

Analysis on Evaluation of Inclusive Finance Development and Influencing Factors in Hubei Province*

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Abstract—The paper selects the relevant data of Hubei province from 2009 to 2017, evaluates inclusive finance development index of Hubei province, and from seven aspects of economic development level, deposit resources utilization level, urbanization level, urban-rural income gap, informationization level, transportation convenience and education level, makes an empirical study on the influencing factors of the inclusive financial index. The results show that the inclusive finance index is positively correlated with the degree of economic development level, deposit resources utilization level, urbanization level, informationization level and transportation convenience, is negatively correlated with the urban-rural income gap, and is not related to the education degree. Finally, the policy recommendations are given to promote the development of the inclusive finance of Hubei province.

Keywords—*inclusive finance; inclusive finance index; influencing factor*

I. INTRODUCTION

The term Inclusive Finance began with the United Nations Year of Microfinance in 2005 and was then vigorously promoted by the United Nations and the World Bank to provide financial services to all strata and groups in an all-round and multi-level manner through the development of inclusive finance, especially for individuals and groups excluded from regular financial institutions. It allows it to have a fair opportunity to obtain effective financial services and financial products. Since then, inclusive finance has been highly valued by the CPC Central Committee and the State Council. In the report of the Third Plenary Session of the Eighteenth CPC Central Committee in 2013 on the Decision of the CPC Central Committee on Several Major Issues Concerning the Comprehensive and Deepening Reform, it formally put forward that "developing inclusive finance, encouraging financial innovation, enriching financial market levels and products." Promote inclusive finance to a national strategic level. In 2015, the

*Fund Project: Science and Guidance Research Program for Hubei Provincial Education Department, 'Evaluation and Influencing Factors of Inclusive Financial Development in Rural Areas of Hubei Province' (Number: B2017319). Science and Research Program in Wuhan Technology and Business University, 'Research on the Development Path of Inclusive Finance in Rural Areas of Hubei Province from the Perspective of Financial Poverty Alleviation' (Number: A2017001).

CPC Central Committee on the formulation of the 13th Five-Year Plan for National Economic and Social Development put forward "the development of inclusive finance, focusing on strengthening financial services for small and medium-sized enterprises, rural areas, especially in poor areas". In 2016, the State Council officially promulgated the "Promotion of inclusive financial development plan (2016-2020)", which designated farmers, small and micro enterprises, urban low-income groups and the disabled, the elderly and other special groups as the main target of inclusive financial services, and it meant that Inclusive Finance had shifted from the stage of national strategic concept to specific Implementation phase. In 2017, General Secretary Xi Jinping stressed at the Fifth National Financial Work Conference that "we should build a universal financial system and strengthen financial services for small and micro enterprises, agriculture, rural areas and remote areas."

As a traditional agricultural province, Hubei Province, facing the needs of industrial transformation and upgrading, a sound inclusive financial system is essential. In addition, the gap between the rich and the poor in Hubei Province is large, and the distribution of the financial industry is uneven. A large number of small and medium-sized enterprises and rural poor areas still have great difficulties in obtaining financial services. Therefore, through the empirical analysis of data, this paper studies the development level of Inclusive Finance in Hubei Province and its influencing factors, and puts forward corresponding suggestions accordingly.

II. LITERATURE REVIEW

Many foreign literatures have analyzed the measurement and influence factors of Inclusive Finance level. Beck used eight indicators to measure Inclusive Finance in 2007, including the number of financial institutions per 10,000 people, financial institutions per 100 square kilometers, ATMs per 10,000 people, ATMs per 100 square kilometers, the per capita savings/per capita GDP, the per capita loan/per capita GDP, savings accounts per 1,000 people and loan accounts per 1,000 people. And taking the developing countries as the research object of this paper, it is considered that transaction costs, investment decisions, economic growth rate, savings rate, technological innovation and other factors will have an impact on the availability of financial

services. Sarma (2010) selects indicators from three aspects of geographic penetration, utility and product contact by referring to the method of constructing the United Nations Human Development Index (HDI), and puts forward the use of financial inclusiveness index to measure the level of Inclