
Analysis of Inclusive Financial Development and Poverty Governance in Eastern, Central and Western China

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Abstract: Current problem of tackling poverty in China has been effectively solved, and the scale of the poor has been greatly reduced. However, the task of achieving comprehensive poverty alleviation across the country in 2020 remains daunting. Financial poverty alleviation strategies, especially vigorously developing inclusive finance is one of the effective ways to achieve comprehensive poverty alleviation. This paper aims to test whether inclusive finance policies has positive effects on our poverty alleviation work. We select nine provinces panel data, constructing the inclusive financial index in three dimensions: financial support, permeability, and accessibility. Based on the calculated inclusive financial index, this paper establishes a regression with income poverty, educational poverty and medical poverty as explained variables, inclusive financial index as explanatory variable, and control variables such as economic growth, local education level, and local medical level. The results show that the level of inclusive financial development has a significant positive impact on the income poverty. However, when it comes to educational and medical poverty alleviation, the improvement of the inclusive financial level in a short period does not reflect obvious promotion effects, but has negative impacts. Finally, we suggest the government that continuously improve the accessibility of inclusive financial services; increase the distribution of outlets of inclusive financial institutions, specifically by adding inclusive financial institutions, ATMs, financial poverty alleviation service stations, etc.; and constantly improve financial infrastructure to better provide financial services and improve the availability of inclusive financial services.

Keywords: Inclusive Finance, Inclusive Financial Index, Poverty Alleviation

1. Introduction

With the solid advancement of the government's precise poverty alleviation work, the proportion of poor people in China is gradually decreasing. According to the *UN Millennium Development Goals Report 2015*, the proportion of China's extremely poor people fell from 61% in 1990 to less than 30% in 2002, which was halved. In 2014, the proportion fell to 4.2%, and China's contribution to global poverty reduction exceeded 70%. It can be seen that the current problem of tackling poverty in China has been effectively solved, and the scale of the poor has been greatly reduced. However, up to 2018, there are still more than 300 deep poverty-stricken counties and more than 31000 deep-poor villages in China. The poor people in these deep-poor areas are more difficult to get rid of poverty. The investment in precision poverty alleviation has further aggravated the national financial burden. Therefore, the task of achieving

comprehensive poverty alleviation across the country in 2020 remains daunting.

As an important method to effectively promote poverty alleviation in China, financial poverty alleviation plays a major role. At present, the focus of China's financial poverty alleviation is to increase the availability of public financial services. The development of inclusive finance can not only reduce the financial burden, but also has a great equitable effect on poverty alleviation funds. In *2017 Government Work Report*, it is clearly stated that we should vigorously develop inclusive finance, guarantee that all market players, especially the poor and vulnerable groups, can enjoy inclusive financial services. The State Council pointed out the general idea of developing inclusive finance in *Promoting Inclusive Financial Development Plan (2016-2020)*, emphasizing the important role of financial poverty alleviation. Governments of various provinces, autonomous regions, and municipalities directly under the Central Government should give full play to

strengthen the public's awareness of financial education and rights protection. The combination of precise poverty alleviation and inclusive finance will help provide better financial services to vulnerable groups, help deepen financial service reform, and promote economic development in poor areas. In this sense, it is necessary to discuss and analyze the development of inclusive finance and China's precision poverty alleviation.

The concept of inclusive finance was proposed by the United Nations in 2005, which refers to financial institutions providing financial services to groups with financial needs at a lower and affordable cost, especially for small and micro enterprises and low-income people. Inclusive finance is regarded as an important method that can effectively alleviate local poverty, achieve social equity, and promote economic growth. The Chinese government promulgated several documents to promote the development of inclusive finance such as *Promoting Inclusive Financial Development Plan (2016-2020)* and *Notice on Printing and Distributing the Implementation Plan for the Integral Financial Business Unit of Large and Medium-sized Commercial Banks*. In recent years, Chinese government has vigorously developing inclusive finance, and its effect on poverty alleviation will be discussed in this paper.

2. Literature Review

For the development of inclusive finance to efficaciously promote poverty governance, domestic and foreign scholars have conducted in-depth research on ways to alleviate poverty.

