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Research on the Impact of Digital Inclusive Finance on the High-quality Economic Development of Jiangxi Province

Qiuxia Wu[1], Wenjuan Wang[1], Pengbin Zhan[2]

[1]School of Finance and Economics, Nanchang Institute of Technology;

[2]Yingtan Yuanjiu Trade Co., Ltd.

ABSTRACT

As the economy develops, the integration of finance and digital technology has deepened, gradually replacing traditional forms of inclusive finance with digital inclusive finance. Currently, most research on digital inclusive finance focuses on areas such as urban-rural disparities and regional coordination, with fewer studies examining the application of digital inclusive finance in provincial and municipal economic development. This paper investigates the quality of economic development in 11 cities in Jiangxi Province from 2011 to 2021 and analyzes the relationship between economic development and the application of digital inclusive finance. A fixed effects model is established to map the association between the quality of economic development and the application of digital inclusive finance. The results show that there is a positive correlation between the degree of digital inclusive finance application and the quality of economic development; the application of digital inclusive finance has a significant effect on addressing financial exclusion; strengthening the improvement of the digital inclusive finance system and technological innovation will play a crucial role in the future high-quality development of regional economies.

KEYWORDS

Digital Inclusive Finance; Economy; Financial Exclusion

With the development of the economy, the importance of finance has gradually been recognized, and the significance of finance for the economic system has become increasingly evident. Advancing digital construction in the financial sector is an inevitable path for financial development.However, financial exclusion remains widespread all over the world, and finance still fails to benefit the general public. Middle and low-income groups cannot get access to the financial products and services they deserve. In Jiangxi Province, geographical and other factors have led to imbalanced economic development and more severe financial exclusion. In 2015, China issued a document to promote the development of inclusive finance, and Jiangxi government emphasized the importance of digital inclusive finance in its 14th Five-Year Financial Plan. This indicates that financial development is beginning to enter the stage of digital inclusive finance. Based on the theoretical research on digital inclusive finance, this paper takes the economic development status of 11 prefecture-level cities in Jiangxi Province as the research object and establishes a fixed effects model with appropriate evaluation indicators. It analyzes the mapping relationship between the application of digital finance inclusion and the quality of urban economic development from the perspective of digitizing progress, and provides suggestions on how to apply digital inclusive finance to promote high-quality regional economic development.digitization.

1 Analysis of High-Quality Economic Development and the Development of Digital Inclusive Finance in Jiangxi Province

1.1 Theoretical Development Process

Inclusive finance, also known as Financial Inclusion, refers to a financial system that provides efficient and comprehensive financial services to all members of society, regardless of their social strata or group affiliations. Digital inclusive finance is the combination of digital technology and traditional inclusive finance. It utilizes digital and internet technologies to provide a new generation of financial services and products for regional development. Promoting the application of digital inclusive finance not only achieves substantial returns but also contributes to its long-term sustainable development. High-quality economic development must consider social and ecological benefits, balanced economic structures, and adhere to the fundamental purpose of economic development.

Financial exclusion encompasses five scenarios: condition exclusion, access exclusion, marketing exclusion, price exclusion and self-exclusion. Inclusive growth does not aim solely at economic growth, it is a model of coordinated economic and social development that can achieve sustainable, high-quality economic growth. Other goals include protecting vulnerable groups, balancing the process of economic growth, liberalizing investment and trade, opposing protectionism, enhancing social stability and ensuring that the globalization benefits more people. Financial inclusion is an emerging research direction in the field of financial development. With the application of digital technology, digital inclusive finance can enhance communication and interaction among various financial participants, effectively addressing the issue of information asymmetry in the financial development process. Digital inclusive finance also facilitates efficient matching between investors and investees, leading to the rational allocation of financial resources and the creation of more high-quality development opportunities. It fosters a fair and just development environment, contributing to high-quality economic growth in regions.

1.2 Application of Digital Inclusive Finance in Jiangxi Province

From 2011 to 2021, the distribution of the digital inclusive finance index for the 11 prefecture-level cities in Jiangxi Province is shown in Figure 1. It can be observed that the overall level of digital inclusive finance application in the 11 cities has shown an upward trend. At any given point in time, the levels of digital inclusive finance development among these cities are relatively close, indicating a relatively balanced development of digital inclusive finance across different cities in Jiangxi. Analysis of the digital inclusive finance index at different time points shows that the economic development levels of the cities in Jiangxi Province experienced significant growth from 2011 to 2021, indicating the continuous development of digital inclusive finance business in these cities. As inclusive finance continues to integrate with digital technology and internet technology, overcoming the shortcomings of traditional inclusive finance, the financial index growth of cities in Jiangxi has entered a stage of steady development.

