



Digital Inclusive Finance and China's Rural-Urban Income Gap

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Abstract. This paper mainly discusses issues about what influence the development of digital financial inclusion has on the China's rural-urban income gap, through utilizing and analyzing relevant data from Peking University's Digital Inclusion Index and the China Statistical Yearbook. The results show that the development and advancement of digital financial inclusion can significantly improve the income disparities between urban and rural areas. The coefficient remains significant even after controlling the regional-level variables. Thus, the digital financial inclusion should be vigorously developed, and the idea of shared development needs to be valued and advocated, aiming to reduce the urban-rural income gap, and improve social security, citizens' well-beings and sense of security.

Keywords: Digital financial inclusion; digital economy; reallocation of financial resources; the rural income

1 Introduction

On the Basis of the income distribution data from the National Bureau of Statistics, the Gini coefficient for national resident income, while showing slight improvement in recent years, remains relatively high. Specifically, it was 0.479 in 2003, peaked at 0.491 in 2008, then decreased to 0.473 in 2013, and further to 0.468 in both 2018 and 2020. Obviously, despite the slowdown in China's economic growth, income gap is still an important issue in social development. For a long time, the urban-rural dual economic structure has been regarded as a major obstacle to the growth of rural income. Although the income gap between urban and rural residents has narrowed from 2.69 times in 2018 to 2.45 times in 2022, there is still a significant gap between urban and rural areas. The long-term existence of such a gap may lead to unfair social structure and unstable social environment, which may further aggravate social contradictions and affect the safe operation and healthy development of society. Therefore, under the new economic situation, how to further reduce the urban-rural income gap has become an urgent problem to be solved.

The emergence of inclusive finance has provided more people with financial service opportunities, greatly reducing financing costs and easing financial constraints. With

the rapid development of the digital economy, digital financial inclusion is viewed as an important way to break through the limitations of financial technology. The G20 Hangzhou Summit in 2016 adopted the G20 High-level Principles for Digital Financial Inclusion, which defined digital financial inclusion as the key measure to promote financial inclusion through digital financial services, that is, to provide effective financial services to market players on the basis of equal opportunity, commercial sustainability and affordable costs. The core question of this paper is whether efficient and convenient financial services can become a new way to narrow the urban-rural income gap.

Based on the analyses above, this paper, by utilizing empirical standardized methods on the basis of a panel data model, aims to investigate the causal relationship between digital inclusive finance and the urban-rural income gap, offering theoretical and practical insights for narrowing this gap. Besides, with the help of digital inclusive finance, the government can realize the diversification of financial services, reallocation of financial resources, and become a new way of income distribution, which ultimately brings the beautiful vision of common prosperity for urban and rural areas.

2 Literature Review

The literature review is mainly divided into three parts: the mechanism of digital inclusive finance, the current status quo of urban-rural income disparities and the relationship between digital inclusive finance and the rural-urban income gap.

2.1 The Mechanism of Digital Inclusive Finance

Based on existing relevant research findings from both Chinese and international literature sources, the mechanism of digital inclusive finance is mainly summarized into three aspects: First, digital inclusive finance makes the acquisition of funds cheaper by lowering the cost threshold; second, digital financial inclusion promotes income growth and enhances the economic capabilities of the population; third, digital inclusive finance can stimulate the vitality of the consumption market and improve people's propensity to consume (Gomber et al., 2017)^[5].

Sylviane's (2008)^[11] research highlighted that digital financial technology broke traditional financial service limitations, reducing geographical constraints, lowering financing barriers, and narrowing the rural-urban consumption gap, thus promoting balanced development. Chowdhury and Maung (2012)^[1] found that the maturity of financial markets and reduced information asymmetry helped enterprises increase R&D investment, boosting economic growth. Ozili (2017)^[10] revealed that digital financial inclusion expanded financial services, increased consumer numbers, enhanced market vitality, and indirectly boosted government tax revenue, providing more resources for public services and infrastructure. Fisman and Love (2003)^[3] observed that financial development and resource allocation efficiency promoted industry interactions, accelerating industrial upgrading and transforming the economic system towards higher efficiency. Grohmann et al. (2018)^[4] emphasized that digital finance improved market

transparency and efficiency by solving information asymmetry through Internet technology, further promoting inclusive finance.

2.2 Existing Findings on Urban-Rural Income Gap

The urban-rural income gap is an important issue that economics has been paying attention to for a long time. Kuznets (1955)^[6] assumed that economic development could not directly drive the linear growth of residents' income. Especially after observing developed countries, he found that the shift of rural labor from agriculture to non-agriculture brought about a decline in primary industry productivity, thereby widening the productivity of the primary industry and expanding the income disparities between urban and rural areas. And other research also demonstrated that the rapid economic development promoted rural revitalization, continuously benefited the public, and increased the income of rural residents (Liu Wei et al., 2021)^[9].