Burgess and Pande (2005) [1] empirically analyzed the data of rural banks in rural India and found that increasing the number of banks in rural areas can significantly reduce the incidence of rural poverty. Claessens and Feije (2006) [2] pointed out that increasing the availability of financial services, through the provision of inclusive financial services such as micro finance, will enable the poor to directly participate in more financial activities, which will increase their expected income and reduce poverty. Zhang Lijun and Zhan Yong (2006) [3] used China's 1994-2004 time series data and 2004 cross-sectional data, and found that micro finance can effectively increase the income of farmers and reduce poverty levels. Imai et al. (2010) [4] analyzed panel data at the household level in India, they pointed out that 40% of all poverty reductions in India's micro finance project operations were attributed to micro finance. Dupas and Robinson (2013) [5] did an analysis of bank data in poor areas of Kenya and found that an increase in the bank's effective account can lead to an increase in consumption and income levels. Cui Yanjuan and Sun Gang (2012) [6] did empirical tests on panel data of

Chinese provinces from 1978 to 2010, pointing out that the development of financial level can effectively promote economic growth, optimize income distribution, and improve the income level of low-income people. Su Jing (2013) [7] used panel smooth transition model to empirically analyze the poverty reduction effect of rural informal financial development in China. She pointed out that rural informal financial development had certain influence on rural poverty incidence, poverty depth and poverty intensity. Chen Mingyin (2017) [8] did an empirical test of 494 farmer households to explore the development status of inclusive finance in rural areas of China and its impact on alleviating poverty. The results showed that inclusive financial development can effectively alleviate poverty in rural areas of China. In addition, there are some opposing views. For example, Roodman and Morduch (2009) [9] stated that the poverty reduction effect of micro finance services was not obvious through the study of Bangladesh data.

As for the estimation of inclusive finance level, there has been a lot of research on this field. Beck (2008) [10] first proposed an indicator to measure the level of inclusive finance. Hereafter, Sarma (2011) [11] established the Inclusive Financial Index, referred to as IFI, and proposed three dimensions: geographic penetration, product contact, and utility. Arora (2010) [12] described the level of inclusive finance development in terms of the scope of banking services, the convenience of services, and the cost. Gupte et al. (2012) [13] argued that Sarma's inclusive financial index ignores the convenience and cost of financial services. Arora's inclusive financial development level measurement system ignores the utility of financial services. Therefore, according to Indian social condition, he designed a combination with four dimensions: service scope, utility, service convenience, and transaction cost.

The domestic scholars' measurements of the development level of inclusive finance mostly draws on the three dimensions of Sarma's construction. The selected indicators focus on the general financial service system, macroeconomic and social development, and infrastructure conditions. In general, we will measure the penetration with indicators such as the number of financial institutions per unit area and the number of financial employees per unit area; measure the contact ability with indicators such as the per capita deposit balance and per capita loan balance; measure the utility with indicators such as the proportion of financial institutions' deposits to GDP and the ratio of financial institution loans to GDP. We summarize the recent domestic researches about inclusive financial measurement, which is shown in the following table.

Table 1. Measurements of Inclusive Finance from Existing Literature.

Authors	Year	Indicators or Dimensions
Liu Ming and Liu Zhen [14]	2014	Ratio of per capita loans to per capita net income, proportion of rural loans, ratio of enterprise loans to total corporate loans.
Wang Xiuhua [15]	2014	Permeability, utility, affordability.
Jiao Wei, Huang Tingting, Wang Tiandu [16]	2015	Financial service usage, availability, service quality.
Yu Xiaohong and Lou Wengao [17]	2016	Financial and micro finance loans for the number of small financial institutions per 10,000

Authors	Year	Indicators or Dimensions
He Xuesong and Kong Rong [18]	2017	population, number of employees in small rural financial institutions per 10,000 population, loan balance of micro finance companies, loan balance of financial institutions.
Zhang Yu and Zhao Min [19]	2017	Breadth and depth.
Li Mingxian and Tan Sichao [20]	2018	Rural credit cooperatives to account for the use of rural financial services
		Permeability, accessibility, utility.

3. Models and Methodology

3.1. Inclusive Financial Index Indicator Selection

Based on methods from existing literature, considering data availability and the quantifiable indicators, this paper constructs the IFI index from three dimensions: financial support, permeability, and accessibility. So far, no scholar has taken local financial support into consideration when they establish their inclusive financial index.

