

Research on the Impact of Digital Inclusive Finance on Residents' Consumption Upgrading

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Abstract

During China's economic transition, consumption has become the main growth driver. Based on data from 281 cities in China from 2011 to 2020, this paper explores the impact of digital inclusive finance on residents' consumption upgrading and its mechanism using a fixed-effects model. The results show that (1) digital inclusive finance significantly promotes residents' consumption, especially in terms of breadth of coverage, depth of use, and degree of digitization. (2) In the heterogeneity analysis, region, city size, and urban-rural differences show heterogeneity in the impact of digital inclusive finance on consumption upgrading, with eastern, rural, and densely populated areas benefiting more. (3) Mechanism analysis reveals that digital inclusive finance promotes consumption growth by raising income and financial development levels and easing liquidity constraints. The findings of this paper provide a basis for the formulation of digital inclusive finance policies to promote consumption upgrading.

Keywords

Digital financial inclusion, Consumer spending upgrading, Labor and employment, Liquidity constraints.

1. Introduction

Against the backdrop of the new era, China's economy is gradually transforming from production-driven to consumption-driven, and consumption has become the key force driving economic growth and the solid foundation of the national economy. In the face of the intensification of global inflation and the rising risk of recession since 2022, China has put forward a new development model based on the domestic macro-cycle as the mainstay, with the domestic and international double-cycle mutually promoting each other. Promoting the recovery and expansion of consumption is a top priority, with a view to realizing moderate growth in consumer prices. Therefore, how to effectively promote consumption growth and expand domestic demand has become a key issue that needs to be resolved. With the rapid development of science and technology, digital inclusive finance, as a new model combining Internet technology and financial services, provides strong support for residents' consumption upgrading. Studying the mechanism of digital inclusive finance's role in promoting residents' consumption upgrading and its heterogeneity not only helps to bring its inclusive advantages into play but also promotes the high-quality development of China's economy and realizes more sustainable and sound economic growth.

This paper therefore aims to address the following questions: first, given the broad coverage and efficient service characteristics of digital inclusive finance, this study will examine whether it can effectively promote consumption upgrading. Second, in exploring the multidimensional characteristics of digital inclusive finance, this study refers to Guo Feng et al. (2020)⁰ study to further refine the concept of digital inclusive finance into three key dimensions: breadth of

coverage, depth of use, and degree of digitization. Does constructing an empirical research framework help further reveal digital finance's impact mechanism on promoting consumption upgrading? Third, for regions with different resource endowments, such as the consumption habits of urban and rural residents, the size of the urban population, and the level of economic development in the eastern, central, and western regions, there are significant differences, and this paper will explore whether the impact of digital financial inclusion on residents' consumption upgrading reflects a heterogeneous impact in the urban-rural and sub-regional contexts?

Based on this, this paper explores the influence mechanism of digital finance on residents' consumption level and consumption upgrade based on the Digital Inclusive Finance Index compiled by Peking University.

The innovations of this paper as compared to the existing literature are as follows:

Firstly, The development of digital financial inclusion has had a positive impact on regional economies and residents' incomes, but existing research is dominated by traditional financial credit^[2], often ignoring its potential to promote consumption. Through empirical research, this paper fills this research gap by providing a quantitative analysis of the impact of digital inclusive finance on consumption, thus providing a new perspective for understanding its comprehensive role in promoting economic development and improving residents' living standards. Secondly, regarding the more dispersed transmission path of Internet finance or digital finance on consumption upgrading, combined with relevant consumption theories, this paper aims to influence labor employment and income levels, alleviate liquidity constraints, two mechanism paths to objectively analyze its impact mechanism, and empirical tests, put forward targeted recommendations that help optimize the policy effects of digital financial finance. From the realistic level, the universality and long-tail advantage of digital inclusive finance not only meet the needs of the majority of residents to consume across the period and alleviate the imbalance between income and expenditure but also provide strong support for the diversification of residents' consumption and further promotes the upgrading of consumption. Third, this paper explores the heterogeneous impact of digital inclusive finance on residents' consumption upgrading under different resource conditions, which provides an important reference for an in-depth understanding of the role of digital inclusive finance and the formulation of effective policies and helps to better utilize the potential of digital inclusive finance by identifying the differences in geographic regions, urban and rural areas, and population sizes to promote its development.

2. Literature Review and Research Hypothesis

2.1. The direct impact of digital inclusive finance on residents' consumption upgrade

The advent of digital technology has precipitated the digitisation and inclusion of the financial services industry. The advent of fintech has seen the integration of big data and artificial intelligence, which have transformed traditional financial services^[3] and enhanced the scope and efficacy of the services provided ^[4]. The inclusion of digital financial services has the potential to reduce transaction costs, mitigate information asymmetry, enhance the fairness and accessibility of financial services, and facilitate greater credit opportunities, particularly for the "long-tail group"^[5].

In the process of promoting digital financial inclusion, third-party payment platforms have enhanced the convenience of consumption through the facilitation of mobile payment, thereby stimulating consumption activities. Furthermore, digital inclusive finance simplifies the lending process, thereby facilitating access to credit for rural and low-income households. This effectively alleviates liquidity constraints and releases consumption potential, particularly in

low- and middle-income groups and economically underdeveloped regions. Consequently, there is a reduction in consumption inequality[6][7][8]. In light of these observations, this paper proposes hypothesis 1.

Hypothesis 1: Digital financial inclusion can contribute to upgrading the consumption of the population as a whole

2.2. The mechanism of digital inclusive finance affecting residents' consumption upgrade

2.2.1. Mediating effects of labor force employment and income levels

In examining the role of labor employment in the influence of digital inclusive finance on residents' consumption upgrading, scholars posit that digital inclusive finance has elevated the non-agricultural employment level and wage income of the labor force by lowering the entrepreneurial threshold and popularizing financial services[9], thereby enhancing the consumption capacity of residents[10]. Concurrently, it provides inexpensive financial services, markedly increasing residents' income, particularly among middle- and low-income groups, and facilitating the narrowing of the income gap[11]. Furthermore, the advent of digital technology has led to greater accessibility of services, enhancing the efficiency of information processing and dissemination, optimizing entrepreneurial conditions, and stimulating the employment and entrepreneurial intentions of workers [12][13]. These developments not only facilitate the advancement of the employment market and the expansion of income sources but also serve to mitigate income inequality among residents[14]. As income levels increase, residents' consumption patterns shift from meeting basic living needs to seeking higher-quality products and services, a process known as consumption upgrading[15]. In conclusion, digital inclusive finance has enhanced the employment and income levels of the labor force, providing residents with more consumption options and promoting the optimization of the consumption structure[16]. Based on the foregoing analysis, the following hypothesis 2 is proposed:

Hypothesis 2: Digital financial inclusion promotes consumption upgrading of the population by affecting labor employment and income levels

2.2.2. Mediating effects of liquidity constraints

Digital inclusive finance effectively alleviates residents' liquidity constraints by lowering the threshold for financial services[17]and reducing information asymmetry[18], thereby supporting shared prosperity. In addition to optimizing the credit environment, providing more accurate financial products for low-income groups, and improving their credit opportunities, digital inclusive finance leverages Internet and big data technologies to break service constraints, reduce financing costs, expand income sources, and contribute to narrowing the wealth gap, promoting social common prosperity, and increasing residents' consumption[19][20]. Based on this, the following hypothesis 3 is proposed:

Hypothesis 3: Digital financial inclusion promotes consumption upgrading by easing liquidity constraints

3. Research Design

3.1. Modeling

Based on the theoretical analysis foundation of the previous paper, this paper will mainly study the impact of digital inclusive finance on residents' consumption upgrading by examining the impact of digital inclusive finance on residents' consumption upgrading and analyzing the corresponding mechanism. According to the purpose of empirical research, this paper sets the benchmark model as:

$$\ln c_{it} = \alpha_0 + \alpha_1 \ln index + \alpha_2 ur + \alpha_3 \ln gdp + \alpha_4 gov + \alpha_5 stru + \alpha_6 edu + u_i + v_t + \varepsilon_{it} \quad (1)$$

In equation (1), i represents prefecture-level city, t represents year, $\ln c$ is per capita consumption expenditure of residents, and $\ln index$ is digital financial inclusion index. In order to avoid as much as possible estimation by omitted variables, the urbanization rate (ur), the level of economic development ($\ln gdp$), the degree of government intervention (gov), the industrial structure ($stru$), and the level of human capital (edu) are introduced as the control variables in this paper. Among them u_i is an individual dummy variable, representing unobserved individual characteristics; v_t is a time dummy variable, representing unobserved economic shocks; ε_{it} is the random perturbation term.

3.2. Selection of variables

3.2.1. Explained Variables

Consumption expenditure per inhabitant ($\ln c$). Since the per capita consumption expenditure of residents serves as an indicator reflecting the consumption capacity of regional residents, reference to Lan Leqin et al. (2021)[21] The study chose per capita consumption expenditure of residents as an indicator to measure residents' consumption upgrading.

3.2.2. Explanatory variables

Digital Inclusive Finance Index ($\ln index$). With reference to existing studies, this paper adopts the Digital Inclusive Finance Index jointly compiled by the Digital Finance Research Center of Peking University and Ant Group Research Institute. At the prefecture-level city level, the index covers data related to nearly 281 prefecture-level cities in China and has been widely used in studies related to the development of digital finance. To avoid too large a gap between variables and to facilitate the reporting of estimation results, the digital inclusive finance development index is logarithmized in this paper. Three secondary indicators, namely breadth of coverage, depth of use, and degree of digitization, are selected for subsequent testing, and for the detailed compilation process of this index, refer to Guo Feng et al. (2020)[20] for the study.

3.2.3. Mechanism variables

Theoretical analysis shows that digital inclusive finance can promote residents' consumption upgrading by affecting the level of labor employment and income while the level of employment can be characterized by two indicators: the level of labor employment (emp) and the level of urban income (urb).[22] In this paper, the urban registered unemployment rate is used to indicate the labor employment level, which is calculated by the proportion of the urban registered unemployed population to the total labor force population, and the urban income level is indicated by the average wage of on-the-job workers. In this case, the urban income level is expressed as the logarithm of the average wage of on-the-job workers.

Financial development (FIN) plays a crucial role in exploring the complex relationship between economic growth and the release of consumer demand. Through the potential role of enhancing the accessibility of financial resources and improving the efficiency of financial services, financial development eases consumers' liquidity constraints and thus releases their consumption demand. In this paper, it is expressed as the ratio of year-end loan balances of financial institutions to GDP[23].

3.2.4. Control variables

Referring to the existing research practices[24][25][26][27] In this paper, the following control variables are chosen: First, urbanization rate (ur), this paper adopts the proportion of urban population to total population to indicate the regional urbanization rate. Second, the level of economic development ($\ln gdp$), this paper uses the logarithm of per capita gdp to indicate the level of economic development of prefecture-level cities. Third, the degree of government intervention (gov), and the corresponding increase in government financial expenditure will indirectly improve the marginal utility of residents' consumption, which in turn improves residents' consumption expenditure, but at the same time, it also has a crowding out effect on

private consumption, this paper chooses the ratio of general government financial expenditure to regional GDP to indicate government intervention. Fourth, the industrial structure (stru), the development of the tertiary industry can give consumers more consumption choices, and is conducive to expanding consumption, this paper selects the tertiary industry value-added to the value-added of the secondary industry as the ratio indicated. Fifth, the level of human capital (edu) this paper uses the number of general undergraduate and specialized school students at the end of the year so the proportion of the total population can be obtained. Descriptive statistics of the variables are shown in Table 1.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max.
lnc	2799	9.828	0.318	6.944	11.003
lnindex	2799	5.06	0.511	2.972	5.813
lngdp	2799	10.736	0.561	8.842	13.056
ur	2780	0.557	0.148	0.181	1
gov	2799	0.201	0.118	0.044	2.349
stru	2799	2.299	0.145	1.831	2.836
edu	2789	0.02	0.025	0	0.133
lnurb	2799	10.913	0.334	8.509	12.128
emp	2687	3.035	0.762	0.39	5.7
fin	2799	2.499	1.299	0.588	21.302

3.3. Data sources

In this paper, a total of 2,799 city panel data based on 281 cities above the prefecture level in China from 2011 to 2020 are selected for the study. Due to the limitation of data availability, the study does not cover the Tibet Autonomous Region and Hong Kong, Macao, and Taiwan. The data for the above indicators are mainly derived from the China Urban Statistical Yearbook, Wind Database, and China Macroeconomic Database. Among them, the urban digital financial inclusion index is derived from the digital financial inclusion index released by the research team of Peking University and the Ant Group Research Institute, and the interpolation method is used to make up the data for the small amount of missing data of the observed indicators in some cities in the sample.

4. Empirical Analysis

4.1. Basic estimation results

In this paper, the fixed effect model is used to estimate equation (1), and the estimation results are shown in Table 2 and Table 3 below. According to the estimation results, it can be seen that the estimated coefficients of digital inclusive finance pass the significance test at the 1% level by adding the control variables sequentially to the estimation of equation (1) by using step-by-step regression, and they are all positive, i.e., digital inclusive finance promotes the upgrading of residents' consumption. Therefore, hypothesis 1 is valid.

From the estimation results of control variables, urbanization rate, economic development level, government intervention degree, industrial structure, and human capital level have the effect of promoting consumption expenditure on residents' consumption expenditure, among which the effects of industrial structure and human capital level on residents' consumption expenditure are particularly significant, and the upgrading of industrial structure is usually accompanied by the optimization of the economic structure and the development of high-value-added industries, which may lead to an increase in residents' income and consumption capacity. At the same time, the optimization of industrial structure may also bring higher quality and

diversified products and services, thus stimulating residents' consumption demand. The enhancement of human capital will improve the skills and education of the residents, which will not only increase the labor productivity and income level of the residents but also may change the consumption preference, prompting the pursuit of higher-quality consumer goods. In addition, the enhancement of human capital can also promote innovation and technological progress, which will further promote the upgrading of the industrial structure and the development of the economy, and promote the upgrading of the consumption of the residents.

Table 2. Benchmark regression results of digital financial inclusion on consumption expenditure of urban residents

variant	(1)	(2)	(3)	(4)	(5)	(6)
lnindex	0.3713*** (47.4058)	0.3212*** (27.7103)	0.2949*** (16.8594)	0.2311*** (13.4277)	0.1697*** (13.7075)	0.1680*** (13.5406)
ur		0.6919*** (5.7802)	0.6212*** (5.0264)	0.5174*** (4.5691)	0.2903*** (2.8413)	0.2726*** (2.6337)
lngdp			0.0945** (2.5389)	0.1924*** (6.1989)	0.1125*** (3.9093)	0.1094*** (3.8019)
gov				1.0543*** (3.8679)	0.8096*** (3.5371)	0.8109*** (3.5630)
stru					1.0961*** (10.5821)	1.0807*** (10.5681)
edu						2.2603** (2.0025)
_cons	7.9490*** (200.5349)	7.8160*** (162.2351)	6.9746*** (22.2103)	6.0955*** (22.4482)	4.9187*** (20.9018)	4.9621*** (21.3307)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
EntityFE	Yes	Yes	Yes	Yes	Yes	Yes
N	2799	2780	2780	2780	2780	2770
R ²	0.6877	0.6997	0.7035	0.7220	0.7571	0.7585

Note: *, **, *** denote passing the significance test at the 10%, 5%, and 1% levels, respectively, and robust standard errors are in parentheses. The latter table is the same. Columns (1)-(6) show the regression results with control variables added sequentially under fixed effects, respectively.

As mentioned earlier, the Digital Inclusive Finance Index is synthesized due to three sub-indicators: Coverage, Depth, and Digitization. So what kind of impact do these three indicators have on residents' consumption as a branch of Digital Inclusive Finance Finance? Further exploration is needed. The estimation results in Table 3 (1)-(3) below show that the three sub-indicators have a significant positive impact on the improvement of the level of residents' consumption, indicating that the development of digital inclusive finance has a positive effect on the promotion of residents' consumption. By increasing the popularity and efficiency of financial services, digital inclusive finance helps to lower the threshold of access to services, unleash the consumption potential of residents, and increase the level of consumption, thus positively affecting economic growth. This also emphasizes the important role of digital inclusive finance in promoting financial inclusion, improving the quality of life of the population, and fostering economic development.

Table 3. Estimation results of digital financial inclusion sub-dimensions for promoting consumption upgrading

Var	(1)	(2)	(3)
Coverage	0.0003*** (46.8229)		
Depth		0.0003*** (46.0695)	
Digitization			0.0002*** (45.2543)
_cons	9.4701*** (1.2e+03)	9.4854*** (1.3e+03)	9.5055*** (1.3e+03)
Control	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
EntityFE	Yes	Yes	Yes
<i>N</i>	2723	2723	2723
<i>R</i> ²	0.7604	0.7219	0.7023

4.2. Endogeneity test and robustness test

4.2.1. Endogeneity test

In this study, to ensure the causal explanatory power of the estimated results of the impact of digital financial inclusion on residents' consumption upgrading, drawing on the treatment of this issue in existing studies, we adopt the digital financial inclusion index with a one-period lag as an instrumental variable and then implement the endogeneity test using the two-stage least squares (2SLS) method, with the estimation results presented in the columns of Table 4(1).

4.2.2. Robustness Tests

In order to avoid the omission of important variables causing bias in the estimation results, this paper reintroduces the three control variables of the urban-rural income gap, infrastructure level, and Internet penetration rate, and the estimation results are shown in the columns of Table 4(2).

From the estimation results in Table 4, it can be found that the coefficients and significance of the core explanatory variables have not changed significantly, which indicates that the results of the benchmark regression have a high degree of reliability and robustness.

Table 4. Estimation results of endogeneity test and robustness test

Variant	One period behind (1)	Adding control variables (2)
L.lnindex	0.3217*** (40.2249)	
lnindex		0.1700*** (13.1058)
_cons	8.2547*** (206.1632)	4.7724*** (14.8773)
Control	Yes	Yes
Time FE	Yes	Yes
EntityFE	Yes	Yes
<i>N</i>	2519	2594
<i>R</i> ²	0.6374	0.7612

4.3. Discussion of Heterogeneity

The above analysis examines the impact of the development of digital inclusive finance on residents' consumption upgrading from the average effect, without actually distinguishing between sample types, and thus may mask sample-to-sample heterogeneity. China is a vast country, and the differences in its resource endowment and development strategy make digital inclusive finance have different impacts on residents' consumption. Digital inclusive finance demonstrates its dual attributes of popularity and profit orientation among different groups, and the effect of digital inclusive finance on the upgrading of residents' consumption hierarchy may be affected by factors such as geographic location and urban development level. Therefore, this paper will analyze the heterogeneity in terms of geographic location, urban-rural differences, and differences in urban population size as a way to analyze the impact of digital inclusive finance on the upgrading of residents' consumption in a more in-depth manner, and this result is reported in Tables 5 and 6 below.

4.3.1. Classification by geographical location

China's eastern, central, and western regions are different in terms of economic scale and development stage, so it is necessary to consider the heterogeneous characteristics of the impact of digital inclusive finance on residents' consumption upgrading under the conditions of different geographic locations. As can be seen in Table 5 (1)-(3) below, the development of digital inclusive amount on the upgrading of residents' consumption in different regions passes the significance test at the 1% level, and the sign is positive, which means that digital inclusive finance has a significant upgrading effect on residents' consumption. However, the value of the digital financial inclusion coefficient shows that the eastern region (0.1908) >western region (0.1745) > central region (0.1281), in which there may be influencing factors: The eastern region typically exhibits elevated levels of economic development and income for residents, which facilitate greater acceptance and utilization of digital inclusive finance. In contrast, the western region may exhibit certain post-development advantages, such as reduced living costs and accelerated economic growth. These factors could give rise to disparate levels of consumption promotion for digital inclusive finance across different regions.The Chinese government has optimized financial services through the "Planning for the Development of Inclusive Finance (2016-2020)" to enhance financial services in the eastern region. In contrast, the central and western regions have addressed the discrepancy in financial services through the "13th Five-Year Plan for the Development of the Western Regions" and the "Program for the Rise of the Central Regions," respectively, with the objective of stimulating consumption potential. In general, the implementation of digital inclusive finance has demonstrated a tendency towards regional disparities in the promotion of consumption upgrading.

