of -0.0204, and the lndfi coefficient shows no decline. The data therefore fail to support an indirect effect running through payment convenience. A likely explanation is that mobile payment had already become near-universal during the sample window, leaving little interprovincial variation for marginal payment improvements to explain consumption-structure differences. Hypothesis H3 thus receives only partial support.

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Table 6. Mechanism tests

Variable	(1) lncredit	(2) upgrade	(3) lnpayment	(4) upgrade
lndfi	2.7123***	0.1838***	1.0456***	0.2498***
	(4.34)	(3.30)	(4.82)	(4.61)
lncredit		0.0165		
		(1.60)		
lnpayment				-0.0204
				(-0.81)
Control variables	Yes	Yes	Yes	Yes
Province/year fixed effects	Yes	Yes	Yes	Yes
Within R-squared	0.446	0.334	0.340	0.327
Observations	310	310	310	310

5.6. Further analysis: sub-dimension regressions

Replacing the aggregate index in turn with its three first-level sub-dimensions yields the estimates in Table 7. Coverage breadth enters with a coefficient of 0.2419 (significant at 1%), usage depth with 0.0803 (also significant at 1%), and digitization level with -0.0628, which is negative and only marginally significant at 10%. The pulling force behind consumption upgrading evidently originates mainly from wider coverage: bringing previously excluded residents into formal financial services contributes more than intensifying usage among existing users. That digitization carries a marginally negative sign implies that moving services online and streamlining procedures does not, by itself, guarantee structural improvement and may even coincide with phenomena such as overdraft consumption and induced marketing — an issue that future work should seek to identify more sharply.

Table 7. Sub-dimension regressions

Variable	(1) Coverage breadth	(2) Usage depth	(3) Digitization level
lncover	0.2419***		
	(6.82)		
lndepth		0.0803***	
		(3.57)	
lndigit			-0.0628*
			(-2.01)
Control variables	Yes	Yes	Yes
Province/year fixed effects	Yes	Yes	Yes

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Table 7. (continued)

Within R-squared	0.460	0.267	0.251
Observations	310	310	310

6. Conclusion and policy implications

6.1. Main conclusions

Drawing on a 2013-2022 provincial panel of 31 Chinese provinces and estimating two-way fixed effects models, this paper has evaluated how digital financial inclusion bears on household consumption upgrading. The principal findings are summarized below.

First, the effect of digital financial inclusion on household consumption upgrading is significantly positive. Raising the aggregate index by 1% adds about 0.23 percentage points to the share of development- and enjoyment-oriented consumption, and this conclusion survives replacing the outcome measure, using the consumption level in place of the structure, and lagging the core regressor by one period.

Second, the effect is markedly uneven across space. It is statistically detectable in eastern China but not yet in the central and western regions, implying that the conversion of financial supply into consumption behavior leans heavily on complementary conditions in income, logistics, and consumption scenarios.

Third, liquidity constraints constitute an important transmission route. Expanded digital credit provision carries about one fifth of the overall effect, whereas the payment-convenience route finds no support, plausibly because mobile payment was already highly popular.

Fourth, coverage breadth emerges as the dominant sub-dimension: widening service coverage does more for structural upgrading than deepening usage among existing users.

6.2. Policy implications

First, keep widening the coverage breadth of digital financial inclusion. Priority in policy resources should go to populations and territories still outside formal finance — rural communities, small and micro businesses, and new urban residents among them — while customer-acquisition and risk-control costs can be brought down through village-level service stations and agriculture-related, data-enabled credit enhancement.

Second, shore up the supporting weaknesses of central and western China. Digital finance initiatives there ought to advance hand in hand with logistics infrastructure, county-level commercial systems, and the cultivation of consumption scenarios, so that the transmission chain from financial availability to consumption capacity and ultimately to consumption behavior is unblocked and a disconnect in which services exist but consumption does not follow is avoided.

Third, pursue the regulated development of digital consumer credit. So that the credit channel can play its part in easing liquidity constraints, interest-rate disclosure, suitability management, and debt-risk monitoring in internet-based consumer finance all need strengthening to guard low-income groups against over-indebtedness.

Fourth, apply regionally differentiated policies. The eastern region may emphasize deep integration between digital finance and consumption scenarios, while the central and western regions should concentrate on coverage expansion and infrastructure building, thereby steering clear of any single-indicator assessment orientation.

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6.3. Limitations and future research

Several limitations should be acknowledged. The sample window closes in 2022 owing to data availability and thus misses the most recent developments in digital finance. The channel tests rest on provincial business sub-indices that correlate mechanically with the aggregate index, and the income route is left untested; micro datasets such as the China Household Finance Survey (CHFS) would allow the liquidity-constraint and income channels to be identified directly at the household level. Finally, endogeneity is only partially mitigated here, and future studies could tighten causal identification through instrumental variables or quasi-natural experiments.

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