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*Original Paper*

# The Impact of Digital Financial Inclusion Development on Rural Residents' Income in Zhejiang Province

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***Abstract***

*This paper empirically analyzes the impact of digital inclusive finance on rural residents' income in Zhejiang Province with 2010-2020 as the target interval and based on the data of each prefecture-level city in Zhejiang Province. Heterogeneity test and robustness test were carried out after the completion of empirical evidence, and finally both passed the test. From the results, it can be seen that digital inclusive finance in Zhejiang Province can significantly promote the growth of rural residents' income. The test results show that the strength of the impact of digital inclusive finance on rural residents' income varies in different prefecture-level cities. The effect of financial inclusion index on the growth of rural residents' income is more obvious in northeast Zhejiang than in southwest Zhejiang. It is still significant even if the core explanatory variables are replaced during the robustness test. It indicates that when the government improves the level of digital financial inclusion, it should not only improve the overall level of digital financial inclusion, but also focus on increasing the digital financial inclusion investment in backward areas can also reduce the income differences and narrow the regional development gap, which will help to achieve the goal of common prosperity.*

***Keywords***

*Digital inclusive finance, Rural residents income, Income gap*

## 1. Background and Significance of the Study

### *1.1 Background of the Study*

In recent years, the state and local governments have been attaching importance to the development of digital inclusive finance, in 2021, the state implemented the central financial support for the development of inclusive financial demonstration zone award policy, Zhejiang Province, many places to explore the "financial enrichment" model, digital inclusive finance from the "three-foot counter" to the "digital intelligence platform". The digital inclusive finance from "three feet counter" to "digital intelligence

platform". This is an innovation of traditional finance, which is conducive to reducing costs and expanding the coverage of inclusive finance. Break through the boundaries of time and space, so that more people can enjoy financial services, and promote the healthy and sustainable development of the economy.

Zhejiang Province as a large economic province per capita disposable income ranks among the top in the country, Zhejiang Province digital inclusive financial development is also leading the world. However, the gap between urban and rural areas and regional disparities are more obvious, urban residents' income is much higher than rural areas, and northeast Zhejiang is more developed than southwest Zhejiang. Financial services in Zhejiang Province are characterized by several major features: wide coverage of mobile payment, many financial service scenarios, and formal channels for accessing financial services. Zhejiang Province, the rapid development of financial innovation and technological development, these two defects make us realize the necessity of the development of digital financial inclusion, the development of digital financial inclusion can not only solve the problem of large income disparity but also make full use of Zhejiang's science and technology and infrastructure to further the development of financial science and technology, to improve the level of digitization of the entire province, and to further the service of the real economy to promote the development of the economy. The article mainly discusses the relationship between digital inclusive finance and rural residents' income.

*1.2 Research Significance*

Although digital inclusive finance in Zhejiang Province has started early and developed quickly, it still faces the problems of high cost, low efficiency and low sustainability. Financial institutions also often do not see short-term benefits and opportunities for digital financial inclusion. The development of the Internet and information technology can, to a certain extent, solve the shortcomings of digital financial inclusion. Zhejiang Province has actively promoted the development of digital inclusive finance by implementing the decision of "digitalization reform" and "common prosperity demonstration area construction". Digital financial inclusion is an important part of the modern financial system, but also smooth the real economy "capillary". The study of digital inclusive finance and the impact of rural residents' income mechanism has theoretical significance and practical significance.

In terms of theoretical significance, in terms of the research object, the existing research mainly stands in the national or economic circle and other macro perspective, to the province or prefecture-level city as a micro perspective is less. In terms of research object, this paper mainly focuses on rural residents' income, which is consistent with the starting point of financial inclusion focusing on vulnerable groups. This is conducive to improving the theory of the relationship between digital inclusive finance and rural residents' income in terms. And according to the transmission path specifically analyze its impact, is conducive to the theoretical aspects of the analysis of the transmission channel and the role of the mechanism, to find and eliminate the interference factors in the transmission path.

Considering the practical significance, promoting the development of digital inclusive finance is conducive to improving the living standards of rural residents, developing digital inclusive finance is

conducive to narrowing the urban-rural gap regional disparity, promoting the healthy development of the economy, making a pilot project for the national inclusive finance, and promoting the development of the whole country with the experience of local inclusive finance.

## 2. Literature Review

### *2.1 Accessibility of Digital Inclusive Finance*

The purpose of digital financial inclusion is to enable people to access financial services at an acceptable cost. Yu Jiang (2022) states that in order to circumvent the phenomenon of financial exclusion, digital inclusive finance must be established. In order to circumvent the phenomenon of financial exclusion and make financial services available to people who cannot access financial services, digital inclusive finance must be established, and reducing the cost of digital inclusive finance is conducive to enhancing the accessibility of digital inclusive finance in the development of digital inclusive finance path. Guo Zhenzhou (2017) To realize the potential of digital inclusive finance it is necessary to expand the dissemination and radiation of digital inclusive finance. The use of modern information technology can enable users to enjoy digital inclusive finance without leaving their homes, and digital inclusive finance can be realized online processing online application. Dong Fang Ran (2018) The development of digital inclusive finance has a huge space for use in places like villages where the population is not concentrated and the economy is not developed. With the development of digital financial inclusion, villagers are able to help themselves realize an increase in income through loans and insurance. In fact, it is also fueling rural economic growth. Due to the exclusion effect we can naturally only focus on involuntary exclusion groups, at which point businesses come into play and will find ways to tap into such customers to provide them with digital financial services and thus gain revenue, which objectively increases the accessibility of digital financial inclusion. From the literature on the accessibility of digital financial inclusion, it is clear that there is an extreme necessity for digital financial inclusion to be established in order to circumvent financial exclusion to make financial services accessible to more people.

### *2.2 Economic Effects of Digital Financial Inclusion*

Research on digital financial inclusion has focused on its economic effects. We can categorize economic effects into income distribution effects economic development effects and resource allocation effects. The result of financial development on income distribution is surprising, Huang Xin (2021) in the analysis of financial development and income gap that in general financial development has a positive effect on income growth. But for the income gap is also gradually widening the income gap. But as far as digital inclusive finance is concerned, it not only does not widen the income gap, but also effectively reduces the income gap. Zhang Lei (2022) said that inclusive finance can increase the scope of financial services. At the same time, funds and even advanced service concepts and technologies are introduced into rural areas, which in turn promotes the development of rural industries and improves their income levels. Thus further reducing the urban-rural income gap.

