

The impact of digital inclusive finance on high-quality consumption: evidence from Jiangsu, Zhejiang and Shanghai of China

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Impact of
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Abstract

Purpose – Digital inclusive finance has a positive promotion effect on the development of the national economy, but little research exists on how digital inclusive finance affects high-quality consumption in economically developed regions. Therefore, to fill the gap, this paper aims to study the impact of digital inclusive finance on high-quality consumption development using the economically developed regions of Jiangsu, Zhejiang and Shanghai as examples.

Design/methodology/approach – Firstly, the entropy method is used to construct the index of high-quality consumption among residents. Then, the municipal-level data of Jiangsu, Zhejiang and Shanghai from 2011 to 2020 are used to test the impact. Subsequently, the mechanism of action test and heterogeneity analysis are conducted.

Findings – The results show that digital inclusive finance has a positive role in promoting the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai. At the same time, digital inclusive finance can promote high-quality consumption through its own digital payment and internet insurance channels. There is regional heterogeneity in the impact.

Originality/value – To the best of the authors' knowledge, this study is the first to examine whether and how digital inclusive finance affects high-quality consumption. The authors consider multiple dimensions, such as consumption level, consumption structure, consumption ability, consumption environment and consumption mode, to measure high-quality consumption. The findings provide valuable insights for policymakers, investors and regulators in planning regulations.

Keywords Digital inclusive finance, High-quality consumption, High-quality development

Paper type Research paper

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1. Introduction

In recent years, China's economy has shifted from a stage of rapid growth to a stage of high-quality development. High-quality development is an important support for building a socialist modern country. Realizing high-quality economic development is an important goal of China's new stage of development (Xiang, 2023). As an important component of high-quality development, high-quality consumption is a necessary path to build a new development pattern, and it is necessary to promote the transformation of consumption from high-speed growth to high-quality development (Mao and Xie, 2018). Promoting high-quality consumption is an important guarantee for promoting the healthy development of the economy. High-quality consumption includes the improvement of consumption level, consumption structure, consumption environment, consumption ability, consumption mode and other aspects.

Previous studies mainly focused on the impact of digital inclusive finance on economic growth, sustainable economic growth and high-quality economic development (Liu *et al.*, 2021; Sun and Tang, 2022; Xu *et al.*, 2023). Digital finance can promote residents' consumption quantity, and its inclusive coverage is crucial for sustainable economic growth, leading to high-quality development in China (Sun and Tang, 2022). Digital inclusive finance has enabled traditional financial institutions to break through time and space constraints, make full use of financial resources and provide safe and convenient financial services to groups excluded from the financial system. Digital inclusive finance development minimizes the "digital divide," enhances service efficiency and expands coverage. It can be seen from Figure 1 that the digital inclusive finance index and its three sub-indices in Jiangsu, Zhejiang and Shanghai have gradually increased between 2011 and 2020.

However, little literature explores digital inclusive finance's impact on high-quality consumption or its regional effects. Jiangsu, Zhejiang and Shanghai are economically developed regions with the leading financial development in China. In Figure 2, the per capita consumption expenditure of residents has also increased year by year. On the whole, the change trend in digital inclusive finance and residents' consumption levels is consistent.

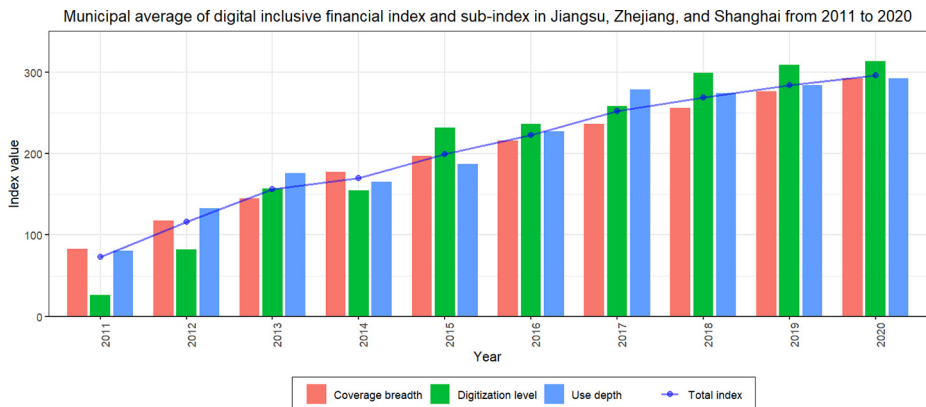


Figure 1.

Municipal average of the digital inclusive financial index and sub-index

Notes: This figure shows the municipal average of the digital inclusive financial index and the sub-index of coverage breadth, digitization level and use depth in Jiangsu, Zhejiang and Shanghai from 2011 to 2020

Source: Peking University Digital Inclusive Financial Index

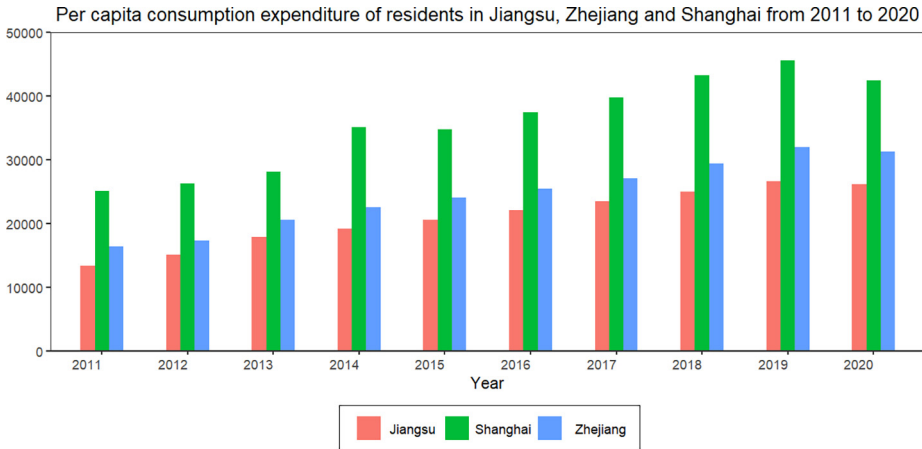


Figure 2. Per capita consumption expenditure of residents

Notes: This figure shows the per capita consumption expenditure of residents in Jiangsu, Zhejiang and Shanghai from 2011 to 2020
Source: National Bureau of Statistics

