The Impact of Financial Inclusion on Household Income: Micro Evidence for Chinese Households

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Abstract: *Based on the perspective of Chinese residents' digital capability and financial literacy, this paper explores the impact of inclusive finance on household income level and the proportion of property income and the specific mechanism of the impact. Moreover, the micro survey data of China Household Finance Survey (CHFS) in 2011, 2013, 2015, 2017 and 2019 are used as samples for empirical test. The results show that the development of inclusive finance promotes the increase of household income and the proportion of property income, the improvement of digital ability promotes the increase of household income, and the improvement of financial literacy promotes the increase of household property income. The mechanism test finds that digital capability enhances the promoting effect of inclusive finance development on the increase of household income, and financial literacy enhances the promoting effect of inclusive finance development on the increase of household property income. The above research further enriches the research on inclusive finance and household income, and provides some policy implications for the consolidation of poverty alleviation achievements and the expansion of the proportion of property income in total household income.*

Keywords: *Financial Inclusion; Digital Ability; Financial Literacy; Increased Household Income; Property Income*

1. Introduction

One of the main goals of economic and social development during the 14th Five-Year Plan period is to basically keep pace with the growth of per capita disposable income and GDP. In addition, the Fifth Plenary Session of the 19th CPC Central Committee pointed out that property income of urban and rural residents should be increased through multiple channels, and the proportion of property income in total household income should be expanded. Growth in per capita disposable income will help bring people's wellbeing to a new level and consolidate and expand our achievements in poverty alleviation. Increasing the proportion of people's property income is an important way to achieve common prosperity.[1] According to the data of the National Bureau of Statistics, from 2013 to 2022, on the one hand, although the per capita disposable income of Chinese residents increased from 18,311 yuan to 36,883 yuan, an increase of 101%. However, it cannot be ignored that according to the standard of the World Bank, China has just entered the ranks of upper-middle-income countries. Compared with the major developed countries in the world, there is still a lot of room for improvement in the income level of residents. On the other hand, the per capita net disposable property income of Chinese residents increased slowly from 7.77% to 8.75%, and the contribution of property income to the total household income still has great potential to be tapped. Based on this, how to continue to improve the level of residents' income and expand the proportion of property income in the total household income is one of the issues that should be paid attention to in the field of national income.

In order for all groups of society to have access to equitable financial services at reasonable prices, after the Third Plenary Session of the 18th CPC Central Committee in 2013 clearly proposed "developing inclusive finance", at the beginning of 2016, the State Council issued the "Plan for Promoting Inclusive Financial Development (2016-2020)" (hereinafter referred to as the "Plan"). According to the Plan, financial inclusion refers to the provision of appropriate and effective financial services at an affordable cost to all social strata and groups in need of financial services based on the requirements of equal opportunity and the principle of business sustainability. With the development of Internet information technology, big data, cloud computing, artificial intelligence and blockchain are widely used, and inclusive finance is developing to a deeper level of digital inclusive finance.[2] It was also in 2016 that the Hangzhou G20 Summit put forward the concept of digital inclusive finance. According to the G20

High-level Principles for Digital Financial Inclusion, digital financial inclusion generally refers to all actions to promote financial inclusion through digital financial services. The inclusive finance studied in this paper includes traditional inclusive finance and the digital inclusive finance derived from it. The development of inclusive finance has the effect of improving income distribution, which can significantly narrow the urban-rural income gap,[3] and improve residents' financial literacy. [4] Then, what role does the development of inclusive finance play in the growth of household income and the expansion of property income in total income? A clear understanding of these issues will help steadily expand the middle-income group and help property income become an important pillar of household income growth.

In recent years, many scholars have studied the concept[5] and dimensions[6] of inclusive finance, as well as the relationship between inclusive finance and income distribution and poverty alleviation[3] . The existing literature on inclusive finance has paid little attention to household income, even if there are a few studies on the relationship between financial inclusion and household income,[6-7] they only explore the relationship between financial inclusion and household income by constructing the financial inclusion index. Few studies have simultaneously studied the relationship between financial inclusion and household income level and income structure. Based on this, this paper discusses the relationship between financial inclusion and household income. Compared with existing research, the marginal contribution of this paper mainly lies in: First, this paper clarifies the impact of inclusive finance on the level of household income and the proportion of property income in China, and explores the specific mechanism of the impact of inclusive finance development on the level of household income and the proportion of property income from the perspective of digital capability and financial literacy. Second, this paper supplements the research on the impact of inclusive finance on household income, improves the mechanism through which the development of inclusive finance affects household income, and further enriches the research on inclusive finance and household income. Third, the research conclusions of this paper provide a feasible path for increasing household income and the proportion of property income, which is conducive to consolidating the achievements of poverty alleviation and helping property income become an important pillar of residents' income growth.

2. Literature review and theoretical analysis

A literature review was first conducted. The ability of economic subjects to obtain and use digital technology to create economic benefits is called digital capability.[8] There are some differences between domestic and foreign scholars on the impact of digital ability on household income level. Some scholars believe that digital ability has significantly promoted the growth of household income. For example, Goldfarb and Tucker found that the use of digital technology can help families alleviate the information asymmetry between the two sides of employment,[9] to obtain more new employment information and opportunities, so as to achieve the growth of family income. Muafi et al. 's study found that in the process of using digital technology, the digital ability of the family is improved, and the digital human capital is accumulated,[10] thus increasing the family income. Zang et al. found that under the background of rural revitalization aided by digital technology, the improvement of farmers' digital ability significantly promoted their income growth, which was mainly reflected in the improvement of farmers' wage and property income.[8] Other scholars believe that the impact of digital ability on household income level can be ignored. For example, Seo et al. found that the scenarios in which households use digital technology are basically online shopping and mobile payment. Although digital technology has changed the consumption mode of households, it has not had a significant impact on the production and operation of households.[11] Therefore, digital ability does not significantly increase household income. Qiu Zeqi et al. found that there is an obvious digital divide in the current rural areas, which leads to a welfare gap between urban and rural areas, and this welfare gap is reflected in the income gap.[12] In other words, numeracy does not have a broad income-increasing effect.

Financial literacy is a comprehensive literacy that individuals have in the field of finance, including knowledge, skills, behaviors and attitudes, so as to understand and cope with financial problems, make wise financial decisions, achieve personal financial goals and maintain financial health.[13] Family property income refers to the income and fruits obtained by transferring the ownership and use right of various assets and natural resources owned by the family to natural persons or legal persons. These incomes include financial property income and non-financial property income, the difference is whether the income is brought by financial assets. Tang et al. found that improving financial literacy can not only increase the possibility of households obtaining property income, but also increase the total amount of household property income and the proportion of property income in the total household income. Compared with non-financial property income, financial literacy has a more significant impact on household financial property income. Financial literacy affects household property income through four

main ways: increasing the proportion of risky assets, enhancing the return rate of risky assets, promoting investment real estate holdings and land transfer.[1]

The interaction between financial inclusion and digital inclusion and their impact on household income is one of the focuses of academic research. Studies based on the traditional perspective of inclusive finance find that the development of inclusive finance can promote residents' employment and increase household income. For example, Yang Dong et al. found that the development of rural inclusive finance can positively promote the improvement of farmers' disposable income, that is, the higher the level of inclusive finance development, the higher the income of farmers.[7] Research based on digital inclusive finance has found that digital inclusive finance can increase household income by easing financing constraints, reducing financial service costs, promoting economic growth and entrepreneurial behavior, increasing employment opportunities and promoting industrial upgrading. For example, Yacob et al. found that digital financial inclusion can lower the threshold of financial services and financing costs, especially ease the credit constraints of small and medium-sized enterprises, thus bringing about a "trickle-down effect."[14] This effect can increase farmers' access to non-agricultural employment opportunities and work income. Yang Weiming et al. found that digital inclusive finance has significantly increased the income of urban and rural residents in China by promoting economic growth and entrepreneurial behavior.[15] Liu Ziqiang and Zhang Tian found that the way for digital financial inclusion to increase rural residents' income is through regional economic growth, more job opportunities and higher salary levels.[16] Zhang Lin found that digital inclusive finance not only directly promoted the increase of rural residents' income, but also indirectly promoted the increase of rural residents' income through the upgrading of county industries.[17]

This is followed by the theoretical analysis. The path of (digital) inclusive finance affecting the household income level has been basically clarified in the previous section, in general, it can be summarized that with the development of (digital) inclusive finance, the employment channels of residents are expanded, and the household income is ultimately increased. Specifically, digital inclusive finance has become an important supplement to traditional inclusive finance by relying on digital technologies and means such as big data and cloud computing to expand the scope and coverage of services. At the same time, digital inclusive finance provides financial support to the entrepreneurial behavior of economic subjects from multiple channels, especially under the background of China's vigorous advocacy of street stall economy, which has greatly reduced the financing difficulty of small and medium-sized enterprises, broadened the income sources of residents, and significantly improved the income level of households.[15] Secondly, the inclusiveness released by digital inclusive finance has a positive effect on regional economic development, which can indirectly increase employment opportunities, improve residents' enthusiasm for production and operation, broaden financial management channels and expand information sources, thus helping to improve residents' income level and increase household income.[16] Finally, digital inclusive finance improves the availability and affordability of financial services, making financial services more convenient, diverse and low-cost. This change will stimulate the growth of household consumption and the upgrading of consumption level, and then promote the rapid development of industry, especially the tertiary industry. Industrial upgrading, especially the vigorous development of the tertiary industry, has created more jobs, thus broadening the income channels of residents and promoting the sustained and stable growth of household income.[17] Based on the above analysis, this paper proposes the following research hypotheses:

H1: The development of inclusive finance promotes the increase of household income.

Digital capability refers to the ability of economic agents to acquire and use digital technologies to create economic benefits for themselves. Therefore, the use of digital technology is directly related to the amount of economic benefits that residents can create. In the traditional labor market, workers are often at an information disadvantage, while employers are at an information advantage, which is not conducive to workers getting reasonable labor compensation. The wide application of digital technology is conducive to improving the information asymmetry between the two sides of employment, enabling most residents who are laborers to share more of the economic benefits created by themselves, thus helping to improve the income level of residents. In addition, the popularization of digital technology has also given rise to the emergence of many emerging industries, and the development of these emerging industries will create more employment opportunities, enabling residents to obtain more employment options,[9] thus broadening residents' income channels.

Regarding the role of digital capability in the impact of inclusive finance on household income level, on the one hand, digital inclusive finance derived from inclusive finance can ease the financing constraints of small and micro enterprises, thus facilitating residents to carry out entrepreneurial activities.[15] And the greater the ability to acquire and use digital technologies to create economic

efficiencies for themselves, the more conducive to reducing the communication and negotiation costs between residents and various financial institutions and government agencies(For example, the cost of people, time and money to travel between various financial institutions and government agencies), making it easier for residents to access financing, and the amount of financing is more plentiful. This advantage is very beneficial to the capital turnover and normal operation of small and micro enterprises, which can promote small and micro enterprises to generate continuous profits, thus expanding the income source of families. On the other hand, digital inclusive finance derived from inclusive finance is conducive to the development of regional economy,[16] and promotes industrial transformation and upgrading,[17] while the improvement of digital capability promotes the accumulation of digital human capital.[10] The accumulation of digital human capital helps residents improve their competitiveness in the job market, so as to better enjoy the dividend of increased employment opportunities brought by regional economic development and industrial transformation and upgrading, and thus promote the growth of household income. Based on the above analysis, this paper proposes the following research hypotheses:

H2: Digital capability plays a positive moderating role in the promotion of household income by the development of inclusive finance.

Next, we analyze how the development of inclusive finance affects the proportion of household property income. First of all, digital inclusive finance derived from traditional inclusive finance has expanded the coverage of financial services, and the popularization of Internet financial products has broadened the channels for residents to participate in the financial market and improved their awareness of financial management.[16] With the improvement of financial awareness, residents will seek the help of professional investment consultants and financial planners to allocate household financial assets more scientifically and rationally, thus promoting the increase of the proportion of household financial property income. Secondly, the application of various emerging digital technologies has promoted the development of inclusive finance to a deeper level of digital inclusive finance.[2] The development of digital inclusive finance has broken the dependence of traditional housing leasing on physical intermediary locations, enabling the demand side and supply side of housing leasing to communicate online through various leasing platforms based on digital technology anytime and anywhere. This reform reduces the cost of housing rental, improves the efficiency of housing rental transactions, facilitates residents to earn property rental income, and promotes the increase of the proportion of household housing asset income. Finally, digital inclusive finance has promoted the upgrading and transformation of county industries, which has created more non-agricultural jobs for rural residents. [17] The use of digital technology is conducive to rural residents' access to non-agricultural employment information.[9] These two factors objectively promote rural residents to engage in non-agricultural industries. When rural residents are no longer engaged in agricultural production, they have sufficient motivation to subcontract their own cultivated land to others to obtain land rental income,[18] thus promoting the increase in the proportion of rural household land resource income. Based on the above analysis, this paper proposes the following research hypotheses:

H3: The development of inclusive finance promotes the increase in the proportion of household property income.

The Sharpe ratio of the financial asset portfolio allocated to households with higher financial literacy is larger. This means that for the same risk, these households can obtain a higher excess return, or for the same excess return, take a lower risk.[19] On the one hand, improving financial literacy is conducive to improving the effectiveness of household asset portfolio, thus promoting the increase of household financial property income. On the other hand, the improvement of residents' financial literacy also helps to increase their non-financial property income. In general, the improvement of financial literacy can increase the proportion of property income in the total household income.[1]

As for the role of financial literacy in the impact of inclusive finance on the proportion of household property income, on the one hand, digital inclusive finance derived from inclusive finance has greatly expanded residents' financial management channels.[16] The expansion of financial channels enables residents to use various financial tools to plan and manage household wealth, while the improvement of financial literacy helps residents to optimize the allocation of household assets,[19] enabling them to make optimal financial decisions based on the comprehensive macroeconomic trend and the existing level of household wealth.[20] So as to increase the proportion of household financial property income in total income. On the other hand, the development of digital inclusive finance is conducive to enhancing the motivation of land resource leasing of households in housing leasing transactions. House leasing and land resource leasing involve a lot of financial knowledge, such as interest rates, lease insurance, tax matters related to housing and land, and asset appraisal of the value of housing and land. The

improvement of financial literacy helps the households with housing assets and land resources to maximize the non-financial property income, and then promotes the increase of the proportion of household non-financial property income. Based on the above analysis, this paper proposes the following research hypotheses:

H4: Financial literacy plays a positive moderating role in the increase of the proportion of household property income promoted by the development of inclusive finance.

3. Research Design

3.1. Source of data

The data source of this paper is the micro survey of China Household Finance Survey (CHFS) in 2011, 2013, 2015, 2017 and 2019.[21] In order to meet the research needs and refer to relevant studies,[22-23] this paper conducts the following processing on the original data: (1) Only the samples whose household heads are older than or equal to 18 years old and younger than or equal to 75 years old are retained; (2) The samples with abnormal and extreme data points in the control variables were eliminated; (3) The total assets per capita, disposable income per capita and GDP per capita are winsorized at the level of 1%-99% after the consumer price index is used to eliminate the inflation interference and log it with 2011 as the base period. Finally, this paper obtains the unbalanced panel data of 2011, 2013, 2015, 2017 and 2019, with a total of 112,305 household samples. The empirical analysis is completed by Stata16.0.

3.2. Definition of variables

The explained variables in this paper are the proportion of household income and household property income. Drawing on the existing research,[7,15] uses the annual per capita disposable income of the household to measure the household income. At the same time, taking 2011 as the base period, the consumer price index is used to eliminate the interference of inflation on household income.[16] The proportion of household property income is the proportion of household property income in total household disposable income.

The explanatory variable in this paper is the development level of inclusive finance. Referring to the practice of Yin Zhicao et al.,[6] this paper constructs a relatively comprehensive indicator system of inclusive finance. This system includes two aspects of financial demand and financial supply, and selects 12 specific indicators from four dimensions of satisfaction, convenience, usability and penetration. By standardizing the sub-indicators of financial inclusion, and under the assumption of equal weight, the average Euclidean distance method is used to calculate the total score of each indicator, and finally the total index of household financial inclusion is synthesized.

The mechanism variables in this paper are digital ability and financial literacy, and the factor analysis method is used to measure digital ability[8] and financial literacy[24] . Eight representative questions were selected from the CHFS questionnaire, and the comprehensive score was calculated according to the answers of respondents to measure the digital ability and financial literacy of residents. The four questions selected in this paper to measure residents' digital ability are "Has your family ever done online shopping?", "Is the phone you are using a smart phone?", "Do you have a computer at home?", "Does your family's project operate through the Internet?". These four questions basically reflect the ability of households to acquire and use digital technology to create economic benefits for themselves, which is in line with the definition of digital capability. The four questions selected in this paper to measure residents' financial literacy are: "Suppose the bank's annual interest rate is 5% and the inflation rate is 8% per year, what can I buy after depositing 100 yuan in the bank for one year?", "If you had money to invest, which investment project would you most like to choose?", "What do you think is the most important reason for the irrational allocation of household assets?", "Do you hold financial assets other than cash and bank deposits?". These four questions basically reflect a comprehensive literacy including knowledge, skills, behaviors and attitudes possessed by households in the financial field, which is in line with the definition of financial literacy.

Referring to the existing research,[25] this paper selects control variables from four aspects: macroeconomic development level, region and industry, household level and household head level, which specifically include: (1) Household characteristic variables include the proportion of financial assets, household registration type, household size, per capita assets, housing ownership and industrial

and commercial operation. (2) The characteristic variables of the household head include age, gender, marital status, education level, physical condition, nature of work, occupation type, participation in social endowment insurance, and participation in social medical insurance. (3) The region where the household is located is represented by the provincial dummy variable, and the provincial fixed effect is controlled. Industry is represented by the industry of the work unit of the household head. (4) The level of macroeconomic development is measured by provincial per capita GDP.

3.3. The empirical model

Based on the panel data fixed effect model, this paper tests the research hypotheses proposed in the previous paper.

In order to verify H1 and H3, the following fixed effect model is established:

$$ln(Income\_mean_{i,t})=\beta 0+\beta 1\times HFI\_index_{i,t}+\delta 0\times X_{i,t}+province_i+\varepsilon 0_{i,t} \qquad (1)$$

$$PI\_ratio_{i,t}=\beta 2+\beta 3\times HFI\_index_{i,t}+\delta 1\times X_{i,t}+province_i+\varepsilon 1_{i,t} \qquad (2)$$

In models (1) and (2), $ln(Income\_mean_{i,t})$ represents the logarithm of per capita disposable income of household i in period t, $PI\_ratio_{i,t}$ represents the proportion of property income in disposable income of household i in period t, and $HFI\_index_{i,t}$ represents the household financial inclusion index of household i in period t. X is other control variables, *province* is province fixed effects, and ε is random error terms.

In order to verify H2 and H4, models (3) and (4) are established, and the interaction term between household inclusive financial index and digital capability is added to model (1), so as to verify whether digital capability moderates the impact of inclusive financial development on household income level. The interaction term of household inclusive financial index and financial literacy is added to model (2), so as to verify whether financial literacy moderates the impact of inclusive financial development on the proportion of household property income.

$$ln(Income\_mean_{i,t})=\beta 4+\beta 5\times HFI\_index_{i,t}+\beta 6\times HFI\_index_{i,t}\times DA_{i,t}+\delta 2\times X_{i,t}+province_i+\varepsilon 2_{i,t} \qquad (3)$$

$$PI\_ratio_{i,t}=\beta 7+\beta 8\times HFI\_index_{i,t}+\beta 9\times HFI\_index_{i,t}\times FL_{i,t}+\delta 3\times X_{i,t}+province_i+\varepsilon 3_{i,t} \qquad (4)$$

In model (3), $DA_{i,t}$ represents the digital ability of family i in period t; in model (4), $FL_{i,t}$ represents the financial literacy of family i in period t; and other variables have the same meaning as models (1) and (2).

3.4. Descriptive statistical analysis

The descriptive statistical analysis of the variables used in this paper is shown in Table 1. In addition, this paper also conducts Pearson correlation coefficient test among variables, and the absolute value of correlation coefficient between core explanatory variables and all control variables is less than 0.5. Therefore, the interference of multicollinearity is basically excluded.

Table 1: Descriptive statistics of variables.