In 2018, the central government issued a special fund of 10 billion yuan for inclusive financial development, with an increase of 2.3 billion yuan over 2017, rising by about 29.85%. After the central fiscal special fund is allocated, local governments will be further urged to pay close attention to policy implementation, strengthen performance management, and continuously improve the efficiency of capital use. It is obvious that the support of the Chinese government for the inclusive financial industry is gradually strengthening.

Therefore, in terms of Financial Support dimension, we choose the ratio of financial fiscal expenditure to population and the ratio of financial fiscal expenditure to total fiscal expenditure to represent.

Permeability is mainly considered from the per capita financial service occupancy. According to the representativeness and availability of the data, this paper selects the number of financial outlets per capita, financial outlets density at unit area, the proportion of financial personnel, and number of financial employees per unit as the consideration data.

Accessibility is mainly based on the actual effects obtained by inclusive finance in various regions. This paper selects the per capita deposit balance, per capita loan balance, insurance density, insurance depth, the ratio of local and foreign currency deposit balance to GDP, and the ratio of local currency loan balance to GDP. Indicators measure the level of financial development in the region.

Table 2. Indicators of Inclusive Finance.

Dimension	Indicator	Unit	Description	Effect
Financial Support	Financial Fiscal Expenditure	Billion / 100,000	Financial Fiscal Expenditure/Population	Positive
	Proportion of Financial Fiscal Expenditure	%	Financial Fiscal Expenditure/Total Fiscal Expenditure	Positive
	Financial Outlets	/person	Number of Financial Outlets/Population	Positive
Permeability	Financial Outlets Density	/km ²	Number of Financial Outlets/Acreage	Positive
	Financial Personnel	/10,000	Financial Personnel/Total Number of Employed Persons	Positive
	Financial Employees	/km ²	Number of Financial Employees /Acreage	Positive
	Balance of local Currency Deposits	%	Balance of Local Currency Deposits /GDP	Positive
Accessibility	Balance of Local Currency Loans	%	Balance of Local Currency Loans /GDP	Positive
	Insurance Density	Yuan/person	The Average Amount of Insurance Premium for Permanent Residents in the Region	Positive
	Deposit Balance	Yuan/person	Deposit Balance/Population	Positive
	Loan Balance	Yuan/person	Loan Balance/Population	Positive

3.2. Inclusive Financial Index Calculation

Since each dimension contains multiple metrics, we set the same weight for each metric so as to simplify the calculation, setting:

$$X_i = (X_{i1} + X_{i2} + \dots + X_{in})/n \quad (1)$$

Where, i denotes the dimension, n denotes the index for each dimension. So in this study:

$$\begin{aligned} X_1 &= X_{11} \\ X_2 &= (X_{21} + X_{22} + X_{23} + X_{24} + X_{25})/5 \\ X_3 &= (X_{31} + X_{32} + X_{33} + X_{34})/4 \end{aligned} \quad (2)$$

In order to eliminate the dimensional difference between

the indicators, We do the following step for each dimension:

$$d_i = \frac{X_i - m_i}{M_i - m_i} \quad (3)$$

Where, M_i is the largest positive integer less than the smallest of the dimensions, m_i is the smallest positive integer greater than the maximum in each dimension. Therefore, the dimension value after dimensionless should be between 0 and 1.

Combining the measured values of the dimensions after dimensionless processing with the most ideal Euclidean distance, the formula for calculating the development level of inclusive finance is obtained:

$$IFI = 1 - \sqrt{\frac{w_1^2(1-d_1)^2 + w_2^2(1-d_2)^2 + w_3^2(1-d_3)^2 + \dots + w_n^2(1-d_n)^2}{w_1^2 + w_2^2 + w_3^2 + \dots + w_n^2}} \tag{4}$$

