The Impact of Digital Inclusive Finance on Residents' Consumption under the Background of Dual Cycle

-- Based on Panel Quantile Model Analysis

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Abstract

Digital financial inclusion is an important trend in current financial development. In the context of the new development pattern, from a spatial perspective, based on the panel data of various provinces and cities in my country from 2011 to 2020, the heterogeneous impact of digital financial inclusion on household consumption expenditure is studied. It presents the characteristics of spatial agglomeration; the direct effect of the coverage and depth of digital inclusive finance on household consumption expenditure is significantly positive, but the direct effect of its digitalization degree is significantly negative, which may be because online shopping will be more inclined to necessities of life, Its low price elasticity of demand leads to a decrease in total household consumption; however, due to resource competition, the indirect effects of the three dimensions of digital financial inclusion are significantly negative or insignificant. Based on this, the network should be strengthened, The construction of network infrastructure, the improvement of the development plan of digital inclusive finance, and the improvement of the digital inclusive finance supervision mechanism.

Keywords

Resident Consumption; Digital Financial Inclusion; Spatial Spillover Effect; Panel Quantile Model.

1. Introduction

In April 2020, General Secretary Xi Jinping emphasized at the seventh meeting of the Central Finance and Economics Committee: to build a new development pattern with the domestic cycle as the main body and the domestic and international dual cycles to promote each other. Expanding domestic demand and promoting consumption is the proper meaning of smooth domestic circulation. The development of the financial market is an important factor affecting household consumption. As early as 2013, the Chinese government proposed to develop inclusive finance. With the practice of inclusive finance and the development of digital finance, the two have developed a strong correlation. The emergence of digital inclusive finance can further expand its coverage through the digital finance model, reduce the cost of financial products, and allow more residents to obtain inclusive financial services and thus affect consumption. Therefore, under the new development pattern, studying the heterogeneous impact of digital financial inclusion on household consumption has certain practical significance, and can also provide theoretical reference for further improving digital financial inclusion and related policies to promote household consumption [1].

2. Literature Review

The relationship between finance and consumption has always been the focus of research. Finance mainly affects household consumption through channels such as alleviating liquidity
constraints, reducing uncertainty, and adjusting income distribution. Ye Yaoming and Wang Sheng (2007) established a GLS panel model based on the life cycle hypothesis and Euler equation for empirical research, and found that financial marketization eases the flow through various channels such as reducing financial intermediary costs, providing more wealth management services, and increasing consumer credit services. Sexual constraints, promote the growth of household consumption, and this relationship is more significant in economically developed regions. Liu Yurong et al. (2019) conducted an empirical study by establishing an SV model and showed that the increase in the price of financial assets will not promote the consumption of urban residents, but the uncertainty caused by frequent price fluctuations will play a certain inhibitory role[2].

Zheng Dekun and Li Ling (2021) analyzed by establishing a theoretical model of intertemporal utility function and an empirical model of intermediary effect respectively. The research shows that financial development affects household consumption through income distribution, and income distribution reduces the total amount of financial development on household consumption. As an emerging field, digital financial inclusion has received much attention in recent years focus on. Yin Yingkai and Hou Rui (2017) systematically sort out the development logic of digital inclusive finance, divide the historical development stage of digital inclusive finance in my country on this basis, and explain the development of digital inclusive finance in my country from three levels of government, financial institutions and enterprises. Regarding the lack of unified level measurement standards, Guo Feng et al. (2020) constructed a digital financial inclusion indicator, which uses a large amount of data provided by Ant Group, and refers to the calculation method of traditional financial inclusion indicators and the new features of digital financial inclusion. Analytic hierarchy process measures the level of digital financial inclusion in my country's provinces, cities and counties from the horizontal and vertical dimensions. Jiao Yunxia (2021) used Dagum Gini coefficient, spatial Markov chain and other methods to find that the level of digital financial inclusion in my country's provinces and cities shows an overall convergence trend, and the spatial spillover effect plays an important role[3].