In addition to economic growth, researchers have explored the urban-rural income disparities from various perspectives, including education level, industrial structure, economic openness, urbanization rate, and government financial expenditure. Liu et al. (2022)^[8] showed that school quality and teaching ability could compensate for individual endowment differences, with higher teaching standards in rural schools boosting students' future income. Li et al. (2019)^[7] used provincial panel data (2011-2016) and the entropy method to measure economic openness, finding that higher openness levels narrowed the urban-rural income gap and benefited neighboring provinces. Cheng et al. (2022)^[2] found that urbanization reduced the income gap but its effectiveness diminished over time. Liu et al. (2022)^[8] discovered that vertical fiscal imbalance in China's fiscal system widened the urban-rural income gap by causing a mismatch between local governments' income and expenditure.

Valero et al. (2022)^[12] found that the digital inclusive financial index and its sub-indexes effectively narrowed the urban-rural income gap, with human-centered new urbanization showing similar effects. However, the interaction between digital finance and urbanization widened the income gap, indicating low coupling and coordination. They suggested that digital inclusive finance should promote new urbanization in the future. Zhang et al. (2022)^[15] found through the system GMM and differential models that smart city construction promoted digital inclusive finance development by improving infrastructure and reducing the urban-rural income gap. Zhang and Tian (2022)^[14], using 2011-2020 provincial panel data, indicated that digital financial inclusion significantly improved agricultural total factor productivity, particularly in the western regions, increasing household income. Additionally, Zhang and Gao (2023)^[13] demonstrated that digital financial inclusion boosts rural incomes by promoting the digital transformation of agriculture, with industrial agglomeration being a key path to reducing the rural-urban income gap.

Through extensive literature review, it can be found that the research of digital inclusive finance on urban and rural residents' income has made great progress, but there are still shortcomings. Firstly, existing studies mainly use Gini coefficient to measure

urban-rural income gap, ignoring other measurement methods. Secondly, the synergistic influence of regional macro factors has not been considered and controlled in the study. This paper aims to solve these research gap.

3 Methodology

3.1 Data Sources

The dataset comes mainly from two sources: the China Statistical Yearbook published by the National Bureau of Statistics of China and the provincial Digital Financial Inclusion Index compiled by the Internet Finance Research Center of Peking University. As the time frame of the Digital Financial Inclusion Index is 2011-2020, the corresponding data for this period in the China Statistical Yearbook was used.

3.2 Variable Definition

3.2.1. Explanatory Variable.

The explanatory variable of this study was F_index . To this end, the Institute of Digital Finance of Peking University constructed a comprehensive measurement index system, comprising three dimensions: digitalization degree, coverage, and application of digital finance. According to the index system's established rules, a higher value indicated a higher degree of digital financial inclusion development in the region.

3.2.2. Explained Variable.

This paper is concerned with the Thiel Index (Gap) of urban-rural income disparity. By incorporating the evolving patterns of urban and rural population demographics into the assessment of income disparity, the Thiel Index can effectively capture the distinctive shifts in the dual economic structure and income distribution between urban and rural areas. This study employs data from the China Statistical Yearbook for the period between 2011 and 2020 to calculate the Thiel Index of urban-rural income disparity.

3.2.3. Control Variables.

The control variables in this study are as follows: Trade openness ($Open$) is measured by the ratio of total goods imports and exports to the GDP of foreign-invested enterprises. The structure of the secondary industry ($Ind2$) is defined as the proportion of the secondary industry's total value to the GDP. The structure of the tertiary industry ($Ind3$) is defined as the proportion of the tertiary industry's total value to the GDP. Regional education level ($Educ$) is measured as the proportion of the population aged 6 and above with tertiary education or higher. The level of economic development ($lgGDP$) is represented by the logarithm of each province's GDP. Population size ($lgPop$) is expressed as the logarithm of each province's total population.

3.3 Research Model

The empirical model constructed is as follows:

$$Gap_{it} = \alpha_i + \beta_1 Fin_{it} + \beta_2 Open_{it} + \beta_3 Ind2_{it} + \beta_4 Ind3_{it} + \beta_5 Educ_{it} + \beta_6 lgGDP_{it} + \beta_7 lgPop_{it} + \tau_t + \varepsilon_{it} \tag{1}$$

Among them, τ_t is time fixed effect; ε_{it} is a random disturbance term

4 Empirical Analysis

4.1 Descriptive Statistics

Table 1. Summary of major variables

Variables	Observed values	Mean values	SD	Min values	Max values
Gap	310	0.091	0.040	0.018	0.202
Fin	310	5.212	0.677	2.786	6.068
Open	310	0.019	0.030	0.000	0.226
Ind2	310	0.428	0.089	0.118	0.590
Ind3	310	0.471	0.099	0.153	0.839
Educ	310	0.139	0.077	0.024	0.505
lgGDP	310	9.742	0.983	6.407	11.615
lgPop	310	8.129	0.843	5.733	9.443

Table 1 provides a summary of the main variables in the study. The average rural-urban income gap in China was 0.091, with a minimum value of 0.018 and a maximum value of 0.202, indicating a significant income disparity between rural and urban areas. After logarithmic transformation, the mean digital inclusive finance index was 5.212, with values ranging from 2.786 to 6.068, showing substantial differences in the development of digital inclusive finance across provinces. Additionally, provinces displayed notable variations in economic development levels, trade openness, and industrial structure. Failing to control for these factors could introduce bias into the regression results.