In view of the fact that only three dimensions are involved in this paper, the inclusive financial coefficient formula can be expressed as:

$$IFI = 1 - \sqrt{\frac{w_1^2(1-d_1)^2 + w_2^2(1-d_2)^2 + w_3^2(1-d_3)^2}{w_1^2 + w_2^2 + w_3^2}} \tag{5}$$

w_i in formula (5) indicates the weight of each dimension, which is the key to calculate the inclusive financial coefficient, calculated by the coefficient of variation. The basic principle of the so-called coefficient of variation method is that if the coefficient of variation of a dimension indicator is larger, it has a stronger ability to measure the difference of the problem, and should give this dimension a

larger weight. Conversely, if the coefficient of variation of the dimension is smaller, it is given a smaller weight. The formula is:

$$V_i = \frac{S_i}{X_i}, \quad w_i = \frac{V_i}{\sum_{i=1}^n V_i} \tag{6}$$

X_i represents the average of each dimension, S_i is the standard deviation and V_i is the coefficient of variation.

As shown in Table 3, through the above formulas, we measured the inclusive financial coefficients of the selected nine provinces.

Table 3. Inclusive Financial Coefficients.

Area	Province	2012	2013	2014	2015	2016	Average
Coastal Developed Areas	Shanghai	0.2543	0.2715	0.3085	0.3141	0.3239	0.3563
	Zhejiang	0.3591	0.3641	0.3742	0.3777	0.3811	
	Shandong	0.3139	0.3227	0.3410	0.3531	0.3639	
Centrally Developed Regions	Hubei	0.2969	0.2972	0.3164	0.3264	0.3333	0.3425
	Hunan	0.3066	0.3136	0.3215	0.3277	0.3327	
	Shanxi	0.3056	0.3142	0.3280	0.3374	0.3614	
West Poor Regions	Gansu	0.2532	0.2588	0.2715	0.2910	0.2966	0.2739
	Qinghai	0.2527	0.2590	0.2640	0.2690	0.2775	
	Xinjiang	0.2285	0.2319	0.2388	0.2366	0.2476	
	Average	0.2856	0.2926	0.3071	0.3148	0.3242	

It can be seen from Table 3 that in 2012, the highest level of inclusive financial development among the nine provinces was in Zhejiang Province, and the inclusive financial coefficient was 0.3591. The lowest was 0.2285 in Xinjiang Uygur Autonomous Region. By 2016, the province with the highest level was still in Zhejiang Province. At this time, the IFI coefficient reached 0.3811. Similarly, the Xinjiang Uygur Autonomous Region is still at the lowest levels, and the IFI coefficient is 0.2476. On average, the overall level of inclusive finance in the nine regions shows an increasing trend during the selected time periods, from 0.2856 in 2012 to 0.3242 in 2016, by approximately 14%. It is worth noting that China's central and local governments made a great contribution to the vigorous development of inclusive finance. Among the above nine regions, the development level of inclusive finance in the eastern, central and western regions is obviously stepped, with the best development in the east, followed by the central and the western region.

3.3. Regression Model Construction

In view of the multifaceted results of poverty governance, in order to explore the impact of inclusive financial development on poverty reduction, this paper also introduces the panel models with control variables such as economic

growth, local education level, and local medical level:

$$I_{it} = \alpha_0 + \alpha_1 IFI_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 E_{it} + \alpha_4 M_{it} + \varepsilon_{it} \tag{7}$$

i denotes each selected area and t represents year. $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are coefficient terms. IFI is the inclusive financial coefficient. $\ln GDP$ is the logarithm of the local GDP. E represents the proportion of education expenditure in the province's total fiscal expenditure. M stands for the proportion of medical expenditure in the province's total fiscal expenditure. ε is the random error term. Dependent variable I represents the poverty alleviation coefficient of each province. As we know, poverty alleviation contains a lot of content. In addition to the most intuitive income poverty alleviation, this paper will consider educational and medical care poverty alleviation. In terms of income poverty, this paper selects the logarithm form of per capita disposable income of residents as the basis for consideration, so that the data is more stable. In the aspect of educational poverty alleviation, this paper chooses the ratio of teachers and students in ordinary high school as representative variable. We also select health technicians per thousand people to represent medical poverty alleviation.

3.4. Analysis of Regression Results

Table 4. Regression Results.