Regarding the research on the relationship between digital financial inclusion and consumption, Yi Xingjian and Zhou Li (2018) theoretically and empirically demonstrate that digital financial inclusion can facilitate payment and ease liquidity constraints by establishing utility functions and Euler equations. Channels affect residents' consumption, and it is found that digital inclusive finance has a more obvious role in promoting consumption of low- and middle-income groups. Jiang Hongli and Jiang Pengcheng (2020) conducted an empirical study by establishing a dynamic panel model and found that digital inclusive finance promotes the increase of residents' consumption level and the upgrading of consumption structure, which has a stronger role in promoting development and enjoyment-oriented consumption. By combing past literature, this paper finds that existing studies have shown that digital financial inclusion has the characteristics of spatial agglomeration, but few literatures study the heterogeneous impact of digital financial inclusion on consumption from a spatial perspective. Therefore, this paper studies the heterogeneous impact of digital financial inclusion on residents' consumption from a spatial perspective by establishing a spatial econometric model, in order to enrich relevant research and provide a certain reference for subsequent research.
3. Theoretical Mechanism

With reference to the "White Paper on the Development of Digital Inclusive Finance (2019)", this paper defines digital inclusive finance: "Digital inclusive finance is based on various digital technologies under the premise of controllable costs and sustainable models. All social strata, especially urban low-income people, rural population, population in remote areas and other special groups and small and micro enterprises that are under-covered by the existing financial system, provide equal, effective, comprehensive and convenient financial products and services." By definition, digital financial inclusion is actually the provision of services by financial inclusion with the help of digital technology. Digital financial inclusion affects household consumption mainly through the following three channels[4].

3.1. Alleviate Liquidity Constraints

Residents are sometimes unable to spend due to insufficient funds available. For example, residents often need to save for a period of time to purchase large-value commodities, and the income and consumption of rural residents also have seasonal characteristics due to the development of agriculture. Compared with traditional financial services, digital inclusive finance can further improve the coverage and availability of financial services with the help of digital technology, and effectively alleviate the liquidity constraints of residents to achieve intertemporal consumption. For another example, residents can obtain a certain amount of liquidity support through Ant Financial's Huabei service to realize "consumption first, repayment later" shopping, avoiding the situation of being unable to consume due to temporary liquidity constraints[5].

3.2. Reduce Uncertainty

Residents often affect consumption according to the potential risks. Digital inclusive finance promotes the development of the Internet insurance industry, improves the inclusiveness and availability of insurance, and makes it easier for residents to obtain insurance services. The existence of insurance reduces the adverse impact of potential risks on the consumption level of residents, reduces the corresponding precautionary savings, and increases consumption. For example, residents who buy accident insurance can get a certain amount of financial compensation when the corresponding accident occurs, without the need to make more preventive savings.

3.3. Facilitate Payment

The digital payment of digital inclusive finance brings payment convenience to consumers, and consumers do not need to carry paper money to consume. From a psychological point of view, residents are more sensitive to paper currency, and digital payment may lead to more consumption by residents. At the same time, the increase in payment efficiency brought about by digital payment reduces transaction costs for both parties. In addition, the emergence of online shopping platforms has intensified competition among merchants, which will bring certain benefits to residents. Although the number of consumer goods may increase, because online shopping will be more inclined to necessities, the price elasticity of demand is low, resulting in a decrease in the total consumption of residents[6].

4. Establishment and Analysis of the Model

4.1. Variable Selection and Data Description

Explained variable. The explained variable is the per capita consumption expenditure of residents, which is processed logarithmically. Core explanatory variables. With reference to the "Peking University Digital Financial Inclusion Index (2011-2020)", three dimensions of
digital financial inclusion are selected as the core explanatory variables, which are the breadth of coverage, the depth of use and the degree of digitization, which are processed logarithmically. Control variables. The control variables are GDP per capita, industrial structure, government support, urbanization rate and economic openness. Among them, per capita GDP is treated as logarithm. The empirical analysis part of this paper selects the panel data of 31 provinces and cities (except Hong Kong, Macau and Taiwan) from 2011 to 2020. The data comes from "Peking University Digital Financial Inclusion Index (2011-2020)" and "China Statistical Yearbook".