Variables	Value of observation	Mean value	Standard deviation	Minimum value	Maximum value
Log of per capita disposable income	112305	9.856	2.748	0	12.707
Proportion of property income	112305	0.065	4.635	0	1
Index of household financial inclusion	112305	0.516	1.891	0	1
Digital ability	112305	-0.002	0.583	-0.699	3.529
Financial Literacy	112305	4.28E-08	0.514	-0.573	2.496
Log of total assets per capita	112305	11.955	1.737	1	15.439
Proportion of financial assets	112305	0.139	3.356	0	1
Number of family members	112305	2.059	0.631	1	12
Type of household registration	112305	1.57	0.685	1	4
Home ownership status	112305	0.582	0.329	0	1
Business situation of industry and commerce	112305	0.138	0.344	0	1
Age of household head	112305	57.719	8.49	18	75
Gender	112305	0.767	0.423	0	1
Marital status	112305	2.383	1.21	1	7

Level of education	112305	3.397	1.659	1	9
Physical condition	112305	2.668	0.992	1	5
Nature of work	112305	1.762	0.749	1	4
Type of occupation	112305	4.892	2.127	1	7
Industry you belong to	112305	6.295	4.793	1	14
Participation in social endowment insurance	112305	0.884	0.394	0	1
Participation in social medical insurance	112305	0.927	0.281	0	1
Log of GDP per capita	112305	10.794	0.352	9.688	12.009

Note: The mean value, standard deviation, minimum value and maximum value are retained at most three decimal places, and the retention rule is rounded.
Data source: processed by Stata16.0.

4. Analysis of empirical results

4.1. Benchmark regression

Table 2 reports the impact of financial inclusion development on household income level and the proportion of property-based income. The regression coefficient of household inclusive financial index on per capita disposable income is 0.081, which is positive and significant at the level of 1%, indicating that the development of inclusive financial system promotes the increase of household income, this result validates H1. The regression coefficient of the index of household inclusive finance on the proportion of property income is 0.039, which is positive and significant at the level of 5%, indicating that the development of inclusive finance promotes the increase of the proportion of household property income, this result validates H3.

Table 2: Test on the impact of inclusive financial development on household income level and the proportion of property income.

Variables	Log of per capita disposable income	Proportion of property income
Index of household financial inclusion	0.081***	0.039**
	(7.29)	(3.44)
Variable of control	YES	YES
Province fixed effect	YES	YES
Value of observation	112305	112305
R-squared	0.4564	0.3901

Note: (1) * , ** and *** indicate significance at the level of 10%, 5% and 1% respectively, the same below; (2) The values in the brackets are the t values of the test, the same below; (3) The regression coefficients, numbers in brackets and R-squared should be kept at most four decimal places, and the retention rule should be rounded, the same below.

4.2. Test of mechanism

In order to verify whether digital capability regulates the promoting effect of inclusive finance development on the increase of household income, and financial literacy regulates the promoting effect of inclusive finance development on the increase of the proportion of household property income, the following mechanism tests are conducted. The test results are shown in Table 3.

The regression coefficients of family inclusive financial index and digital ability in column (2) 0.037 and 0.168 are positive, and both are significant at the level of 1%. The regression coefficient of 0.044 of the interaction term family inclusive financial index multiplied by digital ability is positive and significant at the level of 5%, indicating that digital ability enhances the promotion effect of inclusive financial development on household income increase. This result validates H2. In columns (1) and (2), the regression coefficients of digital ability 0.157 and 0.168 are positive, and both are significant at the level of 1%, indicating that the improvement of digital ability promotes the increase of household income. In addition, compared with without the interaction term, the impact of digital ability on the increase of household income is more profound when the family inclusive financial index multiplied by digital ability is added. Therefore, with the in-depth development of inclusive finance, the improvement of residents' digital ability can greatly improve their income level.

The regression coefficients of family inclusive financial index and financial literacy in column (4) 0.018 and 0.13 are positive and significant at the level of 5% and 1% respectively. The regression coefficient 0.036 of the cross term family inclusive financial index multiplied by financial literacy is positive and significant at the level of 5%. This shows that financial literacy enhances the promotion effect of inclusive finance development on the increase in the proportion of household property income, which verifies H4. In columns (3) and (4), the regression coefficients of financial literacy 0.102 and 0.13 are positive, and both are significant at the level of 1%, indicating that the improvement of financial literacy promotes the increase of the proportion of household property income. In addition, compared with not adding the interaction term, when adding the interactive term family inclusive financial index multiplied by financial literacy, Financial literacy has a deeper impact on the increase in the proportion of household property income. Therefore, with the in-depth development of inclusive finance and the improvement of residents' financial literacy, the proportion of property income can be greatly increased.