Variables	Model 1	Model 2	Model 3
IFI	20930.39*** (3651.79)	-4.77** (1.89)	2.07*** (0.74)
lnGDP	6772.26*** (2391.79)	-0.44 (0.48)	0.40 (0.28)
Fiscal Education Expenditure	-30829.14* (15910.48)	3.87 (8.80)	-6.98** (3.34)
Fiscal Medical Expenditure	-97233.30** (49092.79)	15.95 (23.16)	18.68* (9.87)
Cons	-40585.19 (22371.91)	17.91 (3.96)	1.21 (2.52)
R ²	0.8791	0.3495	0.7925

Note: Standard deviations in parentheses. *, **, *** indicate significant levels at 10%, 5% and 1% respectively.

Regression results are shown in Table 4. Model 1 is the regression analysis that we conducted of income poverty alleviation. Hausman test does not reject the null hypothesis, thus we choose random effect model. Standard Deviations are shown in parentheses. The coefficient of inclusive financial index, which is our core variable of interest, is significant at 1% significance level, and positively correlated with the income poverty alleviation. The results show that in the selected regions, the improvement of the level of inclusive financial stocks can play a positive role in alleviating regional income poverty. In addition, the local economic development level $\ln GDP$ also has a significantly positive effect on the slowdown of income poverty at 1% significance level. Besides, the proportion of education fiscal expenditure and the proportion of medical expenditures have significantly negative impacts on the relief of income poverty, separately at 10% and 5% significance level. In a short period of time, increasing fiscal expenditures in both education and medical care may have a negative effect on current income level.

Model 2 is the regression model of educational poverty alleviation. We choose random effect model after Hausman test. The results show that in the selected regions, the improvement of the level of inclusive financial stocks in the short term has a negative influence on alleviating education poverty. The core variable inclusive financial index is significantly negative at 10% significance level. The effects of all other control variables are not significant.

Model 3 reflects the regression on medical poverty alleviation. We also choose random effect via Hausman test. The estimated coefficient of inclusive financial is significant at 1% significance level, and positively correlated with the slowdown of medical poverty. Local economic development level has no significant effect on palliating medical poverty status. The proportion of education fiscal expenditure has a negative impact on the relief of medical poverty, which is significant at 5% significance level. There is a positive correlation between medical expenditures and alleviation of medical poverty, which is significant at a significance level of 10%.

4. Conclusion and Suggestion

This paper constructs an evaluation index system of inclusive financial development level from the three dimensions of financial support, permeability and accessibility. Through calculations, we found that the overall development

level of inclusive finance in the selected nine regions shows an overall growth trend. Zhejiang's development speed is significantly faster than the other eight provinces. On this basis, the panel model is used to empirically test the impact of the development level of inclusive finance on income poverty reduction, educational poverty reduction, and medical poverty reduction. The level of inclusive financial development has a significant positive impact on the income poverty. However, when it comes to educational and medical poverty alleviation, the improvement of the inclusive financial level in a short period does not reflect the obvious promotion effect, but has a negative impact. The improvement of medical and educational poverty requires a longer action period of time than the slowdown of income poverty. In the long run, the promotion of inclusive financial development to the economy is likely to eventually lead to a qualitative leap in overall poverty governance.

In the following poverty governance progress, inclusive financial institutions also need to work hard to implement the concept of "inclusive finance", especially to provide the inclusive financial services for vulnerable groups such as low-income people and small- and medium-sized enterprises, and protect the legitimate financial interests of vulnerable groups. It is difficult to obtain the financial services that are needed to solve the problem of vulnerable groups. On one hand, governments at all levels should continuously improve the accessibility of inclusive financial services; increase the distribution of outlets of inclusive financial institutions, specifically by adding inclusive financial institutions, ATMs, financial poverty alleviation service stations, etc.; and constantly improve financial infrastructure to better provide financial services and improve the availability of inclusive financial services. On the other hand, the central government should improve the penetration of inclusive financial services and increase policy support for economic development. We suggest the government not only steadily expand policy coverage, but also give financial institutions policy subsidies and tax incentives permanently, and give full play to the leverage effect of fiscal policies. Moreover, we suggest that the government to strengthen business guidance function of regulatory policies, and flexibly use policy instruments such as business access and regulatory assessment to appropriately reduce financial institutional entry barriers guide financial institutions to develop inclusive financial services and mobilize the enthusiasm of financial institutions.

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