The influence of inclusive finance on the income gap between urban and rural residents

Binghui Wu1,*, Chenlu Li1,2, Tingting Duan3 and Wenlong Miao1

1 International Business School, Shaanxi Normal University, Xi’an, China
2 School of Economics, Nankai University, Tianjing, China
3 School of Marxism, Northwestern Polytechnical University, Xi’an, China

*Corresponding author e-mail: vcmd@163.com

Abstract. On the basis of China’s dual structure of urban and rural economy, this paper constructs the inclusive financial index, which contains eight sub-indexes coming from the demand and supply of financial service. And then we analyse the influence of inclusive finance on the income gap between urban and rural residents using the panel data model. The results show that (1) a negative correlation is found between the developmental level of inclusive finance and the urban-rural income gap; (2) under the influence of inclusive finance, the acceleration of economic growth narrows the income gap between urban and rural areas; and (3) the increase of government expenditure causes the income gap between urban and rural areas owing to the characteristic of financial expenditure structure.

1. Introduction

Since reform and opening up in China, the income level of residents has increased rapidly, but the income gap is growing, especially between urban and rural areas. From 2002 to 2010, urban residents had over three times disposable incomes than rural residents. During this period, the income ratio between urban residents and rural residents reached a maximum, 3.33. In recent years, although the income growth is higher in rural areas, the income ratio still maintains a high level. The long-standing imbalance of incomes between urban and rural residents possible affect the sustainable economic development in China. Under this background, the Chinese government has enacted a series of policy measure to support farmers and other vulnerable groups, in order to increase their disposable incomes. Especially in the field of finance, many scholars have noticed that inclusive finance has an important role in reducing financial repression with the rise of conception of inclusive finance [1].

In 2005, the United Nations presented the concept of inclusive finance for the first time [2]. By the implementation of inclusive finance, vulnerable groups can obtain the required financial service with acceptable costs [3]. And the important service objects of inclusive finance mainly include small and medium enterprises and people with low incomes. In the traditional financial system, it is difficult to acquire quality financial resources and services for lower income group and small enterprise having poor credit qualities [4]. Moreover, the access thresholds of traditional finance make lower income groups and small enterprises difficult to obtain funds through the financial service platform [5]. Therefore, the income gap between urban and rural residents is further widen. But the development of inclusive finance can effectively lower the threshold of financial services, and make lower income groups and small enterprises obtain the required funds.
At present, inclusive finance is not only a theoretical focus for scholars, but also a development strategy for governments. The development of inclusive finance has great theoretical and practical significance in the aspect of eliminating individual poverty and relieving the financing dilemma of small and medium-sized enterprises [6]. Therefore, this paper analyses the influence of inclusive finance on the income gap between urban and rural residents by using an inclusive financial index, which is based on the demand and supply of financial service in China’s dual structure of urban and rural economy. And finally, we propose the development suggestions of inclusive finance. The remaining contents in this paper are divided into the following parts. Section 2 shows the measure of inclusive financial index. Next, the empirical analysis is arranged into section 3. Finally, some conclusions are proposed in section 4.

2. The measure of inclusive financial index

2.1. The selection of indexes

Due to the characteristics of China’s dual structure of urban and rural economy, we choose eight indexes from two different perspectives - the demand and supply of financial service, to establish the inclusive financial index [7]. The first dimension is the availability of financial service, coming from the perspective of supply. We use two indexes to measure this dimension, which are the permeability of financial professionals and the permeability of financial branches. The second dimension is the use of financial service, coming from the perspective of demand. For inclusive financial system, it is not enough that financial institutions provide financial services. Urban and rural residents are also required to involve in financial activities. This paper chooses four indexes to measure the use of financial services, which are deposit, loan, insurance and security. Specific measurement methods can be seen in table 1.

| Dimensions              | indicators                                      | The meaning of indicators                                      |
|-------------------------|-------------------------------------------------|----------------------------------------------------------------|
| The availability of     | The permeability of financial branches          | The number of financial branches per ten thousand square       |
| financial service       |                                                  | kilometres                                                    |
|                         | The permeability of financial professionals    | The number of financial professionals per ten thousand square  |
|                         |                                                  | kilometres                                                    |
| The use of financial    | Deposit                                         | The percentage of dispose per capita from GDP per capita       |
| service                 | Loan                                            | The percentage of loan per capita from GDP per capita          |
|                         | Insurance                                       | The insurance density: the ratio of premium income to           |
|                         |                                                 | population size.                                               |
|                         | Security                                        | Insurance penetration: the ratio of premium income to GDP      |

