

# *A study of the impact of financial agglomeration on the urban-rural income gap*

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**Keywords:** Financial employment agglomeration; urban-rural income gap; locational entropy

**Abstract:** Financial agglomeration may become a new opportunity to narrow the urban-rural income gap. This paper takes 30 provinces in China as the research object from 2008 to 2020, uses location entropy to measure the level of financial agglomeration, and empirically analyzes the impact of the level of financial employment agglomeration on the urban-rural income gap from the current situation of financial employment agglomeration and urban-rural income gap. The study finds that: (1) Except for the central region, the level of financial employment agglomeration in the whole country and each region shows a generally upward trend. (2) All regions have experienced a long-term and sustained decline in the urban-rural income gap during the period under examination, but the problem of urban-rural income gap remains serious. (3) From the empirical test, at the national level, the increase in the level of financial employment agglomeration can effectively crack the urban-rural income gap problem. However, at the regional level, the role of financial employment agglomeration in China on the urban-rural income gap varies greatly among regions.

## 1. Introduction

### 1.1 Background of the study

After the reform and opening up, the overall economic level of China's society has increased year by year, contributing to the increase in the income level of urban and rural residents, and consequently the imbalance between urban and rural development, the income gap between urban and rural residents began to widen, which negatively affects the balance of China's economy and its full development. The Statistical Bulletin of the People's Republic of China on National Economic and Social Development for 2021, released by the National Bureau of Statistics, shows that the per capita disposable income of China's urban residents was 47,412 yuan, while that of rural residents was 18,931 yuan. The gap between the disposable income per capita of urban and rural residents in China

was 28,481 yuan, and the ratio of disposable income per capita of urban and rural residents was 2.50, with the gap between urban and rural incomes much higher than the average level of most countries around the world, and the problem remains prominent.

Reducing the urban-rural income gap is the top priority of China's economic and social development, and finance has a very important role in the national economy, but there are fewer studies on the mechanism of influencing the urban-rural income gap through financial measures at present. Financial agglomeration can not only open up a financial perspective for the study of urban-rural income gap, but also provide a reliable basis for the adoption of financial policies to narrow the urban-rural income gap, or will become a new opportunity to solve the problem of urban-rural income gap in China.

## 1.2 Significance of the study

As financial agglomeration has become a major trend in financial development in various countries, academics have gradually focused on financial agglomeration and have achieved notably fruitful research results. Currently, there are fewer studies on whether and how financial agglomeration affects the urban-rural income gap, and there is still disagreement. Among them, the regional variability and spatiality of the impact of financial agglomeration on the urban-rural income gap are often overlooked, and cannot be fully answered by existing theories and empirical studies. The research in this paper is based on the special national conditions of China, in-depth investigation of the impact of China's financial agglomeration development on the urban-rural income gap, and whether there are differences in this impact at the national level and in the east, central, west and northeast regions of China, and the results of the relevant research not only provide a theoretical explanation for the study of the urban-rural income gap from the perspective of the financial employment agglomeration, but also give the analysis of the path of the impact of financial agglomeration on the urban-rural income gap some new empirical Evidence. In addition, narrowing the urban-rural income gap is of practical significance for enhancing the coordination of urban-rural development, promoting the modernization of agriculture and rural areas, and ultimately promoting the common prosperity of urban and rural residents.

## 1.3 Literature review

Scholars at home and abroad generally recognize the role of financial resources and the agglomeration of financial activities in promoting economic growth in the region, but research conclusions on the impact of the urban-rural income gap have not yet been unanimous, and can be summarized in three views.

The first view is that the impact of financial agglomeration on the urban-rural income gap is inverted U-shaped. This is because in the early stage of development, investors with poorer asset profiles are unable to receive services from financial institutions due to monetary constraints and weaker access to information, while on the contrary, investors with better asset profiles are able to participate smoothly and receive value-added, which leads to the increasing income gap between the two types of investors; and after a certain stage of development, inter-institutional competition coupled with the law of diminishing factor rewards will narrow the income gap ( Greenwood & Jovanovic, 1990)<sup>[1]</sup>. Domestic scholars Qiao Haishu and Chen Li (2009), Wang Wenjun (2019), Huayang (2020), Li Dongsen (2020) and other empirical studies of China's county-level regions, prefecture-level cities, the Yangtze River Delta region, etc., have obtained the same conclusion <sup>[2-5]</sup>.