Table 3: Mechanistic tests of digital ability and financial literacy.

Variables	(1) Log of per capita disposable income	(2) Log of per capita disposable income	(3) Proportion of property income	(4) Proportion of property income
Index of household financial inclusion	0.081***	0.037***	0.039**	0.018**
	(7.29)	(4.95)	(3.44)	(2.89)
Digital ability	0.157***	0.168***		
	(5.42)	(9.83)		
Index of household financial inclusion multiplied by Digital ability		0.044**		
		(2.2)		
Financial literacy			0.102***	0.13***
			(12.8)	(15.78)
Index of household financial inclusion multiplied by Financial literacy				0.036**
				(3.77)
Variable of control	YES	YES	YES	YES
Province fixed effect	YES	YES	YES	YES
Value of observation	112305	112305	112305	112305
R-squared	0.4564	0.4286	0.3901	0.3825

4.3. Test for endogeneity

The benchmark regression has confirmed the impact of financial inclusion development on the household income level and the proportion of property income, but the regression results may be biased. On the one hand, there may be reverse causality between the household financial inclusion index and income. On the other hand, there may be some unobservable variables and factors that affect both the household financial inclusion index and income. Thus, the household financial inclusion index may be endogenous. In order to solve the potential endogeneity problem, this paper refers to the idea of Yin Zhichou et al., and selects the population density of the community where the family lives (the logarithm of 100 people per square kilometer of the community) as the instrumental variable of the household inclusive financial index.[6] The selected instrumental variables basically meet the two conditions of correlation and exogeneity. On the one hand, the higher the population density of the community where the family lives means the more opportunities for economic development and the more full the financial development of the community. On the other hand, the population density of a community is mainly determined by its permanent resident population, which depends on the flow of population. Population mobility is exogenous to the economic and financial behavior of a single household, and has almost no direct impact on the income level and the proportion of property income of a single household.

In order to avoid the problems caused by weak instrumental variables as much as possible, this paper uses the limited information maximum likelihood method (LIML), which is more insensitive to weak instrumental variables, to estimate models (1) and (2). Table 4 reports the IV-LIML estimation results using instrumental variables, as well as the results of Hauaman test. According to the results of Hauaman test, the hypothesis that "all variables of the original model are exogenous" can be rejected at the level of 1%, and the F-statistic 269.75 in the first stage is much larger than the critical value of 16.38 at the 10% error level, which also confirms that the instrumental variable is not a weak instrumental variable. The regression coefficient of the household inclusive financial index on per capita disposable income,

0.095, is positive and significant at the level of 1%, which is consistent with the regression results of the benchmark model and further confirms H1. In addition, the regression coefficient of digital ability on per capita disposable income, 0.166, is positive and significant at the level of 1%, which is also consistent with the regression results of the benchmark model. The regression coefficient of the household inclusive financial index on the proportion of property income, 0.045, is positive and significant at the level of 5%, which is consistent with the regression results of the benchmark model and further confirms H3. In addition, the regression coefficient of financial literacy on the proportion of property income, 0.121, is positive and significant at the level of 1%, which is also consistent with the regression results of the benchmark model.

Table 4: Endogeneity test of panel fixed effects model: IV-LIML method.

Variables	Log of per capita disposable income	Proportion of property income
Index of household financial inclusion	0.095***	0.045**
	(8.53)	(5.28)
Digital ability	0.166***	
	(7.08)	
Financial literacy		0.121***
		(14.17)
Variable of control	YES	YES
Province fixed effect	YES	YES
Value of observation	112305	112305
R-squared	0.4429	0.3788
Hauaman test		
chi2(1)	10.645	7.911
p>chi2(1)	0.0026	0.0083
The first stage regression results		
Community population density	2.593***	
	(37.64)	
F-statistics of the first stage	269.75	

5. Conclusions

This paper finds that after excluding the influence of endogeneity problems, the development of inclusive finance promotes the increase of household income and the proportion of property income, the improvement of digital ability promotes the increase of household income, and the improvement of financial literacy promotes the increase of household property income. The mechanism test finds that digital capability enhances the promoting effect of inclusive finance development on the increase of household income, and financial literacy enhances the promoting effect of inclusive finance development on the increase of household property income.

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