Because above indicators have different dimensionalities, it is impossible to calculate the contribution rate of indicators towards inclusive financial index. Thus, this paper introduces appropriate weights into inclusive financial index, and adopts variance coefficient method to build inclusive financial index [8]. The first step is to determinate coefficient of variation (written as $V$), which is a ratio of standard deviation (written as $\sigma$) to mean value (written as $\bar{X}$). So, the coefficient of variation can be represented as $V_{ij} = \frac{\sigma_{ij}}{\bar{X}_{ij}}$ for each indicator, and $V_i = \frac{\sigma_i}{\bar{X}_i}$ for each dimension. In table 1,
the sequence of dimension is expressed as $i, i \in [1,2]$; and the sequence of indicator is expressed as $j, j \in [1,9]$. The second step is to determinate the weight of each indicator (written as $w_i$), which is calculated by the expression $w_i = \frac{v_i}{\sum_{i=1}^{m} v_i}, w_i \in [0,1]$. The increase of $w_i$ shows that the i-th dimension has a bigger impact on the development of inclusive finance. In order to unify all indicators, we convert all data to the new parameters between 0 to 1. Suppose that $d_{ij}$ is a processed indicator based on an original indicator, and $A_{ij}$ is an actual observation reflecting the inclusive level of financial service. A larger value of $A_{ij}$ means a higher inclusive level of financial service. In all actual observations, $\min_{ij}$ and $\max_{ij}$ represent the minimum and maximum values, respectively. Thus, $d_{ij}$ can be written as expression (1). If $A_i = \min_i$, $d_i = 0$. In this case, the development level of inclusive finance is the lowest. Conversely, If $A_i = \max_i$, $d_i = 1$. And, the development level of inclusive finance is the highest.

$$d_{ij} = \frac{A_{ij} - \min_{ij}}{\max_{ij} - \min_{ij}} \quad (1)$$

According to the above indicators, we adopt Euclidean distance algorithm to construct the inclusive financial index, abbreviated to IFI. And IFI is written as expression (2).

$$IFI = 1 - \sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + \ldots + (w_i - d_i)^2} \sqrt{w_1^2 + w_2^2 + \ldots + w_i^2} \quad (2)$$

### 2.2 China's inclusive financial index

Considering the availability of data, this paper chooses the regional panel data between 2009 to 2016, to calculate the inclusive financial index of southeast region, midland region, west region and northeast region. The separation of geographic regions is based on “China’s regional financial operation report”, published by China finance press. The all sample data come from “China’s regional financial operation report”, “China’s Financial Yearbook”, “China’s Insurance Yearbook” and “China’s Statistical Yearbook”, respectively. Table 2 shows the weight value of each indicator, $w_i$.

| Dimensions                        | The meaning of indicators                                      | Indicator number | $w_i$  |
|----------------------------------|----------------------------------------------------------------|------------------|--------|
| The availability of financial service | The number of financial branches per ten thousand square kilometres | 1                | 0.2548 |
|                                   | The number of financial professionals per ten thousand square kilometres | 2                | 0.3517 |
|                                   | The number of financial branches per ten thousand persons      | 3                | 0.0283 |
|                                   | The number of financial professionals per ten thousand persons | 4                | 0.0545 |
| The use of financial service      | The percentage of dispose per capita from GDP per capita        | 5                | 0.0695 |
|                                   | The percentage of loan per capita from GDP per capita           | 6                | 0.0557 |
|                                   | The insurance density: the ratio of premium income to population size | 7                | 0.1382 |
|                                   | Insurance penetration: the ratio of premium income to GDP       | 8                | 0.0473 |
|                                   | The ratio of equity finance to GDP                              | 9                | 0.0769 |

Table 2. The weight value of each indicator
In Table 2, indicator 1 and 2 have the larger weights, combined for 60.65% of total weights. This indicates that indicator 1 and 2 are two most important factors for inclusive financial index, relative to others indicators. Based on the weight value of each indicator in Table 2, the inclusive financial index of different regions can be calculated and shown in Table 3.