Table 5. Estimation results of the geographic location heterogeneity test

categorization (an official) standard	By geographic location			In urban and rural areas	
	(1)	(2)	(3)	(4)	(5)
	Eastern section	Central section	Western section	municipalities	countryside
lnindex	0.1908*** (9.9129)	0.1281*** (5.7738)	0.1745*** (8.3233)	0.1680*** (13.5406)	0.2946*** (10.9976)
_cons	5.3766*** (11.9401)	4.8519*** (12.0112)	4.5194*** (11.7500)	4.9621*** (21.3307)	1.4837*** (3.4969)
Control	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
EntityFE	Yes	Yes	Yes	Yes	Yes

<i>N</i>	965	919	810	2770	2763
<i>R</i> ²	0.8062	0.7031	0.7875	0.7585	0.7676

4.3.2. Classification by urban and rural areas

In China's urban-rural dual social structure, urban and rural areas in the Internet penetration rate, basic security, and other aspects have a large difference, so this paper will be divided into urban residents' consumption and rural residents' consumption respectively regression. As shown in Table5(4)-(5), the regression coefficient of digital financial inclusion on urban residents' consumption is 0.1680, and the regression coefficient on rural residents' consumption is 0.2946, which are both significant at 1% level, indicating that digital financial inclusion affects the consumption of urban and rural residents differently, and has a greater effect on the consumption of rural residents than that of urban residents, which is probably because the accessibility of financial services is usually much lower in the rural than in urban areas, and the rural residents have more access to financial services than urban residents. The reason may be due to the fact that the accessibility of financial services is usually lower in rural areas than in urban areas, and digital inclusive finance can improve rural residents' consumption more significantly by providing more convenient and low-cost financial services; in addition, urban residents may have already been accustomed to diversified consumption modes and financial services, while rural residents may be more reliant on traditional cash transactions and savings, and the intervention of digital inclusive finance may change the consumption habits of rural residents more significantly, releasing a large amount of consumption potential. Digital inclusive finance intervention may more significantly change the consumption habits of rural residents and release a large amount of consumption potential. Therefore, further promoting a balanced distribution of financial resources between urban and rural areas is conducive to the role of digital inclusive finance in expanding consumption demand.

4.3.3. Classification by city size

According to the existing research, to further consider whether the impact of digital financial inclusion on residents' consumption upgrading is constrained by the impact of city size, this paper selects the National Bureau of Statistics for the number of population on the division of city size as a proxy variable for city size, and compares the heterogeneity of the impact of digital financial inclusion on urban and rural residents' consumption expenditures in different population sizes, and the estimation results are as follows in Table 6. Finance in different population size regression coefficients are all positive, that is, they all play a role in promoting residents' consumption, but among them, the value of the digital financial inclusion coefficient shows micro-city (0.2708) > mega-city (0.2391) > small city (0.1710) > large city (0.1680) > medium city (0.1146). The reason behind this may be that digital financial inclusion may make it easier to achieve coverage in microcities with smaller populations, as service providers can concentrate their resources more and improve service efficiency and accessibility; also, microcities may be in the rapid urbanization stage, and residents of megacities may have more diversified needs for financial services, and digital financial inclusion can provide more flexible and personalized services, which can promote consumption more effectively; in addition, micro-cities present high values, possibly due to their smaller populations, denser social networks with a higher level of trust between residents, and more investment in infrastructure development, thus facilitating the promotion of digital inclusive finance. Therefore, in general, the impact of digital inclusive finance on residents' consumption upgrading is limited by population size.