In terms of resource allocation effects. Bai Qinxian (2017) believes that finance is to improve the

efficiency of resource utilization. To put an end to the situation of financial monopoly, play the role and vitality of finance to promote the growth of the real economy, which coincides with the concept of digital inclusive finance, in essence, relative to the development of traditional financial digital inclusive finance makes the efficiency of resource allocation further improved. Chen Yanhua (2023) in the contemporary financial inclusion theory and China's related countermeasures research pointed out that in the context of realizing social equity finance as a scarce resource, must be given a balanced allocation. At the same time finance has a certain specificity as a way of resource allocation. It can configure social and economic resources through the configuration of its own resources.

In terms of economic growth effect. Song Xiaoling (2017) Empirical test of digital inclusive finance to narrow the urban-rural income gap. Relative to traditional finance digital inclusive finance greatly reduces the cost of finance. Broadening the object and scope of service, improving efficiency and easy to form a scale effect. The expansion of the scope raises the demand and the control of cost reduces the cost, which improves the economic efficiency from both sides. Park (2015) in the impact of financial inclusion on the income gap in developing countries in Asia points out that with the development of financial inclusion, their income gap has been reduced to a certain extent. Sethy (2020) in the digital financial inclusion and inclusive growth in India also stated that in developing countries like India, where there is a huge income gap, digital financial inclusion has also been effective to some extent in improving their gap between the rich and the poor. This explains to some extent the role of financial inclusion in reducing the income gap. Zhang Hongbin (2021) points out that the construction of rural digital inclusion system in the development of digital inclusive finance further enhances the economic strength of rural areas. It can be used as rural infrastructure to fuel the economic development of rural areas. From the literature on the economic effects of digital financial inclusion. Digital financial inclusion does reduce the income gap promotes the rational allocation of resources. But we also see that most of their research objects are countries and regions, and there are fewer of them targeting provinces, so this paper takes Zhejiang Province as the object to conduct research.

## 3. Innovations and Shortcomings of This Paper

### *3.1 Innovative Points*

As far as the region is concerned, the existing research mainly stands on the macro perspective such as the whole country or the economic circle, and there are fewer provinces or prefectural-level cities as the micro perspective. As far as the research object is concerned, this paper mainly focuses on the income of rural residents, which is exactly the same as the starting point of financial inclusion focusing on vulnerable groups. This is conducive to improving the theory of the relationship between digital financial inclusion and rural residents' income in terms.

### *3.2 Inadequacies*

3.2.1 Data timeliness. The time span is 2011-2020 because the data for digital financial inclusion ends in 2020 and the latest or previous data for Zhejiang Province is difficult to obtain. This ten-year period is

short and may not support the conclusions as strongly.

3.2.2 Data on some variables of prefecture-level cities in the digital financial inclusion index are missing, such as monetary funds, credit surveys, and investments in prefecture-level cities in Zhejiang Province. Nowadays, there are not many research theories on digital financial inclusion, and variables such as credit investigation are more subjective and difficult to measure.

## 4. The Mechanism Analysis of the Impact of Digital Inclusive Finance on Rural Residents' Income

This chapter is mainly divided into two parts: concept definition and mechanism of digital financial inclusion on rural residents' income. Concept definition is divided into three aspects: digital financial inclusion, financial inclusion, and digital financial inclusion index. The mechanism of the role of digital inclusive finance on the income of rural residents is analyzed in terms of economic growth, entrepreneurship and employment, and income distribution.

### *4.1 Concept Definition*

4.1.1 Financial Inclusion

Inclusive finance refers to the provision of appropriate and effective financial services at affordable costs to all segments and groups of society with financial services needs, based on the requirements of equality of opportunity and the principles of commercial sustainability. Another definition refers to a financial model that provides more people with convenient and safe financial services at affordable costs. Such financial services should not only cover micro and small enterprises and individual users, but also have appropriate limits and risk control measures to ensure the accessibility, affordability and risk controllability of financial services.

The core idea of financial inclusion is to extend financial services to more people, especially those who are difficult to be covered by traditional financial institutions, such as rural areas, the poor and low-income people. This can effectively improve the coverage and accessibility of financial services and promote the realization of financial inclusion and universality.

4.1.2 Digital Inclusive Finance

Digital inclusive finance refers to the innovation of traditional financial institutions and Internet companies through the Internet, big data and other emerging digital technologies to realize payment, credit, wealth management and other financial services of an inclusive nature. At present, the main participants of digital inclusive finance in China are divided into two categories: First, traditional financial institutions that possess strong financial resources, such as major state-owned banks and joint-stock banks. Second, Internet financial companies that actively embrace the digital technology revolution, such as Ant Financial Services and Jingdong Financial. The service content of digital inclusive finance has gradually differentiated, with consumer finance, Internet insurance, Internet wealth management and other fields flourishing across the board, and the scope of digital inclusive financial services is constantly being extended.

4.1.3 Digital Inclusive Finance Index

The Digital Inclusive Finance Index is researched by the Digital Finance Research Center of Peking University. The Digital Inclusive Finance Index consists of three indicators, namely, breadth of coverage, depth of use and degree of digital support services, which comprehensively takes into account the development of digital inclusive finance in China. The specific indicators of the Digital Inclusive Finance Index include, but are not limited to, the following: Breadth of Coverage: refers to the geographic scope of digital inclusive financial services, including urban, rural, township and other levels. Depth of use: refers to the frequency and depth of use of digital inclusive financial services, including the use of users in payment, credit, insurance, investment, credit and other aspects. Degree of digital support services: refers to the level of digital technical support and services involved in digital inclusive financial services, including the application of mobile payment, digital identity authentication, cloud computing, artificial intelligence and other aspects. By comprehensively considering the above three indicators, we can assess the development of digital inclusive finance in China, understand the differences between different regions and organizations, and provide reference for the formulation of relevant policies and measures.

*4.2 The Mechanism of Digital Inclusive Finance on Rural Residents' Income*

The previous section mainly analyzes the current situation of digital inclusive finance in Zhejiang Province, in which science and technology are of great significance to the development of digital inclusive finance. Digital inclusive finance has an important role in relation to the income of rural residents. We found that it can ultimately be transmitted to improve the income of rural residents by acting in other aspects. For example, by boosting economic growth, by providing loans or infrastructure for rural innovation and entrepreneurship, and by regulating income disparity to drive up the income of low-income earners, thus realizing an overall increase. Below will analyze the three aspects of economic growth, entrepreneurship and employment, and income distribution.

4.2.1 Economic Growth Effect

First of all, the popularization and promotion of digital inclusive finance enables more people to have access to financial services, thus increasing the investment awareness and investment capacity of the general public. This promotes the growth of investment, which in turn promotes economic growth. Secondly, the promotion and popularization of digital inclusive finance enables more people to have easy access to financial services, thus increasing people's willingness to consume and their ability to consume. This promotes the growth of consumption, which in turn promotes economic growth.