Table 3. The inclusive financial index of different regions

| Region            | Year       |       |       |       |       |       |
|-------------------|------------|-------|-------|-------|-------|-------|
|                   | 2009       | 2010  | 2011  | 2012  | 2013  | 2014  |
| Southeast region  | 0.2623     | 0.2561| 0.2592| 0.2627| 0.2707| 0.2794|
| Midland region    | 0.1542     | 0.1592| 0.1658| 0.1703| 0.1778| 0.1784|
| West region       | 0.1383     | 0.1440| 0.1540| 0.1531| 0.1616| 0.1638|
| Northeast region  | 0.1430     | 0.1520| 0.1547| 0.1580| 0.1643| 0.1677|
|                   | 0.1440     | 0.1490| 0.1531| 0.1616| 0.1638| 0.1666|
|                   |            | 0.1490| 0.1531| 0.1616| 0.1638| 0.1693|
|                   |            |       |       |       |       |       |
|                   |            |       |       |       |       |       |

From 2009 to 2016, the inclusive financial index of four regions show the states of constant increase. Such states reflect that inclusive finance are progressing steadily. In the transverse comparison, the results show that a large gap exists in above regions. The inclusive financial index of southeast region is largest, and the inclusive financial index of west region is smallest. In addition, the inclusive financial index of midland region is larger, relative to northeast region.

3. The empirical analysis

3.1. Variables

The variables are divided into four types: the explained variable, the explaining variable and the control variable. Firstly, the explained variable is assumed the ratio of urban income to rural income, denoted by Y. Secondly, the explaining variable is assumed the inclusive financial index, denoted by IFI. Finally, the control variable contains the level of economic development, the speed of economic growth, the degree of poverty reduction and the degree of government investment. Table 4 shows all control variables. According to “Regional Financial Report”, “China Statistical Yearbook” and Wind database, the descriptive statistics of above variables are shown in Table 5.

Table 4. The descriptions of control variables

| Control variables                  | Characters | Measurement approach               |
|-----------------------------------|------------|-----------------------------------|
| The degree of government expenditure | GOV        | The proportion of financial expenditure in GDP |
| The speed of economic growth      | ZGDP       | The growth rate of GDP             |
| The level of economic development | PGDP       | GDP per capita                     |
| The degree of poverty reduction   | EC         | Engel coefficient                  |

In Table 5, the mean value of Y is 2.709794. It indicates that the income gap between urban and rural residents is extremely obvious and unbalanced. The standard deviation of GOV and ZGDP are respectively 0.052299 and 0.05607, which reflect small differences in the degree of government investment and the speed of economic growth. As the maximum and minimum of IFI are respectively 0.270700 and 0.144000, the development level of inclusive finance has obvious differences in different regions. Besides, the statistical descriptions of IFI show that inclusive finance has a big development space in China. EC is usually used to reflect the poverty degree of a country. If 0.3<EC<0.4, a country is in an affluent level. And if 0.4<EC<0.5, a country is in a poor level. The maximum and minimum of EC are 0.430000 and 0.345000 in Table 5, which indicate that the economic development is in a transition phase from the primary stage of well-off level to the advanced
phase of affluence level. Finally, the numerical value of PGDP fluctuates in a wide range from 22456.96 to 62140.57, and reflects a larger economic difference in different regions.

### Table 5. The statistical descriptions of variables

| Statistical description | Variables | Y      | GOV    | ZGDP   | IFI    | EC     | PGDP     |
|-------------------------|-----------|--------|--------|--------|--------|--------|----------|
| Mean value              |           | 2.709  | 0.203  | 0.154  | 0.185  | 0.392  | 37132.91 |
| Medium value            |           | 2.586  | 0.197  | 0.157  | 0.163  | 0.392  | 34083.00 |
| Maximum                 |           | 3.458  | 0.284  | 0.235  | 0.271  | 0.430  | 62140.57 |
| Minimum                 |           | 2.288  | 0.130  | 0.080  | 0.144  | 0.345  | 22456.96 |
| Standard deviation      |           | 0.407  | 0.052  | 0.056  | 0.047  | 0.023  | 11257.29 |
| Skewness                |           | 0.580  | 0.246  | 0.063  | 1.066  | -0.234 | 0.693    |
| Kurtosis                |           | 1.878  | 1.906  | 1.384  | 2.300  | 2.478  | 2.583    |

