

Study on the Path and Mechanism of Digital Inclusive Finance on Economic Growth

-- An Empirical Analysis based on National and Provincial Panel Data

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Abstract

Over the past four decades of reform and opening up, China's economy has achieved a high average annual growth rate of over 9 per cent, becoming the second largest economy in the world. At the same time, China's financial reform and development has been continuously optimized, and the financial industry has maintained rapid development. With the accelerated integration of new-generation digital technology and inclusive finance, the flourishing development of inclusive finance has added strong momentum to the financial services economy. Based on the relevant research literature on inclusive finance at home and abroad and the characteristics of digital finance, we constructed the evaluation index system of cross-country digital inclusive finance level and the evaluation index system of provincial digital inclusive finance level, and evaluated the development level of digital inclusive finance in 31 provinces (municipalities directly under the central government) in China. On this basis, the impact of digital financial inclusion on economic growth is comprehensively analyzed from two perspectives (temporal and spatial dimensions) and two levels (cross-country and provincial levels), and the empirical evidence is analyzed from the temporal dimension by using traditional econometric analysis methods. The increase in the level of digital inclusive finance in a region has a significant contribution to the region's economic growth, and the mediating effects of credit constraints, entrepreneurship, investment and urban-rural income gap between digital inclusive finance and economic growth are proposed and verified through the decomposition of the direct-indirect effects and heterogeneity of the spatial Durbin model. Policy recommendations are proposed through relevant research results to help China's further economic development.

Keywords

Digital Financial Inclusion; Economic Growth; GDP; Econometric Analysis.

1. Introduction

Digital financial inclusion is a new form of financial services, based on digital technology and emphasizing the universality and inclusiveness of financial services. The economy is the foundation of a country and the backbone of our society's prosperity and development. Finance is the core and bloodline of the modern economy, and the economy and finance are symbiotic and mutually reinforcing. Exploring the mechanism of digital financial inclusion on economic growth is conducive to solving the problem of the "last kilometer" of financial services, and using digital technology to provide financial services for farmers, urban low-income earners,

small and micro-enterprises, and other disadvantaged groups excluded from traditional finance. Digital financial inclusion is a capillary that directly extends to the end of the economic body, and its connection with the economy is closer and its interaction deeper, so the study of digital financial inclusion and the spatial balanced development of the economy, the regional coordination mechanism of synergistic development and other related issues are of great practical significance in promoting the synergistic development of China's digital financial inclusion and the real economy, so as to promote the high-quality development of the macro-economy.

2. Literature Review

2.1. Review of Foreign Literature

Regan and Paxton (2003) expand the meaning of financial inclusion to include both breadth of demand and depth of participation. Breadth refers primarily to customers' access to a variety of basic financial products and services, such as bank accounts and affordable credit and insurance products. Depth refers to the ability and opportunity of customers to use financial products and services, and Allen et al. (2010) agree that financial inclusion mainly includes the availability and use of financial services, with the former depending on the supply side of financial products and services, i.e., the distribution and density of financial institutions' business outlets and ATMs, and the latter being determined by both supply and demand. Around the research on the factors affecting the level of financial inclusion development, the research analysis of Alpana (2009) found that there is a robust positive correlation between GDP per capita and households' (or businesses') access to and use of formal financial services. Ozili (2017) pointed out through a comparative analysis of the strengths and weaknesses of digital finance that digital finance can have a positive impact on financial inclusion in both emerging and developed economies. positively. Lai et al. (2020) find that digital financial inclusion weakens the ability of Chinese households to withstand temporary income shocks due to online purchases that may lead to over-sensitivity of consumption to income.

2.2. Review of National Literature

Jiao Jinpu et al. (2015) added the measurement of financial service quality on the basis of financial service accessibility and utilization when evaluating financial inclusion. In addition Li Chunxiao (2012) and Fan Xiangmei et al. (2017) added the affordability of financial services on the basis of accessibility and usage, and Qiu Feng et al. (2014) pointed out that Internet finance can realize financial inclusion by reducing the cost of financial transactions, and that the impacts of digital inclusive finance on the Chinese economy are gradually emerging. He Qizhi et al. (2019) analyzed the relationship between Internet penetration, digital financial inclusion and economic growth, and concluded that digital financial inclusion can promote economic growth in the short term. The results of Jiang Changliu et al. (2020) on prefecture-level cities in China showed that digital inclusive finance helps promote high-quality economic development, and Yang Weiming et al. (2020) analyzed digital inclusive finance from the perspective of mediating effect to increase the income of residents through entrepreneurial behaviors and thus reduce the urban-rural income gap, and found that digital inclusive finance can increase the income of farmers to slow down poverty.

Through the above analysis, it can be seen that scholars at home and abroad have achieved certain valuable results in the evaluation of financial inclusion and the relationship between financial inclusion and economic growth, but the existing evaluation index system of the level of digital financial inclusion is not perfect, the theoretical research on the economic growth of digital financial inclusion is still insufficient, and the research on the mechanism of digital

financial inclusion affecting economic growth needs to be in-depth, and in view of the above problems. In order to address the above problems, this study constructs an evaluation index system of digital financial inclusion that can be applied to cross-country comparison and domestic provincial comparison, measures the development of digital financial inclusion in each country and province, constructs a theoretical model of the impact of digital financial inclusion on economic growth at the theoretical level, and develops a quantitative model of the impact of digital financial inclusion on economic growth at the cross-country level and provincial level by using traditional and spatial measurement methods respectively. The quantitative analysis of the impact of digital inclusive finance on economic growth is carried out at the cross-country level and provincial level using traditional and spatial measurement methods respectively to enrich the relevant empirical research; the four intermediary variables of credit constraints, income disparity, entrepreneurship, and investment are introduced to analyze the mechanism of the impact of digital inclusive finance on economic growth from the theoretical and empirical perspectives.

3. Theoretical Analysis and Model Construction

3.1. Driving Effects of Digital Financial Inclusion on Economic Growth

3.1.1. Expanded Coverage of Financial Services

Digital financial inclusion utilizes the Internet and mobile communication technologies to break the geographical and time constraints of traditional financial services, enabling more people and enterprises to enjoy financial services. This not only expands the coverage of financial services, but also helps to promote balanced economic development.

3.1.2. Reducing the Cost of Financial Services

Digital inclusive finance enables financial institutions to automate the processing of credit investigation applications through big data platforms, cloud computing technology and other means, reducing the cost of financial services. At the same time, digital inclusive finance also improves financing efficiency, enabling funds to flow more quickly to enterprises and individuals in need, further promoting economic growth.

3.1.3. Promoting Innovation and Entrepreneurship

The development of digital inclusive finance has provided more financial support for innovation and entrepreneurship. By lowering the threshold and cost of financing, digital inclusive finance enables more entrepreneurs and small and medium-sized enterprises (SMEs) to obtain financial support, thus promoting the development of innovation and entrepreneurship. Enhancing the Inclusiveness and Inclusion of Financial Services, Digital inclusive finance enhances the inclusiveness and inclusion of financial services by providing convenient and efficient financial services. This enables more people and businesses to enjoy financial services, thus promoting balanced economic development.

3.1.4. Optimizing Resource Allocation

Through big data platforms and cloud computing technology, digital inclusive finance can better understand the needs and risk preferences of customers, thereby optimizing the allocation of resources and enabling funds to flow better to enterprises and individuals in need. This is not only conducive to reducing financial risks, but also promotes healthy and sustainable economic development.

3.1.5. Promoting Industrial Structure Upgrading

The development of digital inclusive finance promotes the transformation and upgrading of traditional industries and the development of emerging industries. By providing more convenient and efficient financial services, digital inclusive finance provides more financial

support and development opportunities for traditional industries, as well as more investment opportunities and support for innovation and entrepreneurship for emerging industries. This is conducive to promoting the upgrading and optimization of industrial structure and further promoting economic growth and development.

In summary, the impact of digital inclusive finance on economic growth is mainly reflected in expanding the coverage of financial services, reducing the cost of financial services, promoting innovation and entrepreneurship, enhancing the universality and inclusiveness of financial services, optimizing the allocation of resources, and promoting the upgrading of industrial structure.

3.2. Modeling

$$RGDP_{i,t} = \omega + \omega_1 RGDP_{i,t-1} + \beta_1 DFI_{i,t} + \beta_2 Pconsum_{i,t} + \beta_3 Edu_{i,t} + \beta_4 Cov_{i,t} + \beta_5 Poor_{i,t} + \beta_6 Urbar_{i,t} + \beta_6 Ins_{i,t} + \varphi_i + \delta_{i,t}$$

Among them, RGDP is the explanatory variable, which indicates the level of rural economic growth; DFI is the core explanatory variable, which indicates the Digital Financial Inclusion Indicator (DFI); other control variables include Pconsum, popul, Edu, Gov, Poor, Urban, Ins. ω and β are constant terms and parameters to be estimated, respectively. ω is the constant term, the φ_i is the area solid effect, and $\delta_{i,t}$ is the random error term.

4. Empirical Analysis

4.1. Variable Setting

Explanatory variable: level of rural economic growth (RGDP). At present, there is no standardized measurement method for the level of rural economic development at home and abroad. Considering that the economic structure of rural areas is dominated by the primary industries of agriculture, forestry, animal husbandry and fishery, the annual value added of agriculture, forestry, animal husbandry and fishery industries in rural areas is used as a measure of the level of rural economic growth.

Core explanatory variable: Digital Financial Inclusion Index (DFI). This paper adopts the general index and the secondary index (coverage, depth of use and degree of digitization) of the third DFI compiled by the Center for Financial Research of Peking University as variables to explore the relationship between the development of digital financial inclusion and rural economic growth.

Control variables: In addition to the core explanatory variables studied above, there are many other factors affecting the level of rural economic development, drawing on relevant literature to introduce control variables such as the level of rural per capita consumption (Pconsum), the level of financial support for agriculture (Gov).

4.2. Data Selection

The sample data of this paper is selected from the panel data of 31 provincial regions in China from 2011 to 2020, which is obtained from Wind database, CSMAR database, China Statistical Yearbook and China Agricultural Yearbook, and the data of digital financial inclusion is obtained from the digital financial research center of Peking University, which released the third digital financial inclusion index (2011-2020). The relevant descriptive statistics are analyzed in Table 1 below.