The second viewpoint believes that financial agglomeration widens the gap between urban and rural incomes. This is because financial agglomeration will have different impacts on human capital investment and accumulation of different income groups, which in turn keeps widening the income

gap (Arestis, 2004)<sup>[6]</sup>. As for domestic scholars: Yao Yaojun's (2005) view that the two are positively correlated and have two-way Granger causality<sup>[7]</sup>; Xu Min et al. (2015) used spatial econometrics and applied the SEM spatial error model to come to the same conclusion, and pointed out that the impact of banking agglomeration is most obvious<sup>[8]</sup>.

The third view is that financial agglomeration is conducive to reducing the urban-rural income gap. Clarke and Zou (2006) conducted a study from the perspective of the scale of financial development<sup>[9]</sup>. The study shows that there is a negative correlation between the development of financial agglomeration and the income gap between urban and rural residents; Yang Xuefei (2020) selected the panel data of 283 prefecture-level and above cities in China from 2014-2017, verified that financial agglomeration can reduce the urban-rural income gap through direct and indirect roles, and proposed that there is a moderating effect of the size of the city on the relationship between the two<sup>[10]</sup>; Zhang Liyan (2021) selected the panel data of China's coastal areas from 2001 to 2019, and also obtained the same conclusion<sup>[11]</sup>.

## 1.4 Possible innovations

First, this paper specifically distinguishes between the national and the four major economic regions in the empirical study to examine the overall level and regional heterogeneity of financial agglomeration affecting the urban-rural income gap in China, which is more complete and exhaustive. At the same time, it can more comprehensively and intuitively recognize the specific situation and differences of China's regions under different conditions of economic development and resource endowment.

Secondly, the current research on the status quo of financial agglomeration at the regional level mostly starts from the agglomeration index of securities, insurance, and banking industries, while this paper selects the financial employment agglomeration index for analysis based on the perception of the labor agglomeration perspective in financial agglomeration.

## 2. Model construction

Through the entropy accounting for the level of financial employment agglomeration in the previous section and the consideration of control variables, to more objectively test whether there is an effect, this study constructs a panel data model, specifically:

$$\begin{aligned} \ln gap_{it} = & \alpha + \beta_1 \ln lq_{it} + \beta_2 \ln pgdp_{it} + \beta_3 \ln gov_{it} \\ & + \beta_4 \ln open_{it} + \beta_5 \ln edu_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

In the formula, the subscripts  $i$  and  $t$  denote the province and year;  $\alpha$ ,  $\beta$ ,  $\varepsilon$  are the constant term, regression coefficient, and error term;  $gap$  is the urban-rural income gap;  $lq$  refers to the financial employment agglomeration index;  $pgdp$ ,  $gov$ ,  $open$ , and  $edu$  are the level of regional economic development, the level of governmental policy intervention, the degree of openness to foreign trade, and the level of education, respectively. Among them, the direction and significance of  $\beta_1$  is the focus of this study.

### 3. Indicator selection and data sources

#### 3.1 Selection of indicators

##### 3.1.1 Explanatory variable

Rural-urban income gap: In view of the availability of data and the need for research, this paper adopts the ratio of disposable income per capita of urban and rural residents to measure the urban-rural income gap, which is denoted as the gap. The specific process is equation (2).

$$\text{Urban - rural income ratio} = \frac{\text{per capital disposable income of urban residents}}{\text{rural residents per capita disposable income}} \quad (2)$$

It is generally believed that the closer the ratio is to 1, the more balanced the coordinated urban-rural development of the region is; and vice versa.