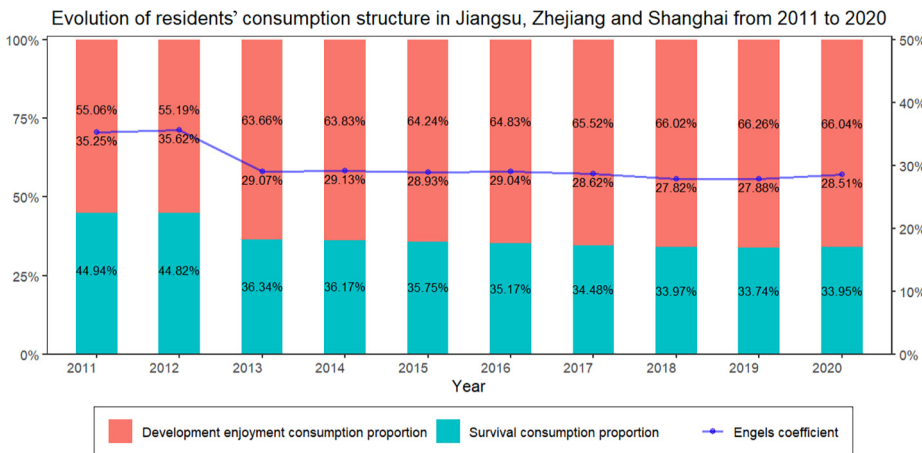


Figure 3. Evolution of residents' consumption structures in Jiangsu, Zhejiang and Shanghai from 2011 to 2020

Notes: This figure shows the evolution of residents' consumption structures in Jiangsu, Zhejiang and Shanghai from 2011 to 2020
Source: National Bureau of Statistics

Figure 3 reflects the consumption structure of residents in Jiangsu, Zhejiang and Shanghai. The proportion of development and enjoyment consumption is increasing year by year in all three regions. The consumption structure is continuously optimized and upgraded, which is positively related to the development of digital inclusive finance. Therefore, this study investigates the influence of digital inclusive finance on high-quality consumption in Jiangsu, Zhejiang and Shanghai.

Compared to the existing literature, our innovation includes several aspects. First, to the best of the authors' knowledge, this study is the first to examine whether and how digital inclusive finance affects high-quality consumption. Second, when measuring high-quality consumption, this article comprehensively considers multiple dimensions, such as consumption level, consumption structure, consumption ability, consumption environment and consumption mode. Third, the article selects regions with higher levels of economic development in China, represented by Jiangsu, Zhejiang and Shanghai, for research. Our findings provide valuable insights for policymakers, investors and regulators in planning regulations.

The rest of the paper is organized as follows. Section 2 provides a literature review. Section 3 presents a theoretical analysis and study hypothesis. Section 4 provides the research design. The empirical findings are reported and discussed in Section 5. Section 6 concludes.

2. Literature review

2.1 *Effect of digital inclusive finance*

Many scholars at home and abroad have studied the impact of digital, inclusive finance on the real economy. Most studies believe that digital inclusive finance can promote economic development, improve social equality, reduce poverty and narrow income inequality (Huang and Tao, 2019; Park and Mercado, 2018; Sun and Tang, 2022). Digital inclusive finance can promote the sustained growth of China's economy, mainly by increasing loans from financial institutions, household savings and consumption and the high-quality development of enterprises (Sun and Tang, 2022).

Digital inclusive finance can also promote enterprise development from various aspects, such as financing and operation (Su *et al.*, 2023; Lee *et al.*, 2023). Digital inclusive finance promotes the high-quality development of enterprises through three channels: improving innovation, easing financing constraints and risk-taking (Su *et al.*, 2023). Moreover, the beneficial effects of digital inclusive finance vary by region, enterprise property rights and industrial nature, and are more pronounced in the eastern region, non-state-owned enterprises and tertiary industry enterprises (Lee *et al.*, 2023).

In addition, the rapid development of China's digital inclusive finance in recent years has penetrated all aspects of daily life (Chen, 2016). Especially in the context of the global economic downturn, digital inclusive finance has played an important role (Bajra and Aliu, 2023; Batten *et al.*, 2023).

2.2 *Digital inclusive finance and resident consumption*

Digital inclusive finance can promote resident consumption growth through low costs, convenient payment and credit services. Digital finance has reduced the cost of services and provided savings and subsidies for families, promoting the consumption growth of residents in underdeveloped areas (Grossman and Tarazi, 2014; Yu and Wang, 2021; Lin and Zhang, 2022). Digital inclusive finance provides financial services such as credit for residents, thus promoting the transformation and upgrading of consumption structures (Corrado and Corrado, 2017). Digital inclusive finance promotes consumption growth through digital payment (Li *et al.*, 2020).

