

On the Influential Factors of the Development of Digital Inclusive Finance in Anhui Province

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Abstract: Based on the panel data of all cities in Anhui Province, this paper studies the development level of digital inclusive finance in all cities. The research shows that the overall index of digital inclusive finance has a significant lag and a significant inverted U-shaped relationship with per capita GDP. The popularity of the Internet, the proportion of education expenditure and the proportion of government expenditure have a significant role in promoting digital inclusive finance. There is a significant positive correlation between per capita GDP, internet penetration, road density, loan to deposit ratio and coverage of digital inclusive finance, while there is a significant negative correlation between population density and coverage. Per capita GDP, internet penetration and government support have significantly promoted the depth of use of digital inclusive finance. Per capita GDP, government support and road density have significantly promoted the degree of digitalization.

Keywords: Digital inclusive finance; System GMM; Economic development level; Regional differences; Influence factor

1. Introduction

With the continuous development of digital technology, the concept of digital inclusive finance was first proposed at the G20 Hangzhou Summit in 2016. Digital inclusive finance generally refers to all actions to promote inclusive finance through the use of digital financial services. At present, the close combination of Internet and financial technology has become an important development point of inclusive finance and a key point in the construction of modern financial system. The development of digital inclusive finance has a positive significance for economic development, improving people's livelihood and narrowing the gap between rich and poor ^[1].

At present, there is relatively little research on digital inclusive finance abroad. Foreign scholars' research on digital inclusive finance mainly focuses on the impact of digital inclusive finance. Ahmad Mahmood and others confirmed that digital inclusive finance can indeed drive effective economic growth by studying the impact of digital inclusive finance on China's provincial economic growth ^[2]. Rita Rena Pudyastuti studied the data of 31 provinces in China through instrumental variable method and spatial SDM model, and concluded that digital inclusive finance can promote entrepreneurship and innovation ^[3].

Domestic scholars study digital inclusive finance more than foreign scholars, mainly in the following aspects. (1) In terms of the connotation of digital inclusive finance. The State Council issued the Development Plan for Promoting Inclusive Finance (2016-2020), which clarifies the connotation of digital inclusive finance ^[4]. (2) In terms of measurement indicators of digital inclusive finance. Guo Feng built a digital inclusive financial indicator system from three dimensions: digital financial coverage, digital financial use depth, and inclusive financial digitalization by establishing a digital inclusive financial indicator system ^[5]. (3) In terms of measurement and influencing factors of the development level of digital inclusive finance. Ge Heping selected five factors, including the level of economic development, geographical factors, financial awareness, urban-rural income gap, and Internet use, to explore and draw corresponding conclusions. Jiang Q.Z. selected three first level dimensions of e-banking: breadth of use, depth of use, and sustainability to build an evaluation index system and evaluate the development level of digital inclusive finance in rural areas in eastern, central, and western

China [6]. Sun Q.L. measured the level of digital inclusive finance in Anhui Province [7]. Although scholars have done a lot of research work on digital inclusive finance, there are few literature on the measurement and influencing factors of the development level of digital inclusive finance in Anhui Province, which also provides space and possibility for writing this paper, and is also the innovation point and practical value of our research.

2. Index selection

The explained variables are the digital inclusive financial index (Difn), the digital inclusive financial coverage index (Coverage), the digital inclusive financial use depth index (Usage), and the digital inclusive financial digitization degree index (Digital).

According to the previous research on the development level of digital inclusive finance, this paper selects explanatory variables from eight dimensions: economic development level (Pgdp), Internet development level (Int), education emphasis level (Edu), government intervention level (Gov), traditional financial development level (Loan), transportation convenience level (Road), population density level (Pop), and tertiary industry development level (Thr). The explanatory variables are GDP per capita, Internet penetration rate, proportion of education expenditure, proportion of fiscal expenditure, loan to loan ratio, population density, road grade and proportion of the tertiary industry.

3. Empirical analysis

3.1. Descriptive analysis

Referring to the data from the Digital Research Center of Peking University and the research of scholar Sun Qinglong, in this paper's exploration of the impact of digital inclusive finance in Anhui Province, it is decided to select the digital inclusive finance general index, coverage index, depth of use index, digitization degree index, per capita GDP, Internet penetration rate, proportion of education expenditure, proportion of financial expenditure, population density, loan deposit ratio, proportion of the tertiary industry 12 variables of road density were explored [7]. All data are sourced from 2011-2020 in all prefecture level cities in Anhui Province.