Financial technology innovation has been actively promoted in Jiangxi by introducing and developing mobile payments, robo-advising, and internet banks, thereby enhancing the intelligence and convenience of financial services in various cities within the province. To fill the gap of financial services in rural area, satellite credit remote sensing technology and intelligently determined credit limits and repayment cycles are piloted within the province. By continuously strengthening financial risk supervision, the stability of financial market environment has been ensured, providing a better setting for the realization of digital inclusive finance.

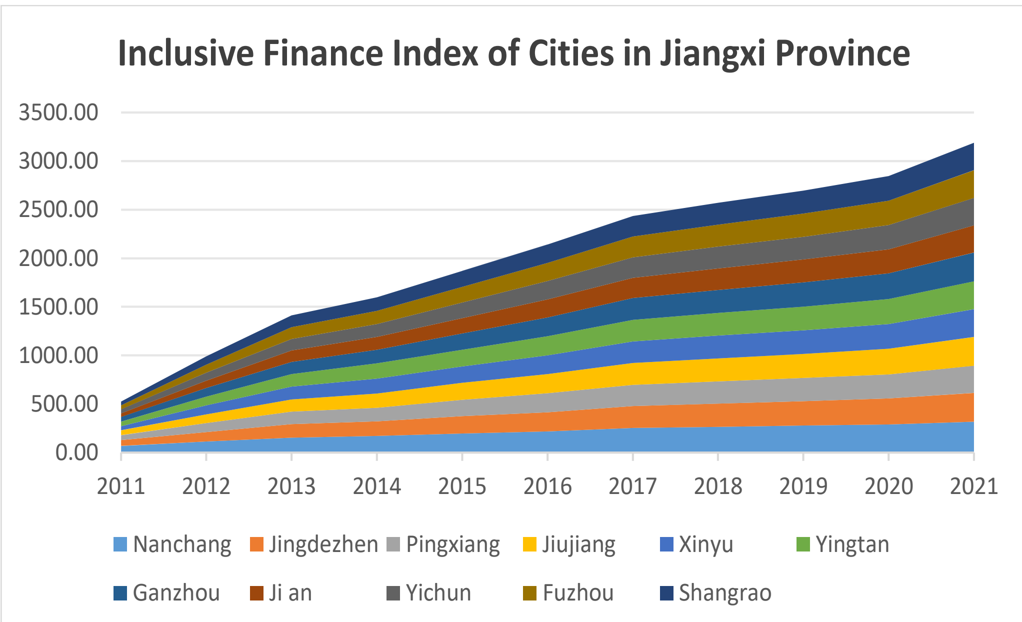

Figure 1 Digital Inclusive Finance Index of 11 Cities in Jiangxi Province from 2011 to 2021

1.3 Economic Development Analysis of 11 Cities in Jiangxi Province

The economic development quality evaluation system established in this paper includes four dimensions: green, innovation, sharing, and coordination. Each dimension comprises multiple key indicators. The main indicators for evaluating economic development are as follows: Innovative Development: This is evaluated by the ratio of expenditures on science and technology to total fiscal expenditures and education to total fiscal expenditures, reflecting the innovation development situation in a region. Coordinated Development: This is assessed using indicators such as industrial structure, people's living standards, and financial development, to evaluate the capacity for coordinated development. Shared Development: This is reflected through a series of indicators including social welfare, consumption levels, and government burden. Green Development: This is evaluated using pollution emission and treatment indicators to assess the capability of green development. For the weights of the above evaluation indicators, this paper uses the entropy method to calculate them. By multiplying the data of each indicator for each sample with the corresponding weight, the evaluation score for each sample can be obtained, which is the high-quality economic development index required by the model, as shown in Table 1.

Table 1 Weights of Regional Economic Development Quality Evaluation Indicators

Primary Indicator	Secondary Indicator	Weight
Expenditure on Science and Education	Science and Technology Expenditure/Total Fiscal Expenditure	0.1164
	Education Expenditure/Total Fiscal Expenditure	0.0501
Financial Development	Financial Deposits/Financial Loans	0.1136
People's Livelihood	Registered Unemployment Rate in Urban Areas	0.0530
	GDP Per Capita	0.0388
Industrial Structure	Tertiary Industry Proportion	0.0627
	Imports and Exports/Gross Production Value	0.0524
Social Welfare	Health and Medical Expenditure/Total Fiscal Expenditure	0.0184
	Number of Beds per Ten Thousand Population	0.0243
	Social Security and Employment Expenditure/Total Fiscal Expenditure	0.0227
Consumption Level	Retail Sales of Consumer Goods/Gross Social Production Value	0.0183
Government Burden	Budgetary Expenditure /Budgetary Revenue	0.0417
Pollution Emission	Industrial Sulfur Dioxide Emissions/Industrial Output Value	0.0441
	Industrial Smoke and Dust Emissions/ Industrial Output Value	0.0556
Pollution Treatment	Harmless Treatment Rate of Municipal Solid Waste	0.1371
	Centralized Treatment Rate of Wastewater Treatment Plants	0.1506

