

Research on the Impact of Chinese Digital Inclusive Finance on Regional Economic Growth

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Abstract: Digital inclusive finance breaks through the barriers of traditional finance and enhances the sustainability of financial inclusion. In this paper, a dynamic panel model is built and the regression analysis on the panel data of 31 provinces and cities in China from 2013 to 2019 is performed. The results show that digital financial inclusion plays a significant role in contributing to economic development. The promotion effect in the eastern region of China is the most obvious, followed by the central and western regions. Therefore, regions should formulate unique development strategies for digital inclusive finance according to their own development status.

1. Introduction

Finance is indispensable in economic development. However, the phenomenon of financial exclusion exists in many countries, such as Russia and Vietnam. Vulnerable groups in society are often excluded from mainstream finance and have more difficulty in enjoying financial services. This has seriously hindered economic development, widened the national income gap to a certain extent, and negatively affected the development of countries and regions. In 2005, the concept of inclusive finance was proposed by the United Nations. Inclusive finance is inclusive and can increase the availability of credit. However, traditional inclusive financial services increase the operating costs of financial institutions because more outlets need to be established. The enthusiasm of financial institutions for developing inclusive finance business has been seriously affected.

The G20 Advanced Principles for Digital Inclusive Finance was successfully passed in September 2016, marking a milestone in the history of global financial inclusion. Digital inclusive finance covers the mobile digitization of traditional finance and Internet finance. It is of great significance for lowering the threshold of financial supply and promoting the business continuity of inclusive finance. Currently, China is in a pivotal period of optimizing the industrial structure. The country especially emphasizes the high-quality development of the economy, so it makes sense to explore the effect of digital financial inclusion on the economy.

The framework of this paper is as follows. The second part reviews the relevant literature on economy and digital financial inclusion. The third part includes basic information about the data, and conducts a descriptive statistical analysis. The fourth part uses the Dynamic Panel Model to study the relationship between regional economic growth and digital financial inclusion. The fifth part explains the results of the empirical analysis and finds that digital financial inclusion can promote economic development effectively, and the promotion effect is the most obvious in the eastern region. The last part expounds the main conclusions of this paper and makes policy recommendations to the government.

2. Literature Review

2.1 Digital Financial Inclusion and Regional Economic Development

Research on the relationship between digital financial inclusion and regional economy presents two opposite conclusions.

Some scholars believe that financial inclusion may be detrimental to economic growth. The main point of the view is that if the proportion of financial intermediaries such as banks is too high, it will damage economic growth. Rajan believes that due to the profit-seeking nature of banks, enterprises are likely to be charged by banks for excess expenses other than loan interest rates, and thus the enthusiasm for investment will be reduced^[1]. However, most scholars believe that digital financial inclusion will contribute to regional economic development. Due to imperfect mechanisms of the traditional finance, low-income groups and micro enterprises face great difficulties in seeking financial services^[2]. The emergence of digital financial inclusion improves efficiency by leveraging modern technology such as mobile Internet^[3]. The threshold for financial inclusion for low-income people is also lowered^[4]. Lei Hanyun and Hao Yunping built a spatial autoregressive model and analyzed the panel data of China's provinces of 6 years, and concluded that digital financial inclusion played a positive role in boosting regional economic growth^[5]. Yang Gang and Zhang Hengyi established a regression model using the Peking University Digital Financial Inclusion Index and found that digital financial inclusion can increase financing possibilities for enterprises and improve the innovation of them^[6].

Based on the above theories, we propose:

Hypothesis 1: Digital financial inclusion has a positive effect on economic development.

2.2 Regional Differences in Digital Financial Inclusion and Economic Development in China

Zhan Yunqiu believes that the development of digital inclusive finance will be affected by infrastructures such as mobile communications and broadband optical fibers^[7]. Digital financial inclusion requires the carrier of digital technology, so the level of digital infrastructure in the region might influence the role of inclusive finance in regional economy. Due to the different levels of Internet infrastructure such as broadband communications, the promotion effect of digital financial inclusion may also vary among regions.

Based on the above literature, this paper proposes:

Hypothesis 2: The promotion effect of digital financial inclusion varies by region.

3. Data and Descriptive Statistics

3.1 Data Sources

The digital financial inclusion index comes from the third issue of 'Peking University Digital Financial Inclusion Index'^[8]. This paper uses the index of 31 provinces and cities in China from 2013 to 2019.

The explanatory variable is selected as the logarithm of GDP per capita after the revision of the price index in each province and city, which is utilized to represent the level of regional economic development. The data comes from the EPS database and regional statistical yearbooks. Because there are many factors affecting economic development, the control variables are selected as consumer price index, urbanization rate (urban population/total population), degree of industrialization (Industrial increase ratio), and fiscal expenditure scale (fiscal expenditure/GDP). The variables control the factors affecting regional economic development from three aspects: residents' consumption capacity (residential consumer price index), urbanization process (urbanization rate), and macroeconomics (scale of fiscal expenditure, degree of industrialization).