Once again compared to traditional finance concentrated in economically developed areas, there is financial exclusion in backward areas. But the integration of digital technology and financial inclusion development has expanded the scope of financial services, with its low-cost and efficient mode to make access to financial services more and more convenient information and communication technology and Internet technology makes the villagers do not leave their homes to access to financial services, breaking through the geographical constraints, which is conducive to their access to a more comprehensive and better quality of financial services, and is conducive to the expansion of the scale of production of the

villagers, which in turn promotes the growth of the economy. Economic growth. In short, the income of rural residents will increase accordingly after the economic growth.

4.2.2 Entrepreneurial Employment Effect

Digital inclusive finance can increase the financing and credit channels for rural residents, provide financial support for rural residents' innovation and entrepreneurship, and further promote innovation and entrepreneurship. Farmers actually want to innovate and start businesses but lack financial support, and with financial support they will actively discover entrepreneurial opportunities in rural areas. For example, rural planting and tourism are now combined with each other, and rapeseed flower is both a cash crop and at the same time can be used as a tourism product when its flowers are open. Supported by these ideas, farmers will be active in entrepreneurial employment, and the increase in entrepreneurial employment will drive the growth of rural residents' incomes.

The development of digital financial inclusion will promote financial innovation, which in turn will provide infrastructure for farmers' entrepreneurship and employment, and the improvement of infrastructure will increase the probability of farmers' employment and entrepreneurship, thus promoting the growth of rural residents' income. With the development of digital financial inclusion, competition among financial institutions is also intensifying, financial innovations that meet the needs of farmers will continue to emerge, and financial products will become more and more diversified, able to find the needs of rural customers, and farmers will be more willing to participate in the construction of digital financial inclusion. When the cost is reduced, financial services are easier to spread and promote, with the support of financial institutions in all aspects of the digital financial inclusion, making digital financial inclusion more accessible, thus providing financial and infrastructure support for rural residents' entrepreneurship and employment, further promoting employment and entrepreneurship, and raising the income of rural residents.

4.2.3 Income Distribution Effect

The technology of digitization has made the marginal cost of digital financial inclusion almost zero. This has greatly increased the enthusiasm of financial institutions to invest in rural areas, thus increasing their efforts to invest in the countryside, and the increase in investment has further promoted the economic development of the countryside, and the economic development has increased the incomes of rural residents, which has further narrowed the income gap, especially the gap between urban and rural areas, and has promoted the rational distribution of incomes.

The promotion and popularization of digital financial inclusion can expand the coverage of financial services, so that more disadvantaged groups can access financial services, which increases the supply of financial services, and also expands the beneficiary. It makes the groups that originally did not have access to financial services have access to financial services, which to a certain extent reduces the gap in finance and further reduces the income gap, and the access of disadvantaged groups to financial services will also lead to a certain increase in their income.

## 5 The Current Situation Analysis of Digital Inclusive Finance and Rural Residents' Income in Zhejiang Province

### *5.1 Current Situation Analysis of Digital Inclusive Finance in Zhejiang Province*

#### 5.1.1 The overall status of digital inclusive finance in Zhejiang Province

Nowadays, the financial inclusion index of Zhejiang Province shows a rapid development trend, has experienced the germination and rapid development period, and is now in an upward trend. As can be seen in Figure 1 in the Yangtze River Delta region, Zhejiang Province digital financial inclusion ranked second only to Shanghai, and in the country Zhejiang Province's digital financial inclusion index ranked third, only after Shanghai and Beijing. It can be said that the level of digital inclusive finance in Zhejiang Province leads the development of the country. The reason for this may be that the financial innovation soil and technology development environment in Zhejiang Province has allowed fintech to gain the same development opportunities as traditional financial institutions, especially the rapid development of third-party applications such as Alipay which has allowed Zhejiang Province to access this type of financial software earlier than other places, while its penetration rate is also the highest in Zhejiang Province. Another reason may be the more open-minded character of Zhejiang Province locals, who are more receptive to new things than other parts of the country, which nearly provides more favorable conditions for the popularization of digital financial inclusion.

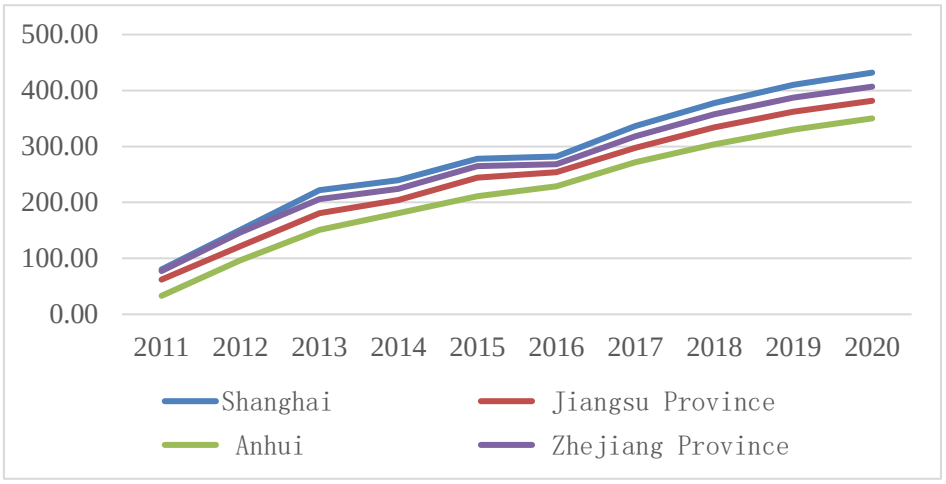


**Figure 1. Digital Financial Inclusion Index by Province in the Yangtze River Delta Economic Circle, 2011-2020**

*Source*: National Bureau of Statistics

#### 5.1.2 The Development Status of Digital Inclusive Finance in Each Prefecture-level City in Zhejiang Province

From Table 1, it can be seen that in Zhejiang Province, the highest digital financial inclusion index is in Hangzhou City, especially starting from 2012, which is significantly more than the other cities; the lowest is Lishui City, compared with the other cities. Jinhua City's digital financial inclusion index has been

steadily increasing year by year and ranks second in the province in 2018-2020. Hangzhou's position as number one is beyond reproach. It is the political, scientific, technological and economic center of Zhejiang Province, so it naturally develops faster in terms of digital financial inclusion index. Lishui City is at the bottom of the list in terms of economic development, located in the inland area of southwestern Zhejiang, with the most backward level of digital financial inclusion. Jinhua's development, however, is surprising, the reason is mainly because of the earlier and faster development of the digital economy in Jinhua, which has laid a good foundation for the development of digital inclusive finance. This, coupled with strong government support, has led to the faster development of its digital inclusive finance index.