Table 1. Statistical analysis of attribute table of variables

variable name	Variable	Obs	Mean	Std.	Min
Level of rural economic growth	RGDP	310	3464	2442	109.4
Digital financial inclusion indicators	DFI	310	216.2	97.03	16.22
Depth of coverage	Breadth	310	196.7	96.56	1.960
Depth of use	usage	310	211.1	98.19	6.760
Degree of digitization	Digital	310	290.1	117.3	7.580
Rural per capita consumption level	Pconsum	310	9881	4021	2742
Level of educational development	Edu	310	1893	1299	212.2
Level of financial support for agriculture	Gov	310	29.67	21	11.96
Poverty incidence	Poor	310	512.4	355.2	47.86

4.3. Empirical Results

Among the variables described above, the level of rural economic development in the previous period may have an impact on the level of development in the current period, which, to a certain extent, may cause the model to have a certain endogeneity problem, thus leading to the bias of the results. In order to solve the endogeneity problem of the model, this paper estimates the model by dynamic system GMM. The above variables are treated as follows: the macro variables are treated as exogenous variables, and the lags of the explanatory variables, the digital financial inclusion index and the micro explanatory variables are treated as endogenous variables. The results of the model show that AR(2)=0.59, with a P-value greater than 0.1, indicating that there is no autocorrelation, and the model does not have second-order serial correlation; through the Hansen test, the P-value is 0.18 greater than 0.1, indicating that the instrumental variables are valid. The results of regression are shown in Table 2.

Table 2. Study on the impact of digital financial inclusion on rural economic growth

	(math.) an analytic variable	Model 1	Model 2	Model 3	Model 4
different dimension	D_RGDP	0.952**(2.092)	0.932*** (0.332)	1.253*** (0.286)	1.365*** (0.300)
	DFI	6.970** (2.253)			
	Breadth		9.762*** (2.423)		
	usage			9.982*** (2.303)	
	Digital				5.721*** (1.800)
	pconsum	0.300*(1.818)			0.132 (0.174)
	Poor	7.272*** (2.722)	2.020 (2.087)		-0.176 (0.750)
control variable	AR(2)	0.59	0.586	0.418	0.43
	Urban	365.918*** (2.696)	191.6** (92.08)	132.5*** (43.96)	100.6*(60.56)
	Hansen	0.18	1	0.9	0.98

4.4. Analysis of Empirical Results

Model 1 shows the regression analysis of the total digital financial inclusion index on the level of rural economic growth, and the results show that the coefficient of the variable β_1 of the total digital financial inclusion index is positive and passes the significance test at the 5% confidence level. This indicates that the development of digital financial inclusion in China has a significant role in promoting rural economic growth.

5. Policy Recommendations

5.1. Improvement of Financial Infrastructure

Strengthening the construction of Internet and mobile communication networks to improve the coverage and accessibility of financial services. At the same time, improve the construction of financial infrastructure, such as electronic payment and credit collection, to provide a favorable basic environment for the development of digital inclusive finance. Guiding financial institutions to actively participate in encouraging cooperation between traditional financial institutions and Internet financial institutions, utilizing their respective advantages to promote the development of digital inclusive finance. At the same time, financial institutions are being guided to actively participate in financial services in rural and impoverished areas and to improve the level of financial services in these areas.

5.2. Innovative Financial Products and Services

Financial institutions are encouraged to innovate financial products and services to meet the diversified needs of different people and enterprises. For example, they have introduced Internet financial products and Internet lending to provide more financial support for innovation and entrepreneurship.

5.3. Strengthening financial Education and Awareness

Strengthening financial education and publicity to raise people's awareness and understanding of digital inclusive finance. Through financial literacy activities and the strengthening of financial education in schools, it has helped people to better understand and use digitally inclusive financial products and services.

5.4. Implementation of Differentiated Regulatory Policies

On the premise of adhering to the principle of consumer protection, differentiated regulatory policies are implemented to maintain moderate flexibility and inclusiveness of regulation. For example, the implementation of categorized regulation for Internet financial institutions encourages bold innovation in the field of financial technology within a certain range.

5.5. Strengthening Risk Management and Regulation

Strengthening risk management and supervision to safeguard financial security. It has established a sound risk management system and supervisory mechanism, strengthened the supervision and risk assessment of financial institutions, and prevented the occurrence of financial risks.

Promoting international cooperation and exchanges: Strengthening international cooperation and exchanges and learning from advanced experiences and practices. Through participation in international rule-making and the organization of international conferences, it will promote international cooperation and exchanges in the field of digital inclusive finance, so as to provide more opportunities and impetus for economic growth.

In summary, in order to better utilize the role of digital inclusive finance in promoting economic growth, policy recommendations in various aspects, such as improving the construction of financial infrastructure, guiding the active participation of financial institutions, innovating financial products and services, strengthening financial education and publicity, implementing differentiated supervisory policies, strengthening risk management and supervision, and promoting international cooperation and exchanges, are needed.

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