As shown in Table 1, Nanchang City stands out with a higher index of high-quality economic development compared to other cities. The differences among the other cities are not significant. As the capital city of Jiangxi Province, Nanchang has a high level of economic development. During the development process of other cities, there is a similar emphasis on high-quality economic development, resulting in no significant disparities within the province. From a longitudinal perspective, the high-quality development indices of all cities have shown considerable growth, indicating that over the past 11 years, most cities in Jiangxi have achieved a certain degree of high-quality economic development. However, from a numerical standpoint, the high-quality development indices of the cities are still not sufficiently high, suggesting that there is significant room for improvement in this field. The focus needs to be on the coordination of issues such as green sharing and collaborative innovation in the context of promoting high-quality economic growth. This is crucial for achieving more balanced and higher-quality developing level.

2 Analysis of the Impact of Digital Inclusive Finance on High-Quality Economic Development in Jiangxi Province

2.1 Model Establishment

To study the impact of the application of digital inclusive finance on the economic development of cities in Jiangxi Province, this paper selected economic development data of 11 cities in Jiangxi Province from 2011 to 2021. The main variable descriptions are shown in Table 2.

Table 2 Main Variable Descriptions

Variable Type	Variable Name	Symbol	Variable Description
Dependent Variable	High-Quality Economic Development Index	ehgi	Comprehensive calculation of various indicators using the entropy method
Core Explanatory Variable	Digital Inclusive Finance Index	ida	Digital finance research report from Peking University
Controlled Variable	Urbanization Level	urb	Urban population/Total population
	Infrastructure Level	road	Urban road length/Total area of the region

Model Establishment: Positive Correlation Between Regional Economic Development Quality and Digital Inclusive Finance: In cities with a high degree of industrial structure optimization, digital inclusive finance has a positive synergistic effect with urban economic construction, promoting high-quality economic development. Urbanization Level Improvement Enhances Urban Economic Development: An increase in the level of urbanization means that the public in the region is more likely to enjoy modern and efficient services. Improving the urbanization level also accelerates the operation of urban economic development. Enhancement of Regional Infrastructure Can Positively Impact Economic Development Quality.

Based on the research findings from Peking University, this paper adopts the logarithmic utility function method to establish the digital inclusive finance index, as shown in Equation 1.

$$d=\frac{\log x-\log x'}{\log x^{h}-\log x'}*100 \tag{1}$$

According tothe above equation, the standardized digital inclusive finance index can be obtained. When calculating the weights of the indicators, both subjective and objective weighting methods are considered. The formulas for the coefficient of variation method are shown in Equations 2 and 3.

$$V_{ij} = \frac{\sigma_{ij}}{x_{ij}} \tag{2}$$

$$W_{ij} = \frac{V_{ij}}{\sum_{j=1}^{m} V_{ij}} \tag{3}$$

$\sigma_{ij}$is the standard deviation, x_{ij} is the mean.

The weighted arithmetic average synthesis is shown in Equation 4:

$$d = \sum_{i=1}^{n} w_i d_i \tag{4}$$

d is the composite index; w_i is the normalized weight of each evaluation indicator; $d_i$is the evaluation score of a single indicator, *n* is the number of evaluation indicators. The index data is shown in Table 3.

Table 3 Digital Inclusive Finance Index for 11 Cities in Jiangxi Province from 2011 to 2021