**Table 1. Digital Financial Inclusion Index of Prefecture-level Cities in Zhejiang Province, 2011-2020**

| | Hangzhou | Jiaxing | Ningbo | Quzhou | Shaoxing | Taizhou | Wenzhou | Zhoushan | Jinhua | Huzhou | Lishui |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 86.18 | 86.51 | 81.77 | 67.99 | 77.10 | 77.26 | 81.83 | 76.74 | 79.46 | 77.79 | 56.21 |
| 2012 | 147.96 | 128.16 | 129.17 | 107.11 | 118.88 | 124.81 | 127.24 | 120.64 | 125.47 | 119.58 | 91.21 |
| 2013 | 189.27 | 165.88 | 168.04 | 149.34 | 156.07 | 160.81 | 169.68 | 157.51 | 166.92 | 160.91 | 133.04 |
| 2014 | 199.40 | 175.41 | 186.10 | 163.35 | 175.02 | 172.87 | 180.98 | 174.58 | 179.43 | 172.70 | 138.63 |
| 2015 | 231.13 | 205.98 | 213.31 | 194.88 | 204.52 | 203.35 | 211.38 | 201.37 | 209.87 | 201.49 | 172.61 |
| 2016 | 246.92 | 220.65 | 228.33 | 210.36 | 220.60 | 218.68 | 229.53 | 222.24 | 222.10 | 218.39 | 194.61 |
| 2017 | 285.43 | 252.92 | 258.55 | 241.64 | 245.75 | 246.88 | 260.22 | 247.96 | 253.80 | 249.64 | 220.34 |
| 2018 | 302.98 | 272.74 | 274.40 | 260.71 | 262.11 | 263.88 | 273.98 | 264.49 | 277.19 | 269.89 | 229.31 |
| 2019 | 321.65 | 287.34 | 288.94 | 275.49 | 281.78 | 278.92 | 286.74 | 278.40 | 294.95 | 283.80 | 236.80 |
| 2020 | 334.48 | 300.48 | 301.13 | 288.24 | 293.21 | 290.21 | 297.22 | 291.14 | 307.33 | 295.53 | 245.11 |

*Source*: Peking University Digital Financial Inclusion Index

*5.2 Analysis of the Current Situation of Rural Residents' Income in Zhejiang Province*

5.2.1 The Overall Status of Rural Residents' Income in Zhejiang Province

Figure 2 shows that the income of rural residents in Zhejiang Province from 2011 to 2020 is much higher than that of the whole country, more than twice the national average. From Figure 3 can be seen in the Yangtze River Delta region in Zhejiang Province, rural residents' income is second only to Shanghai, and the gap with Shanghai is not big, but with the third place Jiangsu Province, the gap is gradually widening, he is more than twice the Anhui Province. This shows that the rural residents of Zhejiang Province income at a relatively high level, and the growth rate is relatively fast. This is mainly because of the strong sense of entrepreneurship in Zhejiang Province, there are a large number of township enterprises and small and micro enterprises in the countryside, and then they are backed by the high consumption areas of Jiangsu and Zhejiang, vegetables and other agricultural products at higher prices, which further improves their per capita income.

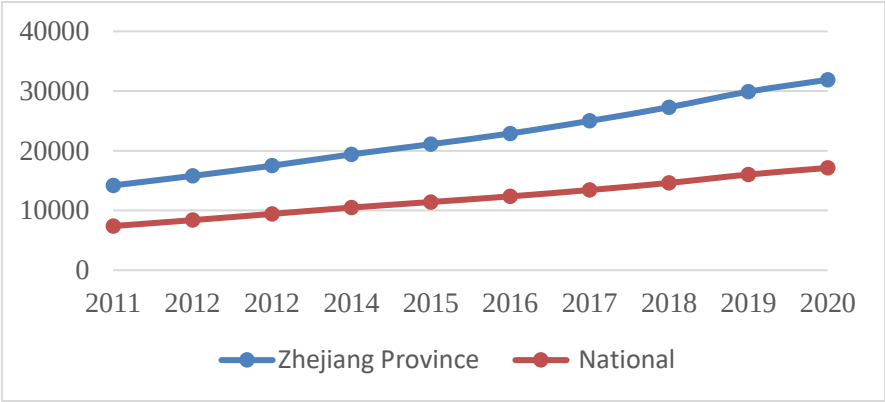


**Figure 2. Income of Rural Residents in the Country and Zhejiang Province, 2011-2020**

Data source: National Bureau of Statistics

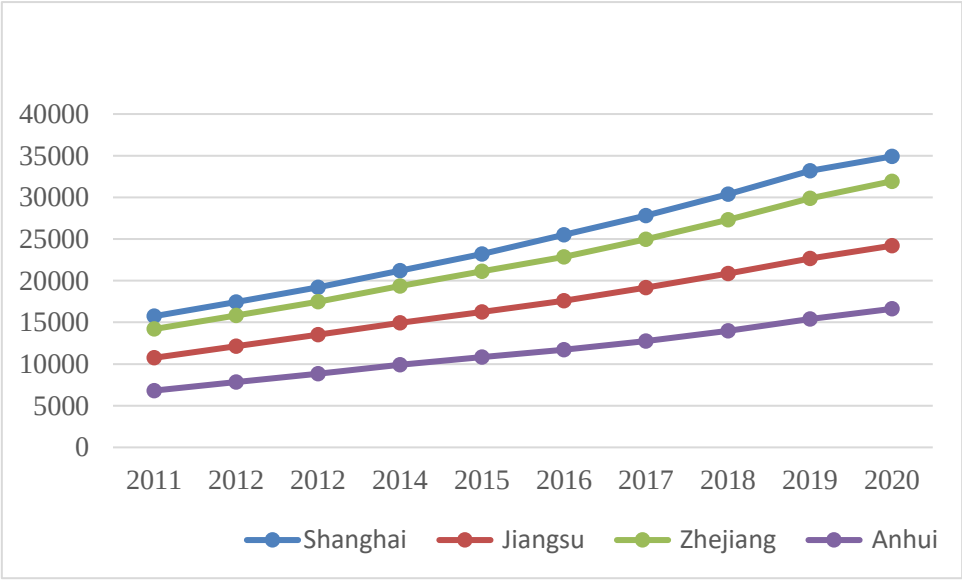


**Figure 3. Income of Rural Residents in the Yangtze River Delta Economic Circle Provinces**

Data source: National Bureau of Statistics

5.2.2 The Status of Rural Residents' Income in Each Prefecture-level City of Zhejiang Province

From Table 2 can be seen in the rural per capita income of prefecture-level cities in Zhejiang Province, Jiaxing City is the highest this result is also somewhat surprising, followed by Hangzhou and Zhoushan, Zhoushan can enter the top three is not quite in line with the level of development of his city as a whole, Lishui is in the last place this is in line with the expectations of the level of development of this and his economy is adapted. Jiaxing is so high if you combine its geographic location will be able to understand. It is located in the south of Shanghai, Hangzhou, north of Shanghai, due to the high rate of local urbanization in Shanghai, rural areas less, which brings an opportunity for Jiaxing, the active development of cash crop planting to supply Shanghai, while actively developing rural tourism to meet

the Shanghai people around the tour, relax and enjoy the mood of the demand. Zhoushan city is high because it is by the sea and has a small population, they mainly develop fishing in the countryside so the income is higher.