After the summary of 160 sample data, the final result shows that the average value of the total index of digital inclusive finance is 176.5, the standard deviation is 68.78, the minimum value is 27.08, and the maximum value is 299.2, which indicates that the development of digital inclusive finance in Anhui Province is uneven. The coverage breadth index, usage depth index and digitization degree index all have too large standard deviation and too large difference between the minimum value and the maximum value. The largest difference is the digitization index, with the maximum value of 437.9 in Huaibei City in 2016 and the minimum value of 19.93 in Tongling City in 2011. This is also consistent with the conclusion that the digital inclusive financial index varies greatly among cities in different years, which further explains the uneven development of digital inclusive finance. In terms of per capita GDP, after logarithmic processing of the data, the coefficient of variation is only 0.05, and the sample per capita GDP level difference is not high, relatively average. In terms of Internet penetration rate, government expenditure, population density and road density, the coefficient of variation is relatively high, which indicates that there are large differences in Internet penetration rate, government expenditure, population density and road density among cities in Anhui Province in each year. In terms of education expenditure, loan ratio and the proportion of the tertiary industry, the coefficient of variation is low, which shows that there is little difference in education expenditure, loan ratio and the tertiary industry among cities in Anhui Province in each year.

3.2. Regression analysis of influencing factors of digital inclusive finance

Based on the analysis above and the selection of sample data, the four models established in this paper are as follows:

$$DIFN_{i,t} = \beta_0 + \beta_1Pgdp_{i,t} + \beta_2Edu_{i,t} + \beta_3Gov_{i,t} + \beta_4Pop_{i,t} + \beta_5Loan_{i,t} + \beta_6Thr_{i,t} + \beta_7Road_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

$$COVERAGE_{i,t} = \beta_0 + \beta_1 Pgd p_{i,t} + \beta_2 Edu_{i,t} + \beta_3 Gov_{i,t} + \beta_4 Pop_{i,t} + \beta_5 Loan_{i,t} + \beta_6 ThR_{i,t} + \beta_7 Road_{i,t} + u_i + \varepsilon_{i,t} \quad (2)$$

$$USAGE_{i,t} = \beta_0 + \beta_1 Pgd p_{i,t} + \beta_2 Edu_{i,t} + \beta_3 Gov_{i,t} + \beta_4 Pop_{i,t} + \beta_5 Loan_{i,t} + \beta_6 ThR_{i,t} + \beta_7 Road_{i,t} + u_i + \varepsilon_{i,t} \quad (3)$$

$$DIGITAL_{i,t} = \beta_0 + \beta_1 Pgd p_{i,t} + \beta_2 Edu_{i,t} + \beta_3 Gov_{i,t} + \beta_4 Pop_{i,t} + \beta_5 Loan_{i,t} + \beta_6 ThR_{i,t} + \beta_7 Road_{i,t} + u_i + \varepsilon_{i,t} \quad (4)$$

According to the regression results of model (1), per capita GDP, the proportion of government expenditure, the proportion of education expenditure, and the Internet penetration rate have significantly promoted the development of digital inclusive finance. This also shows that the level of economic development, the level of Internet development, the degree of emphasis on education, and the degree of government intervention play a significant role in promoting the development of digital inclusive finance. Although population density and road density have a positive effect on digital inclusive finance, the effect is not significant. The development of the tertiary industry and the loan to loan ratio have a certain inhibitory effect on digital inclusive finance, but it is not significant.

The regression results of models (2), (3) and (4) show that the per capita GDP, the proportion of government expenditure, the proportion of education expenditure, and the Internet penetration still play a significant role in promoting the development of coverage, depth of use, and degree of digitalization, among which the proportion of the tertiary industry has a certain inhibitory effect on the development of the three aspects, but it is not significant. Road density does not significantly promote the development of these three aspects.