##### 3.1.2. Core explanatory variables

Financial agglomeration: The phenomenon of financial agglomeration is on the rise in countries around the world today, and the obvious manifestations of agglomeration include the increase of financial talents in specific regions. Therefore, in this paper, it is meaningful to use the entropy method to measure the financial employment agglomeration index in order to measure the level of financial agglomeration, which is denoted as  $LQ_i$ . The specific process is equation (3).

$$LQ_i = \frac{q_i / \sum q_i}{Q_i / \sum Q_i} \quad (3)$$

The formula  $LQ_i$  indicates the entropy of financial employment location in the region of  $i$ ;  $q_i$  is the total number of employed persons engaged in the financial industry in the region of  $i$ ;  $Q_i$  is the total number of employed persons in the region of  $i$ ;  $\sum q_i$  is the total number of employed persons engaged in the financial industry in our country; and  $\sum Q_i$  is the total number of employed persons in the whole country. It should be noted that the existing labor force statistics and surveys on employed persons by industry are only carried out in the urban area, so in the actual calculation,  $q_i$ ,  $Q_i$ ,  $\sum q_i$  and  $\sum Q_i$  represent the employed persons in urban units of the financial industry in the  $i$  area, the employed persons in urban units of the  $i$  area, the employed persons in urban units of the financial industry in the whole country and the employed persons in urban units of the whole country.  $LQ_i$  The larger the number, the higher the level of financial agglomeration in the  $i$  region; and vice versa.

##### 3.1.3. Control variables

① Level of government policy intervention (gov). A competent government can take multiple measures to strengthen regulation and support through policies and integrated planning, to make urban and rural development synergistic, lasting, and vibrant. This paper measures the level of fiscal expenditure of each region through its share of GDP. Specifically, it is the ratio of local fiscal general

budget expenditure to regional GDP. Generally speaking, the larger the ratio, the smaller the urban-rural income gap, to be analyzed specifically.

② Regional level of economic development (pgdp). The positive effect of economic development on urban and rural income changes cannot be ignored. In this paper, we select the key indicator reflecting economic development, i.e. regional per capita GDP. Generally speaking, the higher the level of regional economic development, the smaller the urban-rural income gap.

③ Education level (edu). The level of regional education is equally closely related to the urban-rural income gap, specifically the number of students enrolled in general higher education institutions. Generally speaking, the higher the level of education in a region, the smaller the urban-rural income gap.

④ Openness to foreign trade (OPEN). The pulling effect of foreign trade on the social and economic development of the region is self-evident. This paper adopts the proportion of total import and export of goods to GDP, specifically the ratio of total import and export of the location of the business unit to the gross regional product. Generally speaking, the higher the degree of openness to foreign trade, the smaller the urban-rural income gap.

### 3.2 Data sources

Based on the research needs, 30 provincial administrative units in China are used as the specific research objects of this paper. In view of the availability and continuity of data, the time span of this paper is 2008-2020. a total of 390 sample observations over 13 years constitute the panel data needed for this study. The raw data are taken from the official website of the National Bureau of Statistics (NBS), and the National Statistical Yearbook from 2008 to 2021. Since the size and unit of the data of each variable are different, logarithms are taken uniformly to eliminate the difference between the data scales and obtain smoother data. In addition, descriptive statistics were performed on the data in the sample after taking logarithms. The results are reported by Table 1.

Table 1: Descriptive Statistics.

variable name	unit (of measure)	sample size	average value	(statistics) standard deviation	minimum value	maximum values
gap	-	390	2.665	0.421	1.845	3.952
lq	-	390	1.037	0.259	0.555	1.846
pgdp	Million dollars per person	390	4.787	2.715	0.97	16.42
gov	-	390	0.254	0.111	0.1	0.758
open	-	390	0.288	0.317	0.008	1.598
edu	all the people	390	85.36	51.35	4.22	249.2

Note: Calculated from Stata16

## 4. Analysis of empirical test results and discussion

### 4.1 Preliminary analysis

This paper uses Stata16 to fit the financial employment agglomeration index and the urban-rural income ratio for 30 provincial administrative units in China from 2008 to 2020, generating a scatterplot Figure 1. Where the horizontal axis denotes the level of financial agglomeration (lnlq), i.e., the core explanatory variable, and the vertical axis is the urban-rural income gap (lngap), i.e., the explanatory variable. By observing the fitted values in Fig 1, it can be found that: as the level of

financial agglomeration (lnlq) increases, the urban-rural income gap (lngap) becomes smaller, i.e., they are negatively correlated. The preliminary conclusion is that financial agglomeration is beneficial in reducing the urban-rural income gap. This conclusion is only obtained from the preliminary treatment, and the OLS mixed regression and two-way fixed effects measurement will be completed later to improve the persuasive power.