**Table 2. Income of Rural Residents in Prefecture-level Cities of Zhejiang Province**

| | Hangzhou | Huzhou | Jiaxing | Lishui | Ningbo | Quzhou | Shaoxing | Taizhou | Wenzhou | Zhoushan | Jinhua |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 15245 | 15381 | 16707 | 7809 | 16518 | 9635 | 15861 | 13108 | 13243 | 16608 | 11877 |
| 2012 | 17017 | 1701717188 | 18636 | 8855 | 18475 | 10714 | 17706 | 14567 | 14719 | 18601 | 13286 |
| 2013 | 18923 | 19044 | 20556 | 10024 | 20534 | 11924 | 19618 | 16126 | 16194 | 20573 | 14788 |
| 2014 | 23555 | 22404 | 24676 | 13635 | 24283 | 15354 | 23539 | 19362 | 19394 | 23783 | 18544 |
| 2015 | 25719 | 24410 | 26838 | 15000 | 26469 | 16884 | 25648 | 21225 | 21235 | 25903 | 20297 |
| 2016 | 27908 | 26508 | 28997 | 16459 | 28572 | 18421 | 27744 | 23164 | 22985 | 28308 | 21896 |
| 2017 | 30397 | 28999 | 31436 | 18072 | 30871 | 20225 | 30331 | 25369 | 25154 | 30791 | 23922 |
| 2018 | 33193 | 31767 | 34279 | 19922 | 33633 | 22255 | 33097 | 27631 | 27478 | 33812 | 26218 |
| 2019 | 36255 | 34803 | 37413 | 21931 | 36632 | 24426 | 36120 | 30221 | 30211 | 36784 | 28511 |
| 2020 | 38700 | 37244 | 39801 | 23637 | 39132 | 26290 | 38696 | 32188 | 32428 | 39096 | 30365 |

Data source: Zhejiang Provincial Bureau of Statistics

From the above charts, it can be seen that the rankings of digital financial inclusion index and rural residents' income are consistent in both the Yangtze River Delta Economic Circle and the prefecture-level cities of Zhejiang Province. In the Yangtze River Delta Economic Circle, Shanghai and Zhejiang are in the first or second place in terms of digital financial inclusion index and rural residents' income. The rankings of digital financial inclusion index and rural residents' income of prefecture-level cities in Zhejiang Province are different, but the overall changes are not significant. This shows that there is a relatively close link between the two.

## 6. Empirical Analysis of the Impact of Financial Inclusion Development on Rural Residents' Income in Zhejiang Province

This chapter is mainly divided into two sections: model setting and variable selection, and empirical analysis. This article focuses on the relationship between the development of digital financial inclusion and rural residents' income, taking 11 prefecture-level cities in Zhejiang Province as the research object from 2011 to 2020, with a total of 110 observation samples. The digital financial inclusion index is utilized as a measure of the degree of digital financial inclusion development, and the net income of rural residents is used to measure the income of rural residents, with the main data coming from the Zhejiang Provincial Statistical Yearbook and the National Bureau of Statistics, as well as the Digital Financial Inclusion Index of Peking University.

*6.1 Model Setting and Variable Selection*

6.1.1 Variable Selection

In the model selection we draw on the Douglas production function, the model in which the disposable income of rural residents is the explanatory variable, the digital financial inclusion index is the explanatory variable, and it is the main explanatory variable, and we choose the per capita regional gross domestic product, population, the proportion of fiscal expenditure, the strength of education expenditure, the strength of financial infrastructure support, and the industrial structure as the control variables, and the specific variable selection is as follows.

(1) Explained variables: disposable income of rural residents is the explained variable, and disposable income of rural residents refers to the income obtained by rural households after initial distribution and redistribution. So it can explain the development status of rural areas to a certain extent. It mainly consists of three parts wage income, production and management income, and property income. Wage income and production and operation income in the disposable income of rural residents vary greatly among different regions and groups, and property income also varies greatly among different families. In addition, there are also differences in the sources of income for people of different ages, genders and education levels.

(2) Explanatory variables: the financial inclusion index is the explanatory variable, the digital financial index. This index includes multiple dimensions, it also includes three levels of provinces, cities above prefecture level and counties, covering a wide range, according to the needs of this paper, I have normalized this digital financial index, this variable shows the situation of financial inclusion in a region.

(3) Control variables: ①Gross regional product per capita ②Population ③Fiscal expenditure ratio refers to the ratio of fiscal expenditure to GDP. ④Education expenditure intensity refers to the ratio of fiscal education expenditure to total fiscal expenditure. ⑤ Infrastructure support strength refers to the share of fiscal expenditure on general public services, and ⑥ Industrial structure refers to the share of agriculture, industry and services in a country's economic structure .

**Table 3. Variable Selection**

| Variables | Economic significance |
|---|---|
| Y: Rural net income per capita | Indicates the income level in rural areas |
| X1: digital financial inclusion index | Reflects the level of digital financial inclusion development in the region |
| X2: Gross regional product per capita | Reflects the economic development of the region |
| X3: Population | Population status of the region |
| X4: Fiscal Expenditure Ratio | Reflects the fiscal expenditure status of the region |
| X5: Education Expenditure Strength | Indicates the level of education expenditure |
| X6: Strength of fiscal infrastructure support | Indicates infrastructure support efforts |
| X7: Industrial Structure | Reflects the proportion of each industry in the region |

Considering that other variables will have an impact on the economy, we have identified GDP per capita, population, fiscal expenditure ratio, education expenditure strength, financial infrastructure support strength, and industrial structure as control variables. The fiscal expenditure ratio is represented by dividing the fiscal expenditure by the regional GDP, the strength of education expenditure is represented by dividing the education expenditure by the total expenditure, and the strength of infrastructure is pointed out by dividing the general public service expenditure by the total fiscal expenditure.