3.2. *The empirical analysis*

This paper uses the explained variable, the explaining variable and the control variable to build the fixed effect model, which is shown by expression (3).

\[ Y_{i,t} = \beta_0 + \beta_1 IFI_{i,t} + \beta_2 CON_{i,t} + \mu_{i,t} \]  

In above expression, the control variable is expressed as \( CON_{i,t} \) and the stochastic disturbance is notated as \( \mu_{i,t} \). The empirical result shows that the fitting effect of panel model is good. In table 6, the coefficient of determination, \( R^2 \) is 0.8307. The explained variable, \( Y_{i,t} \) can be explained by the explaining variable, \( IFI_{i,t} \) and the control variable \( CON_{i,t} \). Starting from 2012 to 2015, the coefficient of IFI was negative and reduced year by year. This indicates that the income gap of residents is narrowed with the increase of inclusive financial index.

### Table 6. The empirical results of panel model

| Variable | Coefficient | Standard deviation | T-statistic | P value |
|----------|-------------|--------------------|-------------|---------|
| C        | 4.549991    | 1.589081           | 2.863284    | 0.0087  |
| GOV      | 6.830026    | 2.012259           | 3.394209    | 0.0079  |
| ZGDP     | -20.18114   | 10.17310           | -1.983775   | 0.0786  |
| PGDP     | -5.041132   | 1.913547           | -2.636619   | 0.0271  |
| IFI–2012 | -7.248218   | 4.653171           | -1.557694   | 0.0537  |
| IFI–2013 | -12.05645   | 4.956025           | 2.432686    | 0.0378  |
| IFI–2014 | -14.55416   | 5.723322           | 2.542957    | 0.0316  |
| IFI–2015 | -15.69174   | 7.218870           | 2.173711    | 0.0578  |

In addition, GOV is positive in table 6. This means that the income gap of residents will be further expanded with the increase of GOV. The possible cause for the result relates to the
financial expenditure structure. If financial expenditure centres on rural regions, rural residents’ incomes will rise. However, if financial expenditure centres on urban regions, the urban residents will obtain higher incomes. As local governments pay more attentions to the goal of economic growth, the urban construction always gains more supports in financial expenditure. Thus, the income growth of urban residents is faster, compare with rural residents.

Finally, both ZGDP and PGDP are negative. The increase of GDP or GDP per capita can reduce the income gap between urban and rural residents according to the results in table 6. In a word, the positive effects of inclusive finance on economic growth mainly performs the following: (1) the development of inclusive finance promotes the rising of resident savings, and then the increase of credit funds promotes total social investment and economic growth; (2) the development of inclusive finance can optimize the disposition of resource and accelerate the capital accumulation; (3) the development of inclusive finance can perfect financial service system and improve the efficiency of economic operations.

4. Conclusions

This paper analyses the influence of inclusive finance on the income gap between urban and rural residents. Based on the calculation of inclusive financial index, the results show the development of inclusive finance is extremely unbalanced in China. In the southeast region, the development level of inclusive finance is highest. On the contrary, the development level of inclusive finance is lowest in the west region. In addition, urban and rural residents can obtain more financial services in midland region rather than northeast region. In addition, the empirical analysis indicates that a negative correlation between the inclusive finance index and the urban-rural income gap. With the development of inclusive finance, the urban-rural income gap can be narrowed. In the inclusive finance system, economic growth contributes to narrow the income gap. However, considering the characteristic of financial expenditure structure, the increase of financial expenditure probably widens the income gap. In order to promote the development of inclusive finance, corresponding countermeasures are summarized as follows. Firstly, governments should deepen the reform of the economic system and optimize the financial expenditure structure. Secondly, based on the differences of regional economies, the depth and breadth of financial service should be further increased. Thirdly, financial service should be developed in rural regions by means of internet finance.

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