3.2 Descriptive Statistics

Table 1 shows the results of the descriptive statistics. The logarithmic mean of GDP per capita is 6.245, which represents the average level of national economic development.

Observations above the mean are concentrated in some provinces in the eastern regions. The mean of the digital financial inclusion index is 240.206.

Table 1 Summary Statistics

Variable	Variable meaning	Mean	Std. Dev.	Min	Max
LNPGDP	Logarithmic GDP per capita	6.245	.412	5.41	7.381
FL	Digital Financial Inclusion Index	240.206	62.91	115.1	410.28
EXS	Fiscal expenditure scale	.287	.212	.12	1.379
CPI	Consumer price index	102.073	.647	100.567	103.948
URL	Urbanization rate	.587	.126	.239	.896
Industry	Industrial increase ratio	.073	.037	-.152	.146

4. Method

Regional per capita GDP and regional digital financial inclusion index are used to represent the status of regional economic development and the level of digital financial inclusion development, respectively. In terms of model setting, we mainly study the impact of digital inclusive finance on economic development. Because of the strong endogeneity between variables, a dynamic panel model is established, and the systematic GMM method is utilized to estimate coefficients. With the aim of ensuring the rigor of the research, a correlation test was first performed before panel regression.

Table 2 shows the correlation test results. The correlation coefficient between regional GDP per capita and the financial index is 0.614, showing a significant positive correlation. The correlation coefficient between regional per capita GDP and urbanization rate is 0.887, which is also significantly positive. There is a negative correlation between the scale of fiscal expenditure and economic growth, and the possible reason is that the marginal utility of fiscal expenditure on regional economic growth has declined.

Table 2 Correlation Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) LNPGDP	1.000					
(2) FL	0.614* (0.000)	1.000				
(3) EXS	-0.378* (0.000)	-0.148* (0.029)	1.000			
(4) CPI	0.045 (0.510)	0.001 (0.984)	0.094 (0.170)	1.000		
(5) URL	0.887* (0.000)	0.514* (0.000)	-0.515* (0.000)	0.018 (0.791)	1.000	
(6) LNIndustry	-0.265* (0.000)	-0.430* (0.000)	0.146* (0.032)	0.192* (0.005)	-0.397* (0.000)	1.000

Note: *** p<0.01, ** p<0.05, * p<0.1, the same below.

The model is built as follows:

$$LNPGDP_{i,t} = \alpha LNPGDP_{i,t-1} + \beta_1 FL_{i,t} + \theta Z_{i,t} + \mu_i + \varepsilon_{i,t}$$

$LNPGDP_{i,t}$ is the per capita GDP, and $FL_{i,t}$ is the digital financial inclusion index. $Z_{i,t}$ represents the control variable. μ_i represents the province fixed effect. The subscripts t and i represent year and province, respectively.

5. Results

Model (1) studies the relationship between the Per capita GDP and digital financial inclusion, and the first-order lag terms of the Per capita GDP. Table 3 reports the panel regression results. The estimated coefficient of the core explanatory variable is 0.0016, which is significantly positive at the 10 percent level. It implies that the development of

digital financial inclusion is associated with economic growth. The result remains robust when we include control variables in model (2). The possible reason is that digital financial inclusion guides the cross-temporal and spatial allocation of finance. It can also make full use of financial products and make financial markets more efficient, thereby contributing to economic development.

Table 3 Dynamic Panel Model Regression

	(1)	(2)
	lnPGDP	lnPGDP
lnPGDP_1	1.0162***	1.3333***
	(0.0078)	(0.0536)
FL	0.0016*	0.0091***
	(0.0009)	(0.0022)
lnIndustry		0.0183***
		(0.0035)
CPI		-0.0006
		(0.0038)
URL		-0.0097***
		(0.0014)
EXS		-0.0818**
		(0.0364)
_cons	-0.1155	-1.8718***
	(0.0897)	(0.6512)
N	186	182
hansenp	0.074	0.115
ar2p	0.608	0.746

6. Analysis by Region

China has a vast territory, and the economic levels of various regions are uneven. In order to study the role of inclusive finance in different regions, 31 provinces and cities in China are divided into three regions: the eastern, central and western regions. Dynamic panel analysis is carried out for the provinces in the three regions.

Table 4 reports that the estimated coefficients of the digital financial inclusion index in the three regions are all statistically significant. We again find statistically significant positive effects of digital inclusive finance on economic growth. The regression coefficient of the eastern region is 0.0111. The estimated coefficient of the central region is 0.0054 and the coefficient of the western region is 0.0042. Therefore, digital financial inclusion in the eastern region has the most obvious effect on the economy, followed by the central region and the western region. The local and foreign currency loan business is widely distributed in the eastern region, and enterprises can obtain huge financial support from it. In addition, the market in the eastern region is very dynamic and has great potential for market competition. There are a large number of small, medium and micro enterprises in the market in the eastern region. In their early stage of development, these enterprises often have certain financing needs. If they can receive timely financial support, they can effectively drive local employment and promote economic growth. Digital inclusive finance can expand financing channels and reduce financing barriers for them, so that more funds can be invested in enterprises and more space for development can be gained.

Digital inclusive finance can penetrate into various industrial fields, and some underdeveloped provinces can enjoy high-quality and low-cost financial services, which effectively cooperate with “Western Development” strategy and “Rise of Central China” strategy in China. Digital inclusive finance relies more on digital technologies than traditional inclusive finance, and it will have a stronger role in boosting the economy in areas with high Internet level. Compared with the eastern region, some underdeveloped areas in the central and western regions have a lower market vitality and a poorer level of Internet

development. Some remote areas there may have difficulty in benefiting from digital financial inclusion due to poor Internet conditions.

Table 4 Analysis by Region

	(1)	(2)	(3)
	Eastern	Central	Western
lnPGDP_1	0.9822***	0.8561***	0.3403
	(0.0547)	(0.1443)	(0.3136)
FL	0.0111**	0.0054**	0.0042***
	(0.0046)	(0.0024)	(0.0007)
lnIndustry	0.0097	0.0594***	0.0167*
	(0.0077)	(0.0150)	(0.0099)
CPI	-0.0058	-0.0120	0.0367***
	(0.0081)	(0.0133)	(0.0062)
URL	0.0011	0.0047	0.0159
	(0.0024)	(0.0059)	(0.0101)
EXS	-0.1777	-0.6371	0.1796
	(0.1976)	(0.6116)	(0.1335)
_cons	0.6240	1.7342*	-0.7657
	(0.7089)	(1.0280)	(1.2743)
N	64	47	65
hansenp	0.666	1.000	1.000
ar1p	0.552	0.390	0.000
ar2p	0.443	0.195	0.164

7. Robustness Check

In this section, regional per capita disposable income is used to reflect regional economic development. From the perspective of per capita, the indicator is in line with the meaning of social equity contained in inclusive finance. The selection of control variables is the same as before.

Through the analysis of the regression results, the coefficient of digital inclusive finance is 0.058(statistically significant), so it can be concluded that digital inclusive finance contributes to the increase of regional per capita disposable income. The results hold up when subjected to robustness check.

Table 5 Robustness

	(1)	(2)
	lnPCDI	lnPCDI
lnPCDI_1	0.8228***	1.1197***
	(0.0094)	(0.0185)
FL	0.0708***	0.0580***
	(0.0012)	(0.0036)
lnIndustry		-0.0113
		(0.0187)
CPI		-0.0822***
		(0.0080)
URL		-0.0074***
		(0.0014)
EXS		0.2231**
		(0.0827)
_cons	-1.7760***	4.7265***
	(0.0707)	(0.6655)
N	186	182
hansenp	0.044	0.117
ar1p	0.014	0.009
ar2p	0.637	0.174

8. Conclusion

In this paper, the Dynamic panel model is utilized to explore the impact of digital financial inclusion on economic development. The regression results imply that digital inclusive finance can promote regional economy effectively. After applying the model to different regions, we can find that the promotion effect of digital financial inclusion in the eastern region is the most obvious. Through empirical analysis, the following policy recommendations can be concluded: Firstly, develop a differentiated digital financial inclusion strategy. Since the popularity of digital financial inclusion vary across regions, each region should develop a unique strategy based on its own economic development characteristics. The developed eastern regions should focus on developing financial innovation business and increasing the vitality of the financial market. Some underdeveloped regions in the central and western regions should encourage banking institutions to extend the service scope of digital inclusive finance, and create more financing opportunities for enterprises and individuals. Secondly, increase investment in digital infrastructure construction. The support of digital technology is vital for digital financial inclusion, but Internet infrastructure in some remote regions is not perfect, which makes it difficult for digital inclusive finance to play its role. Therefore, the investment in informatization construction and certain financial subsidies need to be increased in the central and western regions. Thirdly, attach great importance to the leading role of eastern region in China. There is a good foundation for economic development and a wide coverage of finance in the eastern region, so provinces and cities in the eastern part of China can focus on speeding up the top-level design of digital inclusive finance.

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