4.2. Build Panel Quantile Regression Model

The spatial weight matrix selected in the empirical part of this paper is the adjacency weight matrix. On this basis, the Moran test of the spatial correlation between the per capita consumption expenditure of residents and the digital financial inclusion index from 2011 to 2020 is carried out. The Moran test of the financial benefit index can reject the null hypothesis of "no spatial correlation", and the Moran index is greater than 0, indicating that there is a positive spatial correlation between the development of digital financial inclusion and residents' consumption in various provinces and cities, that is, the characteristics of spatial agglomeration.

At the same time, the explanatory variables of residents' consumption in surrounding provinces and cities, as well as the influence of independent variables such as the development of digital inclusive finance and per capita GDP on the consumption of residents in the provinces and cities are considered. This paper chooses the SDM model to study the impact of digital financial inclusion on household consumption. It shows that the consumption of residents in surrounding provinces and cities has a positive impact on the consumption of residents in this province and city, which further confirms that the consumption of residents in each province and city presents the characteristics of spatial agglomeration.

This part builds a panel quantile regression model to conduct an empirical analysis of the consumption promotion effect of tax cuts and fee reductions in the context of the new dual-cycle development. The panel quantile regression model is also a weighted minimization residual error that modifies the traditional linear panel model. The regression estimation method of the sum of absolute values, in the form of:

\[ Y_{it}(T \mid X_{it}, D_{it}) = \alpha_i + \beta_T X_{it} + \theta_T D_{it} + \epsilon_{T, it}. \]  

(1)

Among them: Yit is the explained variable, Xit is the explanatory variable, Dit is the control variable, \( \beta_T \) and \( \theta_T \) are the marginal effect parameters at the Tth quantile, and \( \epsilon_{T, it} \) is the unobserved random item.

In the traditional mean linear model, all sample points are given the same weight in the estimation procedure, so the relative importance of the sample points has nothing to do with the position of the sample points in the sequence; and in the quantile represented by equation (1) in the numerical model, the relative importance of the sample points is constrained by the weight of the sample points in the sequence. The sample points within a given quantile level are given a higher weight.

Therefore, the parameters \( \beta_T, \theta_T \) and \( \epsilon_{T, it} \) are actually conditional estimates under the conditions of a given quantile and a sample set \{Yit,Xit,Dit\}. In the estimation procedure, the panel quantile model described by equation (1) is estimated by minimizing the conditional loss function in equation (2):
\[
\min_{\alpha_T, \beta_T} \sum_{T=1}^{M} \sum_{i=1}^{N} \sum_{r=1}^{T} W_T L_T .
\]

Among them: \(W_T\) is the weight of the quantile of \(T \in (1, 2, \ldots, M-1, M)\); \(L_T\) is the loss function of the panel quantile model parameter estimation; \(L_T\) is expressed by equation (3):

\[
L_T = Y_i \left| X, D_i \right) - \left( \alpha_i + \beta_i X_i + \theta_i D_i \right) + \lambda \left( \sum_{i=1}^{N} |\alpha_{T,i}| \right) .
\]

The panel quantile model can not only effectively eliminate the normal distribution assumption based on the minimum residual square sum panel model for the unobserved residual items; it can also analyze the heterogeneity and adjustment of the parameter values at different locations in the sample interval. Direction to better reflect the rich information in the sample data set. Therefore, this study chooses the panel quantile model for empirical analysis to improve the value and accuracy of the research.