Some scholars in China have studied the impact of digital technology on household consumption in recent years. Digital finance can promote the upgrading of residents' consumption structures in China (Yu *et al.*, 2022; Feng and Zhang, 2022). And digital finance is helpful for the subsistence consumption of rural households (Yang *et al.*, 2022). The digital economy can improve the cultural consumption level of residents and increase online shopping (Wang *et al.*, 2022; Shi *et al.*, 2023).

From the existing relevant research, on the one hand, the literature mainly focuses on one aspect of consumption, mainly including the impact of digital inclusive finance on residents' consumption level or consumption structure. However, few literatures consider other dimensions reflecting consumption, such as consumption environment, consumption mode and consumption capacity. There is a lack of relevant empirical research. So, this paper studies from the perspective of high-quality consumption development, to conduct a comprehensive and systematic study on residents' consumption. On the other hand, in previous studies, few literatures have taken regions with relatively high financial development as examples. Therefore, this paper takes Jiangsu, Zhejiang and Shanghai as examples to study the impact of the development of digital inclusive finance on high-quality consumption and explore its impact mechanism in depth.

3. Theoretical analysis and study hypothesis

3.1 *Impact of digital inclusive finance on high-quality consumption*

At present, China's digital economy has become an important engine of high-quality development. The digital inclusive finance developed by relying on digital technology has a certain role in promoting the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai.

The theory of financial exclusion, first proposed by British scholars [Leyshon and Thrift \(1993\)](#), denotes a condition where certain socially disadvantaged groups lack access to financial services or receive inadequate service. According to the theory of financial exclusion, many vulnerable groups are excluded from the financial service system, especially in economically backward areas. Digital inclusive finance breaks the regional barriers to financial services, broadens the scope of financial services and makes financial services such as investment and financing, internet consumer credit and internet insurance more acceptable to residents through digital technology ([Huang and Tao, 2019](#); [Sun and Tang, 2022](#)). These diversified and personalized financial products provide appropriate financial services to the groups in need, thus stimulating the consumption potential, improving the consumption level of residents and also promoting the optimization and upgrading of the consumption structure ([Su et al., 2023](#); [Lee et al., 2023](#)). Specifically, a wide variety of investment and financial products can disperse investment risks, increase residents' property income and thus enhance residents' consumer confidence. The rapid advancement of digital inclusive finance has ensured that various financial products are no longer restricted to a select group of residents, thus significantly benefiting the "tail group" mentioned in the long tail theory.

The development of digital inclusive finance can promote green innovation in high-polluting enterprises by easing their financial constraints and mismatches ([Xue and Zhang, 2022](#)) and optimizing the consumption environment of residents to a certain extent. In addition, the consumption capacity of residents in Jiangsu, Zhejiang and Shanghai has been gradually improved, and the consumption mode has also been continuously upgraded. On the whole, the consumption quality of residents has improved year by year, consistent with the rapid upward trend of the digital inclusive financial index (DIFI).

Digital inclusive finance makes up for the defects of traditional finance, reduces the threshold of financial services and alleviates financial exclusion. At the same time, the development of digital inclusive finance contributes to the improvement of the economic level in Jiangsu, Zhejiang and Shanghai, and promotes high-quality consumption. Therefore, *H1* is proposed in this paper:

H1. Digital inclusive finance plays a positive role in promoting the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai.

3.2 Analysis of action mechanism

On the one hand, digital inclusive finance optimizes the payment methods of consumers. The development of third-party payment not only promotes the growth of consumption expenditure scale but also optimizes the consumption structure and becomes the main driving force for upgrading residents' consumption (Zhou, 2020). The advent of digital technology has led to the widespread adoption of non-cash payments, fulfilling the payment requirements of individuals and businesses while enhancing convenience in residents' daily lives. Digital payments have also revolutionized commodity trading, boosting online transactions, broadening the trading horizon and diversifying consumer choices.

On the other hand, the rapid development of internet insurance helps to improve the quality of residents' consumption. Leland (1968) introduced the precautionary savings theory, stating that individuals cut back on current consumption in response to future uncertainty, preferring to save more for later use. This theory suggests that people may opt to decrease spending when confronted with uncertain factors ahead. Internet insurance, being a pivotal component of digital inclusive finance, plays a crucial role in risk diversification, enabling residents to mitigate losses and alleviate the uncertainty associated with future cash flows. Therefore, it can expand the current consumption scale of consumers. At the same time, internet insurance simplifies the insurance business process through digital technology, reduces transaction costs, improves the degree of digital security, gives residents in Jiangsu, Zhejiang and Shanghai more confidence in consumption, stimulates their willingness to consume and promotes higher levels of consumption. The theoretical analysis of the action mechanism diagram is shown in Figure 4.

Based on the above analysis, the following hypothesis is proposed:

H2. Digital inclusive finance mainly promotes high-quality consumption among residents in Jiangsu, Zhejiang and Shanghai through digital payment and internet insurance.

3.3 Analysis of regional heterogeneity

The level of digital inclusive finance development varies among cities in Jiangsu, Zhejiang and Shanghai, alongside disparities in residents' consumption levels, structures and environments. Overall, there are inconsistencies in the economic development and digital inclusive finance development trends of various cities. The level of economic development affects residents' income. Residents in economically developed areas have more social resources, better employment opportunities and a higher per capita disposable income than those in economically underdeveloped areas.

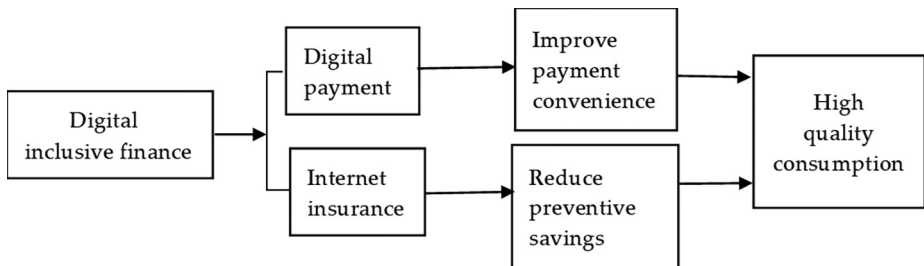


Figure 4.
Theoretical analysis
of the action
mechanism diagram

Notes: This figure presents the mechanism analysis of digital inclusive finance acting on high-quality consumption through digital payment and internet insurance channels

Source: Authors' own creation

In cities with different economic levels, residents' income varies, and the corresponding consumption quality of residents also varies. The development of digital inclusive finance in various cities in the Jiangsu, Zhejiang and Shanghai regions has improved the level of financial development, and played a positive role in economic growth, consumption and other aspects. There are differences in the development of digital inclusive finance among different cities, and the improvement of consumer quality will also vary. Therefore, this article believes that there are differences in the impact of digital inclusive finance on high-quality consumption in different cities with different levels of economic development and different levels of digital inclusive finance. Based on this, *H3* is proposed for further analysis:

- H3.* There is regional heterogeneity in the impact of digital inclusive finance on the high-quality consumption of residents in different cities in the Jiangsu, Zhejiang and Shanghai regions.

4. Research design

4.1 Build a high-quality consumption indicator

Referring to the existing literature on consumption quality (Zhu, 2018) and considering the current consumption situation of residents in Jiangsu, Zhejiang and Shanghai, this paper selects relevant indicators suitable for evaluating the high-quality development of residents, and constructs a comprehensive evaluation system consisting of five first-level indicators and 17 second-level indicators. Specifically, it includes high-quality development in consumption level, consumption structure, consumption environment, consumption capacity, consumption mode and other aspects, and these five indicators are taken as first-level indicators.

In the practice of using comprehensive evaluation methods, there are various evaluation methods. Depending on the weighting, there are subjective and objective evaluation methods. The entropy method is an objective and comprehensive evaluation technique for multiple indicators (Wang *et al.*, 2015; Xu *et al.*, 2023). It assigns weights to these indicators based on their degree of connection or the amount of information they contribute, enabling an accurate and unbiased assessment of the research object. Compared with the subjective assignment method, the entropy value method eliminates human interference factors. The entropy method uses the data entropy information to calculate the weight, which can objectively determine the weight of each index, and can also solve the problem of multi-variable information overlap. The purpose of this study is to objectively evaluate the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai from 2011 to 2020. Therefore, the entropy weighting method is used to evaluate the high-quality consumption of residents in various cities in Jiangsu, Zhejiang and Shanghai. The results are reported in Table 1.

4.2 Variables

4.2.1 *High-quality consumption index of residents.* The high-quality consumption index (HQC) of Jiangsu, Zhejiang and Shanghai constructed by the entropy method is derived from the statistical yearbooks of Shanghai, Jiangsu and Zhejiang. Among them, the data on consumption from 2011 to 2012 are only the consumption expenditure of urban and rural residents in each region, and the data of all residents are missing. Therefore, the data on consumption are calculated by adding urban data to rural data and dividing by the total population. Green and low-carbon consumption is measured by dividing the total carbon emissions in Jiangsu, Zhejiang and Shanghai by the number of permanent residents at the

Table 1.
Weights of indicators
in the evaluation
system of high-
quality consumption

Level 1 indicator	Level 2 indicator	Measurement method	Indicator attribute	Weight
Consumption level	Total retail sales of social consumer goods per capita	Total retail sales of social consumer goods/total population	+	0.038637
	Per capita consumption expenditure	Total consumption/total population	+	0.042304
	Engel coefficient	Food consumption expenditure/total consumption expenditure	-	0.026741
Consumption structure	Survival consumption	food, tobacco, alcohol and clothing consumption/total consumption	-	0.038034
	Development consumption	residential, daily necessities and services, cultural, educational and entertainment consumption/total consumption	+	0.031838
	Enjoyable consumption	transportation, communication, medical care and other consumption/total consumption	+	0.037799
Consumption environment	Internet broadband penetration rate	Internet broadband access users/total population	+	0.051788
	Per capita private car ownership	Private car ownership/total population	+	0.057889
	Per capita financial expenditure on health care	Financial health expenditure/total population	+	0.032882
Consumption capacity	Per capita public green area	Public green space area/total population	+	0.060735
	Per capita disposable income	Urban per capita disposable income * proportion of urban population+rural per capita disposable income * proportion of rural population	+	0.049386

(continued)

Level 1 indicator	Level 2 indicator	Measurement method	Indicator attribute	Weight
Consumption mode	Urban registered unemployment rate	Urban registered unemployment/(urban employees+urban registered unemployment)	-	0.018836
	Average consumption tendency	Per capita consumption expenditure/per capita disposable income	+	0.007345
	Number of college students per 10000 people	Number of students in colleges /total population	+	0.140856
	Online consumption	Express business income/total population	+	0.201057
	Credit consumption	Total consumer loans/total population	+	0.161279
	Low carbon consumption	Total carbon emissions/total population	-	0.002596

Notes: This table shows the weights of five first-level indicators and 17 second-level indicators in the high-quality consumption evaluation system among residents in various cities in Jiangsu, Zhejiang and Shanghai from 2011 to 2020, and the entropy weighting method is used

Source: Authors' own creation

Table 1.

end of the year. Given that the data on carbon emissions were only published in 2017, the data for 2018–2020 are supplemented by interpolation.

4.2.2 Digital inclusive financial index. In this paper, the development of digital inclusive finance is measured by the city-level index of Jiangsu, Zhejiang and Shanghai from 2011 to 2020 released by the Digital Finance Center of Peking University. This index is representative and authoritative, so it can reflect the development level of digital inclusive finance in various regions. It is also the indicator data commonly used by many scholars in their research (Yu *et al.*, 2022; Sun and Tang, 2022; Li and Li, 2023). To match the value of the high-quality consumption of residents constructed by the entropy method, this paper standardizes DIFI through the range standardization method. The index of 25 cities in Jiangsu, Zhejiang and Shanghai is used for analysis. The data is from the Peking University Digital Inclusive Finance Index (2011–2020) (Guo *et al.*, 2020).

4.2.3 Control variables. In addition to the core explanatory variables, there are other factors that can affect the high-quality consumption in Jiangsu, Zhejiang and Shanghai. Therefore, this paper refers to the existing literature (Qiu and Shi, 2021) to add the following control variables:

- The growth rate of GDP per capita (GDP). The growth rate of GDP is used to measure the economic development level of each city in Jiangsu, Zhejiang and Shanghai.
- Per capita disposable income (INCOME). According to the income determination theory, the income of residents is an important factor affecting consumption.
- The scale of government expenditure (GOV) is measured by the ratio of government financial expenditure to GDP.
- Financial development level (FINANCE) is measured by the ratio of the loan balance of financial institutions to GDP.
- Urbanization level (URBON).

The level of urbanization reflects the level of regional economic development and can affect consumption, as expressed by the proportion of urban population in the total population. The data is from the statistical yearbook of 25 cities in Jiangsu, Zhejiang and Shanghai from 2011 to 2020.

4.3 Model specification

We estimate [equation \(1\)](#) to test our *H1*:

$$HQC_{i,t} = \alpha_0 + \alpha_1 DIFI_{i,t} + \sum \alpha_j Control_{i,t}^j + \mu_i + \varepsilon_{i,t} \quad (1)$$

In this paper, the fixed-effects and random-effects models are used for estimation, respectively, and then Hausman test is carried out, and the results are shown in [Table 2](#). The Hausman test corresponds to a *p*-value of 0.0039, rejecting the original hypothesis, so the fixed effects model is chosen as the method for robustness testing of the panel vector autoregressive model.

In [equation \(1\)](#), the subscripts *i* and *t* represent the city and year, respectively; *HQC* is the high-quality consumption development index; *DIFI* is the digital inclusive financial index; and the control variable is expressed by *Control*, where μ_i stands for individual fixed effect and $\varepsilon_{i,t}$ is the random error term.

	HQC	
	Fixed-effects test	Random-effects test
DIFI	0.1843312*** (5.60)	0.1244369*** (4.88)
GDP	0.0779873*** (3.74)	0.0836851*** (3.81)
URBON	-0.1293044 (-1.53)	-0.0538935 (-0.65)
INCOME	0.2925254*** (3.40)	0.354374*** (6.02)
GOV	0.1510769** (2.46)	0.1390801*** (3.23)
FINANCE	-0.1083339* (-1.65)	-0.0379329 (-0.79)
Constant	0.1622101*** (3.78)	0.0851149** (2.05)
N	250	250
R ²	0.9604	0.9589
Hausman test	19.17*** (p-value 0.0039)	

Table 2.
Fixed-effects and random-effects test results

Notes: *t*-statistics in parentheses; ***, ** and * indicate significant at the 1, 5 and 10% levels, respectively
Source: Authors' own creation

Then, we estimate equation (2) and equation (3) to test our *H2*:

$$HQC_{i,t} = \alpha_0 + \alpha_1 Pay_{i,t} + \sum \alpha_j Control_{i,t}^j + \mu_i + \varepsilon_{i,t} \quad (2)$$

$$HQC_{i,t} = \alpha_0 + \alpha_1 Insur_{i,t} + \sum \alpha_j Control_{i,t}^j + \mu_i + \varepsilon_{i,t} \quad (3)$$

Among them, *Pay* stands for digital payment, and *Insur* represents internet insurance.

The three sub-dimension indexes of the digital inclusive finance total index are calculated by taking into account a variety of influencing factors. On the one hand, to verify the mechanism of digital payment for high-quality consumption in Jiangsu, Zhejiang and Shanghai, this paper analyzes the various influencing factors under the digital inclusive financial total index. After comprehensive analysis, this paper believes that there are three sub-indexes that can affect digital payment and promote high-quality consumption in Jiangsu, Zhejiang and Shanghai. The first is the coverage index, that is, the coverage of electronic payment accounts. The higher the index, the wider the impact of digital payment is. The second is that the primary indicator uses the payment business index in the depth index. The higher the business index, the more convenient the payment method is. The third is the digital service degree index, which includes four secondary indicators such as mobility and convenience. These three indexes are closely related to digital payments, so they can be used as test indicators of digital payment channels. On the other hand, to verify the mechanism of internet insurance on high-quality consumption, this paper selects the insurance index as the first-level indicator of the depth of use of digital inclusive finance for analysis.

5. Empirical results

5.1 Descriptive statistics results

Because of the time range of the Digital Inclusive Finance Index from 2011 to 2020, this article studies indicators like it and the HQC from 25 cities in Jiangsu, Zhejiang and Shanghai over the past 10 years. Each indicator contains 250 sample observations. To match the value of the index of HQC constructed through the entropy value method,

DIFI, INCOME, GOV, FINANCE and PRO_INC are standardized with the method of standardization of extreme differences. The descriptive statistics of each variable are shown in Table 3.

From Table 3, it can be seen that the development of digital inclusive finance in 25 cities in Jiangsu, Zhejiang and Shanghai is basically consistent with the previous description, with a large difference between the maximum and minimum values. This indicates significant differences in the development level of digital inclusive finance among different cities within the Jiangsu, Zhejiang and Shanghai regions. Similarly, the standard deviation of the high-quality development index of residents' consumption is also large, indicating that there are significant differences in the consumption quality of residents between different regions within the Jiangsu, Zhejiang and Shanghai regions.

5.2 Overall impact results

In Column (1) of Table 4, the coefficient in equation (1) is 0.184. The result shows that the coefficient of digital inclusive finance development on high-quality consumption development is significantly positive, which proves *H1* that digital inclusive finance plays a positive role in promoting the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai. This is generally in line with the conclusion of existing research that digital financial inclusion significantly contributes to the upgrading of residents' consumption (Li and Li, 2023).

5.3 Mechanism test results

In Columns (2)–(4) of Table 3, this paper examines the impact of three indicators of digital payment on the high-quality consumption of residents. The regression results show that the influence coefficient of coverage on high-quality consumption is 0.237, the coefficient of payment business is 0.094 and the coefficient of digital service level is 0.087, all of which are significantly positive. The empirical results show that digital payment is a direct mechanism for digital inclusive finance to promote the high-quality consumption of residents in Jiangsu, Zhejiang and Shanghai. In Column (5) of Table 4, the insurance index is used as the main explanatory variable. The result shows that the impact coefficient of the insurance business on high-quality consumption is significantly positive at the level of 1%,

Variables	Mean	SD	Max	Min	Num
DIFI	0.540049	0.252958	1	0	250
HQC	0.355277	0.123078	0.753552	0.102385	250
GDP	0.080459	0.068624	0.355949	-0.19095	250
INCOME	0.556415	0.205607	1	0	250
GOV	0.361991	0.181737	1	0	250
FINANCE	0.411756	0.214471	1	0	250
URBON	0.662024	0.092691	0.896	0.447994	250
PRO_INC	0.2688832	0.2097416	1	0	250

Notes: This table presents descriptive statistics for the digital inclusive financial index (DIFI), the high-quality consumption index of residents (HQC) and control variables. GDP represents the growth rate of GDP per capita; the minimum value of GDP is -0.19095, because the growth rate of GDP per capita in Ningbo City decreased by 0.19095 in 2016, compared to that of 2015. DIFI, INCOME, GOV, FINANCE and PRO_INC are standardized values with a minimum value of 0 and a maximum value of 1

Table 3.
Descriptive statistics
of various variables

Source: Authors' own creation

	1. HQC	2. HQC	3. HQC	4. HQC	5. HQC
DIFI	0.1843312*** (5.60)				
Pay1		0.2366599*** (5.68)	0.0937649*** (4.37)	0.0870493*** (5.20)	0.0580987*** (3.79)
Pay2					0.0747467*** (3.48)
Pay3					-0.1552114* (-1.77)
Insur					0.5445623*** (8.48)
GDP	0.0779873*** (3.74)	0.0849473*** (4.08)	0.0622021*** (2.90)	0.0815191*** (3.88)	
URBON	-0.1293044 (-1.53)	-0.1705339*** (-2.03)	-0.1663431* (-1.93)	-0.1264254 (-1.48)	
INCOME	0.2925254*** (3.40)	0.2654511*** (2.98)	0.4715485*** (6.64)	0.4827309*** (7.49)	
GOV	0.1510769** (2.46)	0.1879631*** (3.02)	0.0905827 (1.44)	0.0699972 (1.13)	0.1464514** (2.30)
FINANCE	-0.1083339* (-1.65)	-0.2089011*** (-3.16)	-0.0523324 (-0.75)	-0.0940236 (-1.42)	-0.1057283 (-1.55)
Constant	0.1622101*** (3.78)	0.2029172*** (4.54)	0.1450177*** (3.32)	0.1252553*** (2.94)	0.1097848** (2.51)
Control	Yes	Yes	Yes	Yes	Yes
N	250	250	250	250	250
R ²	0.9604	0.9606	0.9584	0.9597	0.9576

Notes: *t*-statistics in parentheses; ***, ** and * denote significance levels at 1, 5 and 10%, respectively

Source: Authors' own creation

Table 4.
Regression results of the overall impact

which can indicate that the internet insurance business can improve the quality of consumption.

The above results verify *H2*, which shows that digital inclusive finance can promote high-quality consumption in Jiangsu, Zhejiang and Shanghai through digital payment and internet insurance channels. This is consistent with the conclusion that digital financial inclusion can increase consumption using digital payment and insurance channels (Zou and Wang, 2021).

5.4 Heterogeneity test results

To further investigate the differences in the impact of digital inclusive finance on high-quality consumption in Jiangsu, Zhejiang and Shanghai, this article compares 25 cities based on their economic and digital finance development levels. Firstly, these 25 cities are divided into two groups based on their regional GDP in 2020, in descending order. Among them, the group with a higher level of economic development is designated as Region A, while the group with a lower level is designated as Region B. Secondly, based on the 2020 Digital Inclusive Finance Index of each city, these 25 cities are also divided into two groups. Among them, the group with a higher level of development in digital inclusive finance is designated as Region C, while the lower group is designated as Region D.

From Table 5, it can be seen that the impact coefficients of digital inclusive finance in both regions are significantly positive. Specifically, for Region A with a higher level of economic development, the impact coefficient of digital inclusive finance on high-quality consumption development is 0.1298, which is significantly lower than the impact coefficient of Region B, which is 0.1997. Digital inclusive finance plays a greater role in promoting high-quality consumption development in areas with lower levels of economic development. This is consistent with the conclusion that digital inclusive finance is more prominent among low-income and vulnerable groups (Huang and Tao, 2019; Xu *et al.*, 2023). The possible reason is that, on the one hand, in cities with lower levels of economic development, infrastructure is relatively backward, the level of financial market development is also lower and financial accessibility is smaller, and thus the impact of digital inclusive finance is relatively stronger. On the other hand, in cities with lower levels of economic development, income is also lower. According to Keynes (1936) consumption theory, the corresponding marginal propensity to consume will be higher. Digital finance has a greater positive impact on consumption by alleviating liquidity constraints, thus playing a more important role in promoting the improvement of residents' consumption quality. This reflects the inclusiveness of digital inclusive finance, which means that among low-income people, the long tail effect is more pronounced, and the promotion effect on high-quality consumption is stronger.

The test results in Table 5 show that the coefficient of influence of digital inclusive finance on both regions is positive. Among them, the region with a high level of development of digital inclusive finance has an impact on high-quality consumption at a significant level of 5%, while the region with a low level of development is significantly positive at the 1% level, and the coefficient of influence is 0.1885, which is higher than the coefficient of 0.119 in Region C. Therefore, digital inclusive finance plays a greater role in promoting high-quality consumption in areas with low levels of digital finance development. This is consistent with the conclusion that digital inclusive finance is particularly evident in underdeveloped regions of China (Huang and Tao, 2019). The reason for this result may be that traditional finance has a high threshold in areas with low digital inclusive finance development. Digital inclusive finance helps more people access financial services, compensating for system shortcomings. The role of digital inclusive finance is more

	Divided by economic development level			Divided by the development level of digital inclusive finance		
	Region A	Region B	Region C	Region D	Region C	Region D
DIFI	0.1298275*** (3.09)	0.1996929*** (3.75)	0.1194044** (2.50)	0.1885108*** (4.16)	0.1194044** (2.50)	0.1885108*** (4.16)
GDP	0.0959912*** (3.08)	0.0447553 (1.59)	0.1102477*** (4.37)	0.0413224 (1.31)	0.1102477*** (4.37)	0.0413224 (1.31)
URBON	-0.363795*** (-3.08)	0.2002713 (1.50)	-0.1744398*** (-1.80)	-0.0650891 (-0.39)	-0.1744398*** (-1.80)	-0.0650891 (-0.39)
INCOME	0.4201867*** (3.84)	0.2335634* (1.76)	0.3841954*** (3.02)	0.3019814*** (2.84)	0.3841954*** (3.02)	0.3019814*** (2.84)
GOV	0.1211048 (1.25)	0.1133786 (1.34)	0.1524419* (1.69)	0.03033318 (0.37)	0.1524419* (1.69)	0.03033318 (0.37)
FINANCE	-0.0024188 (-0.03)	-0.2141344** (-2.11)	0.0577142 (0.64)	-0.1508761 (-1.54)	0.0577142 (0.64)	-0.1508761 (-1.54)
Constant	0.2566662*** (3.77)	0.0014578 (0.02)	0.1083297** (2.17)	0.1277588 (1.57)	0.1083297** (2.17)	0.1277588 (1.57)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
num	130	120	140	110	140	110
R ²	0.9681	0.9577	0.9702	0.9601	0.9702	0.9601

Notes: *t*-statistics in parentheses, ***, ** and * denote significance levels at 1, 5 and 10%, respectively

Source: Authors' own creation

Table 5. Regional heterogeneity test results

pronounced in low digital literacy areas of research (Aliu *et al.*, 2023; Bouri *et al.*, 2023). This paper uses a panel vector autoregression (PVAR) model to test robustness. The PVAR model is constructed as equation (4):

5.5 Robustness

The above static panel model research method ignores the endogenous problem. Similar to existing research (Aliu *et al.*, 2023; Bouri *et al.*, 2023), this paper uses the PVAR model to test robustness. The PVAR model is constructed as equation (4):

$$Y_{i,t} = \alpha_0 + \sum_{j=1}^p \alpha_j Y_{i,t-j} + \gamma_i + \beta_t + \mu_{i,t} \quad (4)$$

where Y_i is a two-dimensional column vector containing a DIFI and a HQC, that is, [DIFI, HQC] $_{T}$; i represents the city and t is the year; α_0 is the intercept term vector; α_j is the parameter matrix; P represents the order of lag; γ_i is the individual effect vector; β_t is the time effect vector; and $\mu_{i,t}$ is a random interference term.

The HQC and the DIFI both passed the unit root test, indicating that the data is stable. The optimal lag order is then determined to be the first order. The characteristic roots of the variables are all within the unit circle, indicating that the model is stable (because of space reasons, the testing process is omitted here and only the results are displayed). Subsequently, the Granger causality test is used to determine the relationship between DIFI and HQC (see Table 6). The results indicate that, at a significant level of 1%, digital inclusive finance is the Granger reason for the high-quality consumption in the Jiangsu, Zhejiang and Shanghai regions.