6.1.2 Data Acquisition and Descriptive Statistics

Involving the accessibility of data, I chose the data of each indicator for the decade of 2011-2020 to conduct the empirical test.

**Table 4. Descriptive Statistics of Variables**

| Variable | Meaning of variable | Mean | Standard deviation | Minimum value | Maximum value | Quantity |
|---|---|---|---|---|---|---|
| Y | Rural per capita net income | 23,717 | 7,915 | 7,809 | 39,801 | 110 |
| X1 | Digital Financial Inclusion Index | 205.8 | 70.23 | 56.21 | 334.5 | 110 |
| X2 | Gross domestic product per capita | 83,861 | 29,774 | 30,643 | 152,465 | 110 |
| X3 | Population | 485.7 | 258.5 | 96.99 | 1,197 | 110 |
| X4 | Fiscal Expenditure Ratio | 0.149 | 0.0577 | 0.0760 | 0.357 | 110 |
| X5 | Strength of Education Expenditures | 0.192 | 0.0391 | 0.104 | 0.267 | 110 |
| X6 | Strength of financial infrastructure support | 0.114 | 0.0174 | 0.0802 | 0.160 | 110 |
| X7 | Industry Structure | 0.863 | 0.113 | 0.556 | 1.029 | 110 |

From the table, we can see that the maximum value of Y is 39,801, which is much larger than the average value of 23,7176, indicating that there are great differences in the income of rural residents in Zhejiang Province. At the same time, the average value of digital financial inclusion index is 205, and the minimum value is 70.23. The regional differences of digital financial inclusion index are also large. At the same time look at X2, X3, X4, X5, X6, X7 the results of this index is also their variance is very large, at the same time the cities of Zhejiang Province is also a big difference, through the financial inclusion of differentiated inputs to a certain extent will promote the balanced development of the region, is not as strong as the gap between the strongest pull too big.

6.1.3 Modeling

Associated with the conditions for the establishment of the Douglas production function and the scope of application of the model can also be expressed by the same function of the equation

$$Y_{it} = A_{it}F_{it}(IFI_{it}, K_{it}, L_{it}) \quad (4.1)$$

In order to make the data more significant both sides take the ln function at the same time

$$\ln Y_{it} = B_0 + B_1 lnX1_{it} + B_2 lnX2_{it} + B_3 lnX3_{it} + B_4 lnX4_{it} + B_5 lnX5_{it} + B_6 lnX6_{it} + B_7 lnX7_{it} + \varepsilon_{it} \quad (4.2)$$

In this equation, $\beta_0$ is a constant term, $\beta_{(1)}$ $\beta_{(2)}$ $\beta_{(3)}$ $\beta_{(4)}$ $\beta_{(5)}$ $\beta_{(6)}$ $\beta_{(7)}$ represents the elasticity coefficient, μ represents the random error term, which refers to the impact caused by factors that can not be predicted, i represents the region, and t represents time.

In order to test the hypothesis that the development of digital finance can promote the growth of rural residents' income, the model (4.3) is set up in the following form:

$$\ln Y_{it} = B_0 + B_1 lnX1_{it} + B_2 lnX2_{it} + B_3 lnX3_{it} + B_4 lnX4_{it} + B_5 lnX5_{it} + B_6 lnX6_{it} + B_7 lnX7_{it} + \varepsilon_{it} + \mu_{it} + \lambda_{it} \quad (4.3)$$

The coefficient $\beta_1$ describes the effect of digital financial inclusion on rural residents' income; $\beta_0$ is the intercept term of the model; $\beta_2$ is the coefficient of the control variable; $\mu_t$ is the time fixed effect; $\lambda_i$ is the individual fixed effect; $\varepsilon_{it}$ is the random error term.

(4.3) The main regression model, in the formula of (4.3) we remove the X2 and X3 two items to derive the model (4.4), and then verify the hypothesis: the impact of financial inclusion on rural residents' income will not disappear with the deletion of variables, the specific formula is shown below:

$$\ln Y_{it} = B_0 + B_1 lnX1_{it} + B_4 lnX4_{it} + B_5 lnX5_{it} + B_6 lnX6_{it} + B_7 lnX7_{it} + \varepsilon_{it} + \mu_{it} + \lambda_{it} \quad (4.4)$$

In order to verify the hypothesis: the role of digital financial inclusion on the income of rural residents varies between different regions, the city of Zhejiang is divided into two parts of north-east Zhejiang and south-west Zhejiang, and regression is carried out separately, with the same formula as model (4.3).

*6.2 Empirical Analysis*

6.2.1 The Impact of Inclusive Finance on Rural Residents' Income

The process of model selection, by testing the individual effect and time effect of the model, shows that the result is Prob > F = 0.0000, so the random effect and fixed effect model are more appropriate than the mixed effect model. Hausman test, the result can be seen Prob > chi2 = 0.0002, so this paper is most appropriate with the fixed effect model. Because of the influence of different cities and other factors, the two-way fixed effect model is applied by fixing the city (Id) and year (Year).

**Table 5. Impact of Financial Inclusion on Rural Residents' Income**

| Variable | y |
|---|---|
| X1 | 0.649*** |
| | (15.32) |
| X2 | 0.649*** |
| | (15.32) |
| X3 | -0.0423 |
| | (-1.60) |
| X4 | -1.045* |
| | (-2.38) |
| X5 | -0.398 |
| | (-0.61) |
| X6 | 1.442 |
| | (1.49) |
| X7 | (-0.00908) |
| | (-0.07) |
| Observations | 110 |
| R^2 | 0.902 |
| IdFE | Control |
| YearFE | Control |

*Note*. t statistics in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001 The following tables are identical.

The results of the table show that the regression coefficient of the term financial inclusion (x1) is 0.649, which is significant at 99.9% level, indicating that the development of financial inclusion and rural residents' income are positively correlated, i.e., the hypothesis is verified. For every 1% increase in the financial inclusion index rural residents' income increases by 0.469%. GDP per capita, and infrastructure support and GDP per capita is positively correlated, which indicates that with the overall development of the economy will also promote the increase in per capita income in rural areas, infrastructure investment increases will also promote the increase in per capita income in rural areas, the proportion of fiscal expenditure on per capita income in rural areas is negatively correlated, this is the proportion of fiscal expenditure on agriculture in the proportion of inputs in the gradual decrease in the cause of the digital financial inclusion in the final analysis index on rural residents' income is very significant and positively correlated.