Table 6. Estimation results of city size heterogeneity test

Criteria for classification	Megacity	Large cities	Medium-sized city	Small city	Microcity
lnindex	0.2391*** (5.5774)	0.1680*** (7.7704)	0.1146*** (4.7159)	0.1710*** (8.7439)	0.2708*** (5.6591)
_cons	4.6560*** (5.8122)	4.6170*** (13.2888)	5.0699*** (9.8203)	5.0580*** (14.5150)	3.6908*** (3.7995)
Control	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
EntityFE	Yes	Yes	Yes	Yes	Yes
N	164	714	816	974	101
R ²	0.8881	0.8272	0.6783	0.7324	0.9128

5. Mechanism Testing

5.1. Mechanism Identification of Labor Employment and Income Levels

In this paper, we characterize the increase in the level of employment through the two indicator variables of the level of labor employment and the level of urban income and identify the effect of its influence in the promotion of residents' consumption upgrading by digital inclusive finance and the estimation results are shown in Table 7. The estimation results show that digital inclusive finance has a positive impact on the level of urban income, while it has a negative impact on the level of labor employment. The reasons for this are: on the one hand, the regression coefficient (0.2172) of the urban income level is significantly positive, digital inclusive finance can promote more employment opportunities and higher wages by providing a wider range of financial services, thus directly increasing urban income, while the optimization and upgrading of the industrial structure, such as the shift from labor-intensive to technology- or service-intensive industries, may have brought higher value-added jobs and higher wage levels, and education and skill upgrading can similarly increase the productivity and creativity of laborers, allowing them to earn higher incomes. On the other hand, the regression coefficient of labor employment level (-0.9.93) is significantly negative, which means that it is possible that in the process of urbanization, if the city fails to provide enough job opportunities will lead to an increase in the unemployment rate, and at the same time, the economic growth may not always be able to grow in tandem with the employment growth, especially in the industries where the technological progress is rapid, which may reduce the demand for the low-skilled labor force, and in addition, too high government intervention may also, excessive government intervention may also distort the market mechanism affecting the flexibility and efficiency of the job market. In summary, it is further verified that digital inclusive finance helps to improve the employment of labor, raise the level of urban income, and then generate income to promote residents' consumption upgrading. Therefore, hypothesis 2 is proved.

5.2. Mechanism identification of liquidity constraints

This paper introduces the level of financial development as a mechanism variable of liquidity constraint and the estimation results are shown in Table 7. Financial development reduces the liquidity constraint of consumers by providing more credit resources, making it easier for them to access funds and achieve intertemporal smoothing of consumption. The results show that the effects of digital financial inclusion on the level of financial development all pass the significance test at the 1% level except for gdp per capita where the direction is positive. The reason behind this is that the development of digital inclusive finance will alleviate residents'

credit constraints, information constraints, etc., and promote the increase of residents' income by promoting family entrepreneurship, improving the efficiency of labor and other factor allocation, etc., and promote residents' consumption, and the increase of consumers' demand for new technologies and products will motivate enterprises to invest in R&D, and promote technological innovation and product upgrading. The negative coefficient of GDP per capita may reflect the nonlinear relationship between economic development and financial development. In some cases, economic growth may lead to an uneven distribution of income, leaving some segments of the population with liquidity constraints that have not been effectively alleviated. In addition, digital inclusive finance, as a useful supplement to traditional finance, enables low-income households to obtain the necessary financial support and reduce poverty by providing more financial services and credit opportunities, while helping to narrow the income gap and promote social equity. As consumers' disposable income increases, they can purchase more diversified goods and services, which not only improves the quality of life but also promotes the upgrading of the consumption structure. Therefore, hypothesis 3 is valid.

Table 7. Results of the Mechanism Test of Digital Inclusive Finance Influencing Residents' Consumption

Variant	Lnurb	Emp	Fin
lnindex	0.2172*** (14.2027)	-0.0903** (-2.2007)	0.3155*** (6.5536)
_cons	3.7138*** (13.5487)	8.9619*** (9.5559)	1.3234 (1.4358)
Control	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
EntityFE	Yes	Yes	Yes
<i>N</i>	2694	2590	2694
<i>R</i> ²	0.8752	0.1240	0.3961

6. Conclusions and Suggestions

6.1. Conclusion

In the context of the current economic transformation, the growth driving force of China's economy is undergoing a gradual transition from an investment and export-driven model to a consumption-led model. This transformation is of great strategic significance with regard to the realisation of the "dual circulation" strategy, which is a new development pattern comprising a domestic big cycle as the main body and a domestic and international dual cycle that promote each other. As a significant driver of consumption upgrading, digital inclusive finance has garnered considerable interest due to its influence on consumer spending patterns. In light of the aforementioned research on the impact of digital inclusive finance on residents' consumption upgrade, and based on a theoretical mechanism analysis, this paper employs city-level data from China from 2011 to 2020 to construct a panel fixed effects model. This model is used to empirically test the impact and internal mechanism of digital inclusive finance on residents' consumption, and to provide corresponding policy recommendations on how to further release consumption demand.