According to the general theory, the economic development level of a region is always positively related to the financial development level. The higher the level of economic development is, the higher the per capita wealth of residents, the greater the residents' demand for finance. However, according to the existing research results of some scholars, there are some differences between digital inclusive finance and economy. Ge H.P. found that there is a U-shaped relationship between economic development and digital inclusive finance. In order to verify whether this view is established in Anhui province, we specially introduce the square term of per capita GDP to explore whether the nonlinear relationship exists. Build model:

$$DFII_{i,t} = \beta_0 + \beta_1 DFII_{i,t} + \beta_2 Pgd p_{i,t} + \beta_3 Pgd p_{i,t}^2 + \beta_4 Edu_{i,t} + \beta_5 Gov_{i,t} + \beta_6 Pop_{i,t} + \beta_7 Loan_{i,t} + \beta_8 ThR_{i,t} + \beta_9 Road_{i,t} + u_i + \varepsilon_{i,t} \quad (5)$$

If the square coefficient of per capita GDP is positive and significant, there is a positive u-shaped relationship between the level of economic development and the level of digital inclusive finance. If the coefficient is negative and significant, there is an inverted u-shaped relationship. If the coefficient is 0, it is a linear relationship.

According to the regression results of the model, the square coefficient of per capita GDP is significant and negative at the level of 0.01, while the coefficient of per capita GDP is significant and positive at the level of 0.01, which indicates that there is an inverted u-shaped relationship between the economic development level of Anhui Province and the development level of digital inclusive finance. That is, as the economic level develops upward, the development level of digital inclusive finance will first enter a rapid development stage, and then enter a gradually declining state after reaching a certain peak.

3.3. GMM dynamic panel analysis

The development of digital inclusive finance is lagging behind and endogenous. Based on this reason, this paper uses the system GMM dynamic panel analysis to further explore the influencing factors of digital inclusive finance in Anhui province.

In this test, the Sargan test is greater than 0.9, and the p-values of AR (2) are greater than 0.1, indicating that this test is effective and reasonable. According to the data, the regression results are analyzed as follows: digital inclusive finance has a significant lag, because its coefficient is positive, the data of the previous period has a significant role in promoting the data of this period. Per capita GDP has significantly promoted the development of digital inclusive finance, which also shows that with the continuous development of the economy, people's demand for digital inclusive finance is gradually increasing. However, when it increases to a certain extent, due to the highly developed economy, there may be some inhibition. The popularity of the Internet, the proportion of education expenditure and the proportion of government expenditure have significantly promoted digital inclusive finance, which shows that with the continuous development of the Internet, people have a higher degree of contact with finance, which also contributes to the continuous development of digital inclusive finance. As a reflection of the government's emphasis on education, the proportion of education expenditure reflects, to a certain extent, that with the increasing emphasis on education and investment, people have improved their education level, become more aware of finance, and their participation in digital inclusive finance is also increasing. The proportion of government expenditure reflects the degree of government intervention, indicating that the higher the degree of local government intervention, the stronger the guidance for digital inclusive finance. When the government invests more in digital infrastructure and inclusive finance, enterprises and households will also participate more in digital inclusive finance due to policy guidance and preferential effects. Road density does not significantly promote digital inclusive finance. With the increase of road density, the more convenient the traffic is, the more developed the economy will generally be, which also reflects that people can more easily access financial services, reducing the difficulty of accessing digital inclusive financial services, and is conducive to the development of digital inclusive finance.

In terms of coverage, per capita GDP, Internet penetration, road density and loan deposit ratio have significantly promoted the coverage, which means that with the improvement of economic development, Internet penetration and traffic development, digital inclusive finance can better cover the general population. As a measurement factor of traditional finance, the higher the loan to deposit ratio, the stronger the ability to convert deposits into loans, which is more beneficial to the development of traditional finance. This shows that the development of traditional finance promotes the coverage of digital inclusive finance. The population density has a significant inhibitory effect on the coverage, which indicates that with the increase of population density, the number of people to be served by each digital inclusive financial service institution will increase, the service difficulty will increase, and the coverage to the public will decrease.

In terms of the depth of use, per capita gdp, internet penetration and government support have a significant role in promoting the depth of use. This shows that the higher the level of economic development, Internet development, and government intervention, the deeper people use digital inclusive finance, that is, the greater the frequency and scope of use. In terms of the degree of digitalization, the per capita GDP, the degree of government support, and the density of roads have significantly promoted the degree of digitalization, which shows that the higher the level of economic development, the higher the degree of government intervention, and the more developed the traffic, the better the financial digitalization construction, and the better the development of digital inclusive financing.

3.4. Subregional regression analysis

According to its geographical location, Anhui Province is generally divided into three regions: southern Anhui, central Anhui and northern Anhui. These three regions have certain differences in economic development and financial construction. In order to better explore the problem of digital inclusive finance in Anhui Province, we divide the urban data into three regions: southern Anhui, central Anhui and northern Anhui, and then conduct regional regression.