Next, we conduct pulse response analysis to further investigate the impact of digital inclusive finance on high-quality consumption. The pulse response diagram is shown in Figure 5. The solid lines are all above the zero-level line, indicating a positive overall correlation between the development of digital inclusive finance and high-quality consumption. The effect is greatest in lag phase 1, with a strong positive promoting effect in the first two phases and gradually decreasing and stabilizing after the third phase.

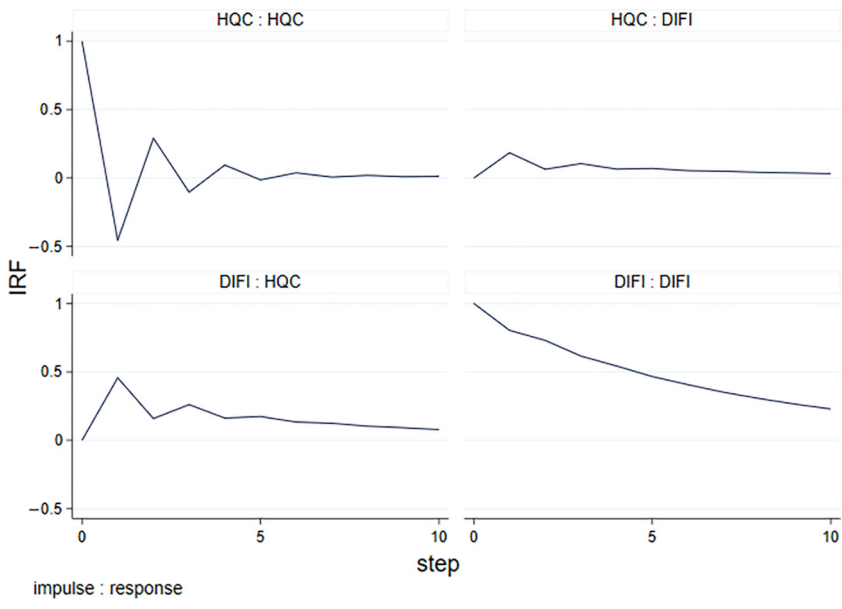
On the basis of impulse response analysis, variance decomposition is conducted on the high-quality consumption development index of residents in the Jiangsu, Zhejiang and Shanghai regions to further analyze the impact of digital inclusive finance on high-quality consumption development. The results are shown in Table 7.

Table 7 presents the variance decomposition results of the HQC of residents in periods 1–10. From the data in Table 7, it can be seen that the changes in the first phase of high-quality consumption development are mainly influenced by their own factors, and their self-regulation ability is strong. Since the second phase, the contribution rate of digital inclusive finance to high-

Original hypothesis	Chi-square statistic	<i>p</i> -value
DIFI is not the Granger reason for HQC	22.908	0.000
HQC is not the Granger reason for DIFI	0.449	0.503

Table 6.
Granger causality
test

Notes: This table presents the Granger causality test for the relationship between DIFI and HQC, and the optimal lag order is then determined to be the first order
Source: Authors' own creation



Notes: This figure shows the pulse response diagram of the impact of digital inclusive finance on high-quality consumption
Source: Authors' own creation

Figure 5. Pulse response function diagram

Response variable	Period	Impulse variable	
		DIFI	HQC
HQC	1	0.0097544	0.9902456
	2	0.2000702	0.7999298
	3	0.2161409	0.7838591
	4	0.2615648	0.7384353
	5	0.2795174	0.7204826
	6	0.2984392	0.7015608
	7	0.3095416	0.6904584
	8	0.3187948	0.6812052
	9	0.3250974	0.6749027
	10	0.3299815	0.6700185

Notes: This table presents the variance decomposition results of the impact of digital inclusive finance on high-quality consumption among residents in Jiangsu, Zhejiang and Shanghai
Source: Authors' own creation

Table 7. Variance decomposition results

quality consumption has been continuously increasing. By the tenth phase, the contribution rate of digital inclusive finance to high-quality consumption had remained at a relatively stable level, reaching around 33%. It can be seen that digital inclusive finance helps promote the further development of high-quality consumption among residents in the Jiangsu, Zhejiang and Shanghai regions. Therefore, it can be considered to have passed the robustness test.

6. Conclusion

This paper takes the economically developed regions of Jiangsu, Zhejiang and Shanghai as examples to study the impact of digital inclusive finance on high-quality consumption development. The entropy method is used to construct the index of high-quality consumption among residents. And the municipal-level data of Jiangsu, Zhejiang and Shanghai, China, from 2011 to 2020 are used to test the impact. The mechanism of action test and heterogeneity analysis are conducted.

Our study finds some interesting findings. First, digital inclusive finance has a positive role in promoting high-quality consumption in Jiangsu, Zhejiang and Shanghai. Second, digitally inclusive finance can promote high-quality consumption through digital payment and internet insurance mechanisms. Third, there is heterogeneity in the impact of digital inclusive finance on the high-quality consumption development of residents in the different cities of Jiangsu, Zhejiang and Shanghai. These findings provide several important signals for policymakers, investors and regulators, which is to better understand the consumption behavior of residents in the current economic environment and have important significance for promoting high-quality economic development.

When the economy develops to a certain level, local governments can increase the development of inclusive finance. They can increase the expenditure of special funds, provide financial support for the development of digital inclusive finance. Relevant financial institutions should rely on digital technology to continuously optimize digital payment, credit, insurance and other financial services. Investors can pay attention to digital, inclusive finance related to consumption. However, because of the annual sampling of data, the sample size in this article is relatively small. This might encourage other scholars to explore the availability of quarterly or monthly data, thereby enabling a more comprehensive analysis of the influence of digital inclusive finance on high-quality economic growth.

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