Year	2011	2012	2013	2014	2015	2016
Nanchang	69.45	113.21	152.18	170.03	197.52	218.74
Jingdezhen	59.37	97.84	139.59	150.24	177.29	196.71
Pingxiang	51.20	92.81	128.96	141.67	170.19	195.97
Jiujiang	50.02	90.95	126.60	145.87	173.13	196.78
Xinyu	41.63	92.89	130.47	153.21	168.73	192.85
Yingtan	46.79	87.21	128.65	156.94	169.63	196.20
Ganzhou	48.38	88.48	126.02	140.38	169.64	195.14
Ji'an	36.31	77.68	116.92	130.64	158.32	184.47
Yichun	42.13	82.41	120.08	132.07	160.96	190.64
Fuzhou	40.72	81.45	121.95	136.50	160.97	186.06
Shangrao	38.28	84.37	119.30	139.50	162.91	186.36
Nanchang	253.13	265.13	278.25	290.99	317.70	226.16
Jingdezhen	238.99	251.35	264.95	296.04	218.47	227.04
Pingxiang	237.33	249.80	281.27	225.12	237.60	249.02
Jiujiang	261.77	294.42	222.79	235.60	242.00	256.97
Xinyu	286.44	219.11	232.20	242.83	256.24	287.40
Yingtan	224.36	236.95	250.84	263.52	295.24	208.62
Ganzhou	221.07	234.85	247.45	280.01	211.89	225.91
Ji'an	235.52	250.13	282.80	212.51	223.84	236.27
Yichun	251.90	284.14	213.81	226.97	238.57	251.90
Fuzhou	283.12	253.13	265.13	278.25	290.99	317.70
Shangrao	226.16	238.99	251.35	264.95	296.04	218.47

2.2 Fixed Effects Model Construction

Based on the statistical data of financial indices for the 11 cities in Jiangxi Province, this paper establishes a fixed effects model as shown in Equation 5 to analyze the impact of digital inclusive finance on the quality of urban economic development.

$$\mathrm{ehgi}_{it} = \alpha_{it} + \beta_1 \mathrm{ida}_{it} + \beta_2 \mathrm{urb}_{it} + \beta_3 \mathrm{road}_{it} + \mathrm{u}_{it} \tag{5}$$

In the model, the subscripts i and t represent the city and time, ehgi is the high-quality economic development index, ida is the digital inclusive finance index, urb is the level of urbanization, α_{it} is the intercept term, road denotes the level of regional infrastructure, and u_{it} is the random error.

2.3 Results Analysis

As shown in Table 4, when the core explanatory variable is significant at the 1% level and the regression coefficient is positive, it indicates that an increase in the digital inclusive finance index can lead to an increase in the high-quality economic development index. This suggests that digital inclusive finance has a positive promoting effect on high-quality economic development. In the process of economic development, digital inclusive finance can more comprehensively and extensively support high-quality development, better meeting the requirements of inclusiveness and injecting high-quality momentum into economic growth. The model results align with Hypothesis 1.Among the controlled variables, the level of urbanization is significant at the 10% level with a positive coefficient, indicating that an increase in the level of urbanization is beneficial to high-quality economic development. An increase in the level of urbanization helps improve efficiency, optimize structure, and enhance the living standards of the population, promoting high-quality economic development from multiple angles. The model results align with Hypothesis 2.The level of infrastructure is significant at the 1% level with a positive coefficient, meaning that improvements in infrastructure are more likely to lead to high-quality economic development. The model results align with Hypothesis 3.

Table 4 Model Results

Variable	Coefficient	*t*-value	Prob
ida***	0.000618	3.57	0.005
urb*	0.371724	1.87	0.090
road***	0.077653	3.42	0.007
cons	-0.017620	-0.18	0.859
$R^2 = 0.5359$ $F = 141.57$ $P = 0.0000$			

Note: *, **, ***indicates significance at the 10% , 5% and 1% level respectively.

3 Conclusion and Recommendations

3.1 Conclusion

The application level of digital inclusive finance is positively correlated with the quality of urban economic development. Compared to traditional inclusive finance models, digital inclusive finance offers greater inclusiveness, efficiency, and comprehensiveness, with lower costs for financial services. It better caters to the needs of socially disadvantaged middle and low-income groups, thus helping to address financial exclusion and promote higher-quality social development. Digital inclusive finance can comprehensively support multiple aspects of economic development, including innovation, coordination, sharing, and green development. Among the digital inclusive finance application indices, the degree of digitization, coverage breadth, usage depth, level of urbanization, and regional infrastructure development have positive promoting effects on the quality of urban economic development to varying degrees. Enhancing the level of urbanization is particularly beneficial for improving the quality of urban economic development.

3.2 Recommendations

To fully leverage the role of digital inclusive finance in enhancing the quality of economic development in the cities of Jiangxi Province, this paper, based on the research findings, proposes the following recommendations:

Strengthen the Construction and Improvement of the Digital Inclusive Finance System: Preventing non-compliant practices can reduce the risks associated with the development of digital inclusive finance and promote sustainable development. Increase Efforts to Develop Innovative Technologies: Continuously enhance the deep integration and application of digital and network technologies in inclusive finance. Accelerate Urbanization: Speeding up urbanization and improving the level of urbanization can effectively enhance the quality of regional economic development. Additionally, higher urbanization levels can attract more talents, significantly boosting regional technological innovation and the development of technology industries, which further promotes the application and popularization of digital and network technologies in inclusive finance.

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