6.2.2 Heterogeneity Analysis

To test the hypothesis that the impact of digital financial inclusion on rural residents' income varies with the region, then all the samples are divided into north-east Zhejiang and south-west Zhejiang, and north-

east Zhejiang includes Hangzhou, Ningbo, Jiaxing, Huzhou, Shaoxing and Zhoushan. Southwest Zhejiang includes Wenzhou, Jinhua, Quzhou, Taizhou, and Lishui. To detect the difference in the development of different regions. Through this difference to specific problems and specific analysis to develop measures in line with the local reality. Descriptive statistics of the data of the two regions.

**Table 6. Descriptive Statistics of Subgroups**

| Region | Variable | Sample size | Mean | Standard deviation | Minimum value | Maximum value |
|---|---|---|---|---|---|---|
| Northeast | Y | 60 | 10.16 | 0.290 | 9.632 | 10.59 |
| | X1 | 60 | 5.285 | 0.401 | 4.340 | 5.813 |
| Southwest | Y | 50 | 9.832 | 0.357 | 8.963 | 10.39 |
| | X1 | 50 | 5.215 | 0.430 | 4.029 | 5.728 |

From the table, we can see that the average value of Y in the northeastern region is 10.16, and 9.832 in the southwestern region, which is obviously higher than that in the southwestern region of northeastern Zhejiang, indicating that the economy of northeastern Zhejiang is more developed, whereas X1, northeastern Zhejiang, 5.285, and southwestern Zhejiang, 5.215, due to the level of economic development of the northeastern Zhejiang region is higher than that of the southwestern region of Zhejiang which leads to the development of its financial level is also relatively high. Financial level of development is also higher, in short, it can be seen that Zhejiang regional development differences are also relatively large, the northeast and southwest of the two regions are not balanced.

**Table 7. Heterogeneity Analysis**

| Variable | Northeast Zhejiang | Southwest Zhejiang |
|---|---|---|
| X1 | 0.658*** | 0.458*** |
| | (12.86) | (7.69) |
| X2 | 0.0624 | 0.414*** |
| | (0.70) | (5.97) |
| X3 | 0.0624 | 0.252*** |
| | (0.70) | (6.47) |
| X4 | 2.133 | 0.127 |
| | (1.91) | (0.45) |
| X5 | 1.549 | -1.908*** |
| | (1.68) | (-3.45) |
| X6 | 1.183 | 1.289 |
| | (1.35) | (1.30) |

| | | |
|---|---|---|
| X7 | 0.226** | -0.161 |
| | (2.71) | (-0.78) |
| ***_cons*** | 5.010*** | 1.728* |
| | (4.81) | (2.01) |
| Observations | 60 | 50 |
| ***R^2*** | 0.9095 | 0.9742 |
| Id FE | Control | Control |
| Variable | North East Zhejiang | Southwest Zhejiang |
| Year FE | Control | Control |

The above table regression results show that the coefficient of the regression of financial inclusion in north-east Zhejiang and south-west Zhejiang is 0.658 and 0.458, and the regression coefficient of north-east Zhejiang and south-west Zhejiang is significant at the level of 1‰. From this we can know that the development of financial inclusion in North Zhejiang and Southwest Zhejiang will have an impact on the income of rural residents, but we should also note that North Zhejiang is higher than Southwest Zhejiang by 0.2, which indicates that the impact of digital financial inclusion on the income of rural residents in North Zhejiang is more significant than in Southwest Zhejiang, due to the degree of financial as well as scientific and technological development of the Southwest Zhejiang region is relatively large difference, there is a financial inclusion lagging behind the place, descriptive statistics It can be seen that the standard deviation of the degree of inclusive financial development in Southwest Zhejiang is higher than that of North East Zhejiang. Their difference is not large, the regression coefficient of financial inclusion in Southwest Zhejiang is 0.458, which indicates that the effect of financial inclusion in Southwest Zhejiang on rural residents' income is smaller than that in North East Zhejiang. It indicates that it is necessary to increase the investment in financial inclusion in Southwest Zhejiang, and at the same time improve the support of science and technology, finance and other infrastructure at the same time to increase financial investment. This is conducive to reducing regional development differences, promoting the common development of finance, and improving the happiness of the people.

6.2.3 Robustness Test

Zhejiang Province as a whole this is more developed, but the development of various regions within Zhejiang Province is not balanced, Zhejiang East and North is more developed, with Hangzhou, Ningbo and other representatives of the Northeast are very developed both economically and technologically, while the development of Southwest Zhejiang is more backward, they are represented by Quzhou and Taizhou they are close to the inland level of economic development is relatively low, the infrastructure is not so perfect, and the availability of financial services is low thus resulting in a The backward situation of digital financial inclusion. Hangzhou, Ningbo and other places with developed economies have a higher level of financial development, while the development of financial technology and Internet

communication technology makes their digital inclusive financial development a leading position in the country. Therefore, Southwest Zhejiang is not only economically backward than North East Zhejiang but also relatively disadvantaged in terms of digital financial inclusion, so their regional differences also affect the effect of financial inclusion on the income of rural residents.

Through the study of the method of robustness test, two methods of replacing the core explanatory variables and deleting part of the explanation are used here. First, since the digital financial inclusion index also includes many dimensions, here we choose the three dimensions of the breadth of digital financial coverage, the depth of digital financial use, and the degree of digitization of financial inclusion to replace the core explanatory variables of the financial inclusion index respectively. Second, by drawing on the methodology in Zhang Zenglian's (2021) paper, we delete the X2 and X3 variables to see whether the impact of financial inclusion on rural residents' income is significant.

**Table 8. Robustness Test**

| Variables | Y | Y | Y |
|---|---|---|---|
| X1 | 0.750*** | 0.580*** | 0.257*** |
| | (17.22) | (12.00) | (9.10) |
| X2 | 0.328*** | 0.417*** | 0.538*** |
| | (5.59) | (5.68) | (6.54) |
| X3 | 0.0549* (-2.26) | -0.0343 | 0.00644 |
| | (-2.26) | (-1.11) | (0.18) |
| X4 | 0.955* (-2.39) | -0.582 | X4 -0.955* (-2.39) - 0.582 (-1.15) |
| | (-2.39) | (-1.15) | (-1.33) |
| X5 | (-0.65) -0.582 (-1.15) - 0.791 (-1.33) | X5 -0.390 (-0.65) | (-0.24) -0.121 |
| | (-0.65) | (-0.24) | (-0.14) |
| X6 | 1.934* (-0.24) -0.121 | -0.394 | 0.276 |
| | (-0.14) | (-0.36) | (0.21) |
| | (2.16) | | |
| X7 | 0.0497 | -0.0761 | -0.324 |
| | (0.41) | (-0.50) | (-1.89) |
| ***_cons*** | 2.681** | 2.685* (2.50) _cons | 2.974* |
| | (3.17) | (2.50) | (2.40) |
| Observations | 110 | 110 | 110 |
| R^2 | 0.957 | 0.9702 | 0.9008 |
| Id FE | Control | Control | Control |

The regression results show that the regression coefficients of the three are 0.750, 0.580, and 0.257, respectively. they are significant at the level of 1 per thousand, which is consistent with the main regression results, which not only proves that the Financial Inclusion Index has a significant impact on the income of the rural residents, but also proves that in the three dimensions of the breadth of coverage, depth of use, and level of digitization, the coverage breadth of the impact on the income of the rural residents is more significant. Therefore, we conclude that financial inclusion has a significant impact on rural residents' income. Secondly, the impact of breadth of coverage is the strongest among these dimensions, which in fact we should increase the investment in the breadth of coverage of financial inclusion so as to effectively promote the impact of rural residents' income.