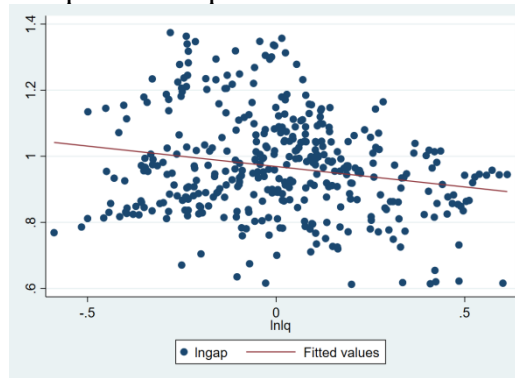


Figure 1: Relationship between financial agglomeration and urban-rural income gap.

#### 4.2 Overall level of analysis

To ensure the robustness of the data results, this paper adjusts the standard errors, and successively adds control variables. Table 2 shows the OLS regression results.

Table 2: OLS regression results.

explanatory variable	Explained variables (lngap)				
	Model (1)	Models (2)	Models (3)	Models (4)	Models (5)
lnlq	-0.1237*** (-4.02)	-0.1598*** (-5.74)	-0.0666*** (-2.67)	-0.0774*** (-3.11)	-0.0672*** (-2.70)
lngov		-0.1676*** (10.61)	0.0984*** (7.81)	0.0575*** (2.60)	0.0103 (0.38)
lnpgdp			-0.1538*** (-12.96)	-0.1499*** (-12.77)	-0.1307*** (-10.06)
lnedu				-0.0287*** (-2.86)	-0.0391*** (-3.93)
lnopen					-0.0271*** (-3.07)
_cons	0.9690*** (126.64)	1.2127*** (47.74)	1.3308*** (57.37)	1.3865*** (56.83)	1.2875*** (29.20)
N	390	390	390	390	390
R <sup>2</sup>	0.0382	0.2242	0.46	0.4705	0.4831

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively; t-values are in parentheses.

Among them, model (1) is the regression result without adding control variables, i.e., only the core explanatory variable financial agglomeration employment index (lnlq). Models (2) to (5) are the regression results after adding the control variables government policy intervention level (lngov), regional economic development level (lnpgdp), education level (lnedu), and openness to foreign trade (lnopen) in turn. From the overall regression results, the regression results of each model after adding the four control variables step by step are generally consistent, and the robustness of the data is good.

From model (5), the empirical results after adding all control variables, it can be found:

Regarding the core explanatory variables, the level of financial agglomeration has a significant negative impact on the urban-rural income gap. Among them,  $p < 0.01$ , which means that the regression result reaches the significance level of 1%, and the degree of explanation of urban-rural income gap is excellent.  $\beta = -0.0672$ , implying that for every 1% increase in the level of financial agglomeration, the urban-rural income gap decreases by 0.0672%. This verifies the results of the preliminary analysis that the continuous pooling of financial resources and factors makes the level of agglomeration increase, which is beneficial to reducing the urban-rural income gap.

### 4.3 Robustness analysis

To further enhance the robustness of the results, this study uses a two-way fixed effects model, while controlling for time and province, for robustness analysis, i.e., model (6). The summary results of model (6) with OLS regression are shown in Table 3.

Table 3: Impact of financial agglomeration on rural-urban income gap.

explanatory variable	Explained variables (lngap)	
	Models (5)	Models (6)
lnlq	-0.0672*** (-2.70)	-0.0268*** (-3.32)
lngov	0.0103 (0.38)	-0.0444*** (-2.59)
lnpgdp	-0.1307** (-10.06)	-0.0568*** (-2.93)
lnedu	-0.0391*** (-3.93)	-0.1082*** (-7.40)
lnopen	-0.0271*** (-3.07)	-0.0160*** (-3.56)
_cons	1.2875*** (29.20)	1.4429*** (24.40)
N	390	390/30
R <sup>2</sup>	0.4831	0.9104

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively; t-values are in parentheses.