4.2 Regression Results

4.2.1. Correlation.

Correlation analysis is used to measure correlation between variables. The correlation coefficient varies from 1 to -1, the stronger the correlation between the variables. Table 2 showed the results of correlation tests among the main variables in the study.

As illustrated in Table 2, the digital financial inclusion index exhibited strong correlations with the structure of both the secondary and tertiary industries, the regional education level, and the level of economic development. Furthermore, the digital financial inclusion index demonstrated a significant negative correlation with the urban-rural income gap. This implies that advancements in digital financial inclusion may contribute to reducing the income disparity between urban and rural areas.

Table 2. Correlation analysis

Variables	Gap	Fin	Open	Ind2	Ind3	Educ	lgGDP	lgPop
Gap	1.000							
Fin	-0.419***	1.000						
Open	-0.476***	-0.116***	1.000					
Ind2	0.230***	-0.450***	-0.072***	1.000				
Ind3	-0.457***	0.503***	0.298***	-0.824***	1.000			
Educ	-0.604***	0.331***	0.309***	-0.476***	0.716***	1.000		
lgGDP	-0.534***	0.322***	0.284***	0.084***	0.075***	0.212***	1.000	
lgPop	-0.192***	0.083***	0.110***	0.242***	-0.217***	-0.119***	0.897***	1.000

4.2.2. Panel Estimation.

Table 3 showed the results of fixed-effect regression based on panel data. In the table, column (1) contained only the explained variable, the Digital Financial Inclusion Index, while column (2) further controlled other variables at the regional level. The results of the regression coefficient showed that the development of digital inclusive finance had a positive effect on reducing the urban-rural income gap, regardless of whether the influencing factors at the regional level were controlled, and this conclusion was stable. However, after controlling for variables at other regional levels, the marginal impact of digital financial inclusion was reduced, suggesting that the development of digital financial inclusion might trigger changes in other macro factors, thus weakening its original effect. If these macro variables were not controlled, the true role of digital financial inclusion in shrinking the urban-rural income gap might be overestimated. In addition, the level of opening-up and regional economic development significantly contributed to narrowing down the urban-rural income gap, while the structure of the secondary industry and the size of the regional population might widen the urban-rural income gap, and these factors required special attention.

Table 3. Estimated results of the panel data

	(1) Gap	(2) Gap
Fin	-0.016*** (0.001)	-0.007*** (0.001)
Open		-0.220*** (0.024)
Ind2		0.053*** (0.011)
Ind3		0.001 (0.011)
Educ		-0.010 (0.010)
lgGDP		-0.030***

		(0.003)
lgPop		0.019*** (0.006)
Constant term	0.173*** (0.006)	0.246*** (0.037)
Observed term	310	310
R^2	0.176	0.641

Note: P<0.001 ***; P<0.05 **; P<0.1 *; Standard errors in parentheses.

5 Conclusions

Based on the above analyses, the following conclusions can be drawn: First, digital financial inclusion significantly contributes to reducing the income gap between urban and rural areas in China, and this conclusion remains robust whether regional macro-economic data is controlled or not. Second, although the marginal effect of digital financial inclusion on narrowing the urban-rural income gap diminishes after accounting for macro-level influencing factors, this suggests that ignoring these macro-factors might lead to an overestimation of the actual impact of digital financial inclusion. Third, the structure of the secondary industry and the population size tend to widen the urban-rural income gap. Therefore, while promoting digital financial inclusion, it is essential to consider the effects of these factors on income disparity.

Based on these conclusions and considering the current state of digital inclusive finance in rural areas, several new strategies and practical recommendations are proposed to address the urban-rural income gap. First, the advancement of digital inclusive finance should be continuously pursued, with increased investment and loan availability in rural regions. Specifically, it is crucial to implement financial education programs in rural areas to enhance farmers' understanding and acceptance of digital inclusive finance, thereby improving their access to financial services and supporting the sustainable development of digital finance in these areas. Second, the infrastructure for digital financial inclusion should be rapidly and efficiently developed, with a focus on enhancing both service capacity and quality. This includes establishing robust support systems such as payment systems, credit systems, and payment instruments, which are essential for the effective functioning of digital inclusive finance. Third, the effective integration and complementarity of digital financial inclusion and traditional finance should be promoted. For traditional banks, they should strengthen product innovation, improve the application of digital technology, comprehensively sort out and transform business processes, and strengthen digital construction in risk management, customer management, product research and development, and pricing management.

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