Method two is shown in Table 9.

**Table 9. Robustness Test**

| Variable | y |
|---|---|
| X1 | 100.9*** |
| | (13.66) |
| X4 | -56252.8*** |
| | (-9.39) |
| X5 | -71965.3*** |
| | (-8.73) |
| X6 | 19183.9 |
| | (0.95) |
| X7 | 5441.6 |
| | (1.94) |
| Observations | 110 |
| R^2 | 0.970 |
| Id FE | Control |
| Year FE | Control |

The data from the above table show that the impact of financial inclusion on rural residents' income is still significant, and it is significant at 1‰, so the hypothesis H2 is verified. Generalized regression its regression coefficient is 100.9, and is significant at the level of 1‰, which is consistent with the main regression results, and also shows that the development of financial inclusion for the improvement of rural residents' income is significant. So various results show that the development of digital finance can promote the growth of rural residents' income.

## 7. Policy Recommendations to Increase the Income of Rural Residents

The conclusion of this article explains the promotion effect of digital financial inclusion on rural residents' income, and the final conclusion remains significant through a series of tests such as robustness and heterogeneity. This opens a new way to improve the income of rural residents, and also provides policy support for our country to reduce the gap between the rich and the poor, reduce the gap between urban and rural areas, and vigorously promote the revitalization of the countryside, as well as the theoretical evidence of how we can better play the role of digital inclusive finance. Therefore, combined with the conclusions of this paper, we put forward the following policy recommendations.

First, fully utilize the role of digital inclusive finance to improve the income of rural residents. Therefore, cities in Zhejiang Province should increase their investment in financial inclusion and emphasize the important role of financial inclusion. First of all, increase investment in digital finance, broaden the market environment, the introduction of some incentives, the governments of Zhejiang Province to take the lead in promoting the integration of traditional finance and digital finance will be blockchain, cloud computing and other technologies used in financial inclusion and improve the life of the residents who can survive; secondly, pay attention to the impact of the mechanism of exploration and application. In Zhejiang Province, more pilot testing and revision of theories in the field life, and then more accurate formulation of corresponding measures to develop relevant technology, but also to avoid excessive abuse of digital finance.

Secondly, in the process of empirical evidence, we found that the financial inclusion in the more developed northeastern part of Zhejiang Province has a more obvious role in boosting the income of rural residents than the less developed areas in the southwestern part of Zhejiang Province, which may be due to the fact that the northeastern part of Zhejiang Province owns a better infrastructure, especially the financial infrastructure and the developed communication and network facilities. So this actually means that we should not only improve the level of digital financial inclusion for less developed areas. At the same time, we also need to pay attention to whether its infrastructure is perfect, and strengthen the investment in infrastructure facilities not only directly for the real economy and primary industry to help, but also through the role of financial inclusion, improve the income of rural residents in Zhejiang Province.

Third, in the empirical process, we found that the net income of rural residents in Northeast Zhejiang is higher than that in Southwest Zhejiang, and the gap between them is relatively small. At the same time, we also find that the financial inclusion index also shows this pattern, they are directly correlated, so focus on improving the level of financial inclusion in southwest Zhejiang. Promote the growth of their rural residents' income, which can reduce the gap in financial inclusion between Northeast Zhejiang and Southwest Zhejiang, and at the same time will reduce the gap in rural per capita income, which will lead to a healthier development of the economy.

Fourth, For individuals and enterprises, we should integrate into the digital era and actively respond to the country's call to participate in the construction and investment in digital financial inclusion. Now e-

commerce and brick-and-mortar enterprises are eyeing the vast market of the countryside, where investment can gain economic benefits as well as certain social benefits. It is believed that through the active investment of enterprises and individuals in the construction of financial inclusion, coupled with the state's support for the three rural areas and the rural revitalization strategy. It will surely narrow the gap between regions and make the economy develop in an orderly and healthy way.

## 8. Conclusion

This article is based on the panel data of prefecture-level cities in Zhejiang Province from 2011 to 2020, mainly studying the impact of digital financial inclusion on rural residents' income in Zhejiang Province, and also studying the impact of the differentiation of financial inclusion development on rural residents' income in different regions thus obtaining the following conclusions:

First, the impact of improving the level of digital inclusive finance on promoting rural residents' income is positive and significant. Second, the impact of digital financial inclusion on rural residents' income is significant and does not change with the increase or decrease of variables. Third, the pulling effect of digital inclusive finance on rural residents' income is significantly larger in Northeast Zhejiang than in Southwest Zhejiang. Fourth, among the three dimensions of the breadth of digital financial coverage, the depth of digital financial use, and the degree of digitization of inclusive finance, it is the breadth of digital financial coverage that has the most significant impact on rural residents' income.

In terms of policy recommendations, the conclusion of this article describes the role of digital financial inclusion in promoting rural residents' income, and the final conclusion remains significant through a series of tests such as robustness and heterogeneity. This opens a new way to improve the income of rural residents, and also provides policy support for our country to reduce the gap between the rich and the poor, reduce the gap between urban and rural areas, and vigorously promote the revitalization of the countryside, and at the same time, it also provides a theoretical proof of how we can better play the role of digital inclusive finance. First of all, fully utilize the role of digital inclusive finance to improve the income of rural residents. Secondly, cities in Zhejiang Province should increase their investment in financial inclusion and emphasize the important role of financial inclusion. Once again we should not only improve the level of digital financial inclusion for less developed areas. At the same time, we should also pay attention to whether its infrastructure is perfect, and strengthen the investment in infrastructure facilities not only directly for the real economy and the primary industry to help. At the same time focus on improving the level of financial inclusion in southwest Zhejiang. Promote the growth of their rural residents' income. Finally, for individuals and enterprises, we should integrate into the digital era and actively respond to the call of the state to participate in the construction and investment of digital financial inclusion.

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