The results show that the two-way fixed effects test is robust and significant. The core explanatory variable (lnlq) is significantly negative in both models, i.e., an inverse relationship, consistent with the benchmark results. This further supports that the previous findings are reliable and robust, i.e., the increase in financial employment agglomeration can alleviate the problem of urban-rural income disparity.

### 4.4 Analysis of regional heterogeneity

China is a vast country with some regional differences, so it makes sense to analyze different regions specifically. This study divides the full sample into four major economic regions. The regression results are shown in Table 4.

It can be observed that financial employment agglomeration has a significant negative correlation effect on the urban-rural income gap only in the western region, i.e., the urban-rural income gap can be mitigated using financial agglomeration, and this pulling effect is quite obvious; while the effect

on the urban-rural income gap in the eastern and northeastern regions is not obvious enough. For the East, its level of financial agglomeration is in a leading position. However, at this stage, it has reached a certain scale and tends to be saturated, and the agglomeration effect stably maintains the state of dynamic equilibrium, and the pulling effect on the urban-rural income gap will be weakened accordingly. As for the three northeastern provinces, since 2013, the construction of the financial agglomeration pattern of "Changchun center, one main and many auxiliary" has been launched, which has deepened the financial employment agglomeration of the northeast as a whole, but due to the severe pressure of economic transformation, the mitigating effect on the urban-rural disparity is not yet significant; there is a significant positive effect on the urban-rural income disparity in the central region. There is a significant positive effect on the urban-rural income gap in the central region, probably because the central region is the only one of the four regions with a declining financial employment agglomeration index during the sample period. The lack of positive development of financial employment agglomeration will increase the urban-rural income gap in the region, which is still in line with the previous conclusion. Challenges and opportunities coexist, and the blueprint for the "Rise of Central China" is now in place, with a promising future.

Table 4: Study on the impact of financial agglomeration on rural-urban income gap in four major regions.

explanatory variable	Explained variables (lngap)			
	eastern part	central section	western part	northwest
lnlq	0.0220 (0.67)	0.1285*** (5.88)	-0.0779** (-2.53)	-0.0645 (-1.02)
lngov	-0.0470 (-0.86)	-0.0483* (-1.84)	0.0112 (0.38)	-0.2719*** (-3.01)
lnpgdp	-0.1238*** (-6.39)	-0.0842*** (-7.16)	-0.1974*** (-12.17)	-0.0737* (-1.92)
lnedu	0.0090 (0.56)	-0.0893*** (-4.55)	0.0097 (0.77)	0.1442** (2.39)
lnopen	0.0375** (2.57)	-0.0756*** (-7.77)	-0.0714*** (-6.68)	0.0389 (0.91)
_cons	0.9981*** (13.54)	1.2210*** (20.34)	1.1473*** (26.96)	0.0510 (0.15)
N	130	78	143	39
R <sup>2</sup>	0.2784	0.9059	0.7354	0.8259

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively; t-values are in parentheses.

In short, there are obvious regional differences among the regions of China. The overall results show negative and significance, mainly due to the role of the western region, which is supported by the fact that the absolute value of the coefficients of the core explanatory variables of the overall regression model is smaller compared to that of the west.

## 5. Conclusions

This paper first explains the meaning and measurement methods of financial agglomeration and urban-rural income gap by combing and studying the literature. Secondly, after reviewing the relevant basic theories, it analyzes the influence mechanism of the two. Once again, this paper selects the entropy of financial employment location and urban-rural income ratio as the measurement methods, and examines the current level and characteristics of financial agglomeration and urban-rural income



gap in the sample period (2008-2020) at the spatial level of both countries and regions. Finally, control variables such as the level of government policy intervention, the level of regional economic development, the level of education, and the degree of openness to foreign trade are introduced, and a panel data model is comprehensively constructed and used to conduct regression analysis on the sample, and passes the robustness test. In addition, this paper empirically tests the regional heterogeneity of the four regions from the regional level. The main research conclusions are as follows:

(1) Looking at the current state of financial agglomeration and the urban-rural income gap: the level of financial employment agglomeration varies among the four major regions. The level of agglomeration in the country as a whole and in the eastern, western, and north-eastern regions has improved steadily, but there is still room for development. The concentration of financial employment in the central region has not developed positively, which may be one of the reasons preventing the income gap between urban and rural residents from easing; the income gap between urban and rural residents in all regions has been steadily improving and narrowing during the period under review, but the problem of income disparity is still serious, and there are some differences between regions, provinces, and municipalities.

(2) From the empirical tests: at the national level, the increase in the level of financial employment agglomeration can effectively alleviate the problem of the urban-rural income gap; at the regional level, there are obvious regional differences among regions. Among them, the effect of financial employment agglomeration on the urban-rural income gap in the eastern and northeastern regions of China is not yet obvious; the development of financial employment agglomeration in the central region has widened the urban-rural income gap; and financial employment agglomeration has significantly narrowed the urban-rural income gap in the west.

Therefore, based on the research content above, this part tries to put forward policy recommendations for further alleviating the urban-rural income gap in China from three aspects.

First, the development of financial clustering should be tailored to local conditions. As a major trend, the four regions of China should rationally view the role of financial clustering. Relevant policies should grasp the current situation of each region and be based on the actual situation, so that the problem of urban-rural income disparity can be alleviated. For the eastern region, the scale of financial agglomeration, the deepening degree of China's first, in terms of policy should be more focused on the efficiency of its development; "the rise of central China" blueprint has appeared, in terms of policy should be actively guided by the inflow of financial resources, talents; the three northeastern provinces of the financial foundation is better, the number of employment growth is leading, it should be fully implemented. The three northeastern provinces have a better financial foundation and a leading increase in employment, and should fully implement the series of innovative policies for the construction of the financial agglomeration pattern of "Changchun Center, One Main and Multiple Subsidiaries", to promote the stable and qualitative development of financial agglomeration; and the western part of the country, which has a better level of financial and employment agglomeration, should give full play to its agglomeration power in terms of policy, and promote the high-quality synergistic development of urban and rural areas, to alleviate the pressure of income disparity.

Secondly, we should return to our roots and narrow the gap between urban and rural areas. The urban-rural gap is a problem that cannot be completely avoided and is far-reaching. Therefore, it is also a good methodology to consider the root of the problem, that is, to look at the needs of the problem at its most basic level. Policies to improve rural infrastructure such as roads, water conservancy and transportation, and to implement basic protection for rural migrant workers such as medical care and pensions, although clichéd, should not be ignored.

Thirdly, we should pay attention to the revitalization and development of rural areas in accordance

with local conditions. From the mechanism of influence between the two, it can be noted that financial resources and factors tend to flow to advanced regions at the expense of the more backward rural areas. Therefore, based on the actual situation, it is possible to actively guide financial resources and factors to converge in rural areas by formulating and refining relevant policies. For example, within a reasonable range, rural areas should be given a certain degree of preference in terms of access to credit, authorization and approval, and stable targeted assistance should be effectively completed and maintained.

## Author Contributions

Study design, Xuelong Wang and Nana Li.; data processing, Xuelong Wang and Lili Zhu; statistical analysis, Xuelong Wang and Shunyu Wang; writing—review and editing, Xuelong Wang and Shuhan Yang . All authors have read and agreed to the published version of the manuscript.

## Acknowledgement

Anhui Institute of Vocational Technology School-level Philosophy and Social Science Research Project; Research on the Impact of Financial Agglomeration on Rural-Urban Income Gap; Project No.: 2023XJZS08

Key Project of Philosophy and Social Science in Universities of Anhui Province; Research on the Impact of Digital Trade Level on the High-Quality Development of Its Economy in Anhui Province; Project No. 2023AH051421

2022 Anhui Provincial Research Preparation Plan Project Provincial Key Project; Research on the Innovation of New Professional Farmer Cultivation Mode under the Strategy of Rural Revitalization; Project No.: 2022AH052032

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