The primary findings of this study are as follows:

First, the benchmark regression results indicate that digital inclusive finance can effectively enhance the consumption level of residents as a whole. From a segmented perspective, the breadth of coverage, depth of usage, and degree of digitalization of digital inclusive finance have a significant positive impact on residents' consumption. Among these factors, the impact of

usage depth is the most pronounced. This conclusion remains consistent when other factors are considered, control variables are added, and endogenous tests are conducted with lagged explanatory variables.

Secondly, this paper employs a heterogeneity analysis, distinguishing between different geographical locations, city sizes, and urban-rural differences, which reveals significant disparities. The results of the heterogeneity analysis indicate that digital inclusive finance exerts the most pronounced influence on residents' consumption upgrade in the eastern region, followed by the western region, and the least pronounced in the central region. Furthermore, the effects of digital inclusive finance on consumption upgrade are more pronounced in cities with large populations and rural areas.

Thirdly, the impact mechanism analysis introduces further variables, namely employment level, income level, and financial development level, in order to explore the mechanism through which digital inclusive finance promotes residents' consumption upgrade. The findings indicate that digital inclusive finance effectively alleviates residents' liquidity constraints by enhancing income levels and financial development. The implementation of the "consumption boost" policy has resulted in an increase in residents' income, which has subsequently led to an increase in consumption growth. In general, the results demonstrate that digital inclusive finance exerts a more pronounced influence on consumption upgrade in economically more developed regions. Furthermore, this finding corroborates the necessity for the government to undertake a comprehensive assessment of the actual conditions prevailing in different regions and to adopt measures that align with the specific circumstances of each locality when implementing decisions.

6.2. Suggestions

In light of the aforementioned considerations, the policy recommendations put forth in this paper are as follows:

Firstly, it is recommended that the government implement a comprehensive strategy to promote the construction of digital inclusive financial infrastructure, with a particular focus on rural and remote areas. This approach would facilitate the improvement of network infrastructure, thereby ensuring that all groups have equal access to digital financial services. Concurrently, the provision of digital inclusive financial products should be optimized in order to meet the heterogeneous demands of the market. Furthermore, a mechanism for cross-departmental collaboration should be established to facilitate the formation of a joint policy force. It is recommended that the government assume a leading role in establishing a multi-party collaboration platform with the objective of promoting the development of digital inclusive finance.

Secondly, enhancing the digital financial literacy of the general public is of paramount importance for stimulating the potential for consumption. The government can facilitate comprehensive improvements in the public's digital financial knowledge through reforms to the educational system, increased publicity through public media, and the implementation of community interaction activities. It is imperative that targeted training programs be designed and implemented for rural residents and elderly groups, who are relatively lacking in financial knowledge.

7. Shortcomings and Prospects

This study offers valuable insights into the relationship between digital inclusive finance and the upgrading of residents' consumption. However, it is not without limitations. The data source may be insufficient for capturing the complete picture of the development of digital inclusive finance. Furthermore, the time frame is relatively brief, and the absence of certain data may

restrict the generalizability of the findings. In the construction of the empirical model, it is possible that the model in this study did not encompass all relevant variables and impact mechanisms.

Further research could enhance our understanding of this field by extending the time range and scope of the data, and investigating the inclusion of additional variables. In light of these limitations, future research on related topics should employ a longer time span and more comprehensive data sets to analyze the long-term impact of digital inclusive finance on residents' consumption upgrading. Additionally, micro survey data should be utilized to analyze the individual-level use of digital inclusive finance and its specific impact on consumption. Furthermore, natural experiment methods or policy evaluation models should be employed to evaluate the effectiveness of existing digital inclusive finance-related policies. The aforementioned studies will facilitate a more comprehensive understanding of the impact of digital inclusive finance on residents' consumption upgrading, thereby providing a more scientific and precise basis for policy formulation.

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