According to the regression results, for the relationship between digital inclusive finance and economic development, the relationship between southern Anhui, Anhui and northern Anhui is inverted u-shaped. Among them, the relationship is significant only in southern Anhui. The total index of digital inclusive finance in southern Anhui is also larger than that in central and northern Anhui. In terms of coverage, depth of use, and degree of digitalization, the coefficients in southern Anhui are significant, while those in northern and central Anhui are not significant. On the one hand, there may be too few data samples, on the other hand, it may be that the overall development of digital inclusive finance in southern Anhui is good.

4. Conclusions and Suggestions

4.1. Conclusions

Based on the digital inclusive finance index of Peking University and the China Statistical Yearbook data, this paper analyzes the development level of digital inclusive finance in various cities of Anhui Province. Through the 12 indicators of digital inclusive finance index, coverage, depth of use, digitalization degree, per capita GDP, Internet penetration rate, education expenditure proportion, financial expenditure proportion, population density, loan deposit ratio, tertiary industry proportion, and road density, GMM regression model is used to analyze the influencing factors of the development of digital inclusive finance in Anhui Province. After getting the preliminary conclusion, according to the regional and development characteristics of Anhui Province, the city will be divided into three regions of southern Anhui, northern Anhui and central Anhui for specific analysis and exploration. The research results show that the development level of digital inclusive finance in various cities in Anhui Province is constantly improving, and the development trend of digital inclusive finance index, digitization degree, use depth and coverage is good. There is still huge development potential and space in the future. There is an inverted u-shaped relationship between the development level of digital inclusive finance and economic development in Anhui province, indicating that with economic development, the level of digital inclusive finance will first increase, and then gradually decrease after reaching a certain peak. In the exploration of the influencing factors of digital inclusive finance in Anhui Province, its economic development, government support, Internet popularity, transportation convenience and digital inclusive finance have relatively high correlation, which basically have a certain role in promoting. However, the development of the tertiary industry and traditional finance will often impact and restrain the development of digital inclusive finance. In the research on the regional development of digital inclusive finance in Anhui province, the development level of digital inclusive finance in southern Anhui is better than that in northern and central Anhui, and the relationship with economic development is more significant.

4.2. Suggestions

(1) Consolidate the economic foundation of each city, and drive the stable growth of digital inclusive finance with economic development. As the basis of all development, the importance of economic development is self-evident. The economy of Anhui Province is currently at a stage of sound development momentum. Economic development fundamentally affects financial development, and good economic development can drive stable growth of digital inclusive finance. At present, the main goal of Anhui Province is to focus on economic development, consolidate the economic foundation, and drive the stable development of digital inclusive finance with strong economic strength as the backing.

(2) We will increase government support and use policy support to boost the sound growth of digital inclusive finance. In the development of digital inclusive finance, government policies and financial support also play a positive role. In terms of policy support, the government can introduce corresponding digital inclusive finance promotion policies to enable more people to participate in digital inclusive finance and attract major enterprises and financial institutions to contribute to the development of digital inclusive finance. In terms of financial support, the government can appropriately subsidize the digital inclusive finance project, so that the development of digital inclusive finance can achieve benign growth.

(3) Standardize the market supervision rules, and ensure the correct development of digital inclusive finance with systems. At present, the development of digital inclusive finance in Anhui Province is still in its infancy, and it will continue to explore in the future. The relevant mechanisms and regulations are still imperfect and need to be constantly explored in practice. In such an environment, the market supervision of digital inclusive finance is imperfect. The government should speed up the construction of the digital inclusive finance system, and lead Anhui's digital inclusive finance to the correct development path with superior system guarantee.

(4) Reasonably allocate financial resources to promote the overall development of digital inclusive finance in a balanced way. The development level of digital inclusive finance in Anhui Province is unbalanced. The government should reasonably allocate resources, increase the investment level of digital inclusive finance in northern Anhui, and make the digital inclusive finance of the province develop together.

(5) Improve relevant infrastructure to ensure the development potential of digital inclusive finance. The popularity of the Internet, road density and other infrastructure construction promote the development of digital inclusive finance. The government should attach importance to the construction of relevant infrastructure, provide a better platform and soil for digital inclusive finance, and expand its future development potential.

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