### 4.3. Descriptive Statistical Analysis

Due to the spatial spillover effect between provinces and cities, the regression coefficient of the SDM model cannot accurately describe the relationship between variables. In order to further study the impact of the development of digital financial inclusion in this province on the consumption of residents in this province and surrounding provinces and cities, this paper uses the direct and indirect effects of the three dimensions of digital financial inclusion to describe. The direct effects of \(\lnFCI\) and \(\lnFUDI\) are both significantly positive, indicating that the increase in the coverage and depth of digital financial inclusion in the province and city will promote the consumption of residents in the province and city. This is mainly because the increase in coverage means that more residents have access to digital financial inclusion services, and the increase in the depth of use means that residents can obtain more services such as credit, insurance and investment, which can ease the liquidity of residents Constraining or reduce potential uncertainty to increase household consumption. The direct effect of \(\lnFUGI\) is significantly negative, indicating that the improvement of the digitalization of digital inclusive finance in the province and city has reduced the consumption of residents in the province and city. This may be because the calculation of the digitization degree indicator takes into account benefits and mobilization. The increase in the digitization degree means that mobile payment is more convenient, and the loan cost of small and micro enterprises is low, which leads to the reduction of labor and capital costs for enterprises. At the same time, digitalization relies on the Internet, and the existence of online shopping platforms has intensified competition among enterprises, which will bring consumers a certain degree of discount, and consumers can buy goods at cheaper prices. Although the number of consumer goods may increase, as online shopping will be more biased towards daily necessities, the price elasticity of demand is low, resulting in a decrease in total household consumption. The indirect effects of \(\lnFCI\) and \(\lnFUDI\) are significantly negative, and the indirect effect of \(\lnFUGI\) is not significant, indicating that the development of digital financial inclusion in this province has not promoted the consumption of residents in surrounding provinces and cities, and even played a hindering role. This is mainly because there is competition between resources. When the coverage, depth of use or degree of digitalization of digital inclusive finance in this province and city develops rapidly, and the financial market further develops, the residents of this province and city will increase their demand for resources such as finance and technology, which will increase the demand for resources from surrounding provinces and cities. Attractiveness, which is not conducive to the increase in the consumption of residents in surrounding provinces and cities.
5. Research Conclusions and Policy Implications

Based on the panel data of various provinces and cities in my country from 2011 to 2020, this paper studies the heterogeneous impact of digital inclusive finance on household consumption from a spatial perspective. The breadth of coverage and depth of use of Hui Finance have a significantly positive direct effect on residents’ consumption, mainly because more residents have access to financial services and residents can obtain more financial services, thereby easing liquidity constraints or reducing potential uncertainty drives up consumption; digital inclusion. The direct effect of financial digitization on household consumption is significantly negative. This may be because the reduction of corporate costs and intensified competition bring consumers a certain degree of preferential treatment. Although the number of goods consumed by consumers may increase, online shopping will be more inclined to for daily necessities, the low price elasticity of demand leads to a decrease in total household consumption; the indirect effects of the three dimensions of digital financial inclusion are significantly negative or insignificant, which is not conducive to the increase in household consumption in surrounding provinces and cities. Based on the above conclusions, the following recommendations are made [7].

Strengthen the construction of network infrastructure. Digital financial inclusion utilization. Digital technology to carry out corresponding services, the premise is a complete network infrastructure. There are still some rural areas in my country with poor network infrastructure, which makes it difficult for local residents to access services related to digital inclusive finance through the Internet. Therefore, the government should further strengthen the network infrastructure construction in my country's rural areas, increase the density of mobile network base stations, and achieve network speed and fee reductions while improving network coverage, laying a solid foundation for the further development of my country's digital inclusive finance [8].

Improve the digital inclusive finance development plan. Considering the direct effect of digital financial inclusion on residents’ consumption, the government can improve the development plan of digital financial inclusion in terms of coverage, depth of use, and degree of digitization. Accounts to increase coverage, publicize financial-related knowledge such as credit and insurance, so that more residents understand how to conduct digital wealth management to increase the depth of use, develop diversified financial products, and use digital technologies such as big data to accurately identify risks, so as to reduce loan interest rates and Increase digitization.

Improve the digital inclusive financial supervision mechanism. Considering the indirect effect of digital inclusive finance on household consumption, it is necessary to further improve the supervision mechanism, clarify the supervisory bodies of various businesses, implement differentiated supervision strategies for different businesses, guide the flow of funds in the financial market, and balance the various provinces and cities. The development of digital inclusive finance will narrow regional differences. For example, unify the network infrastructure construction, digital financial development plans and policy systems in various regions to avoid resource competition and lead to a decline in household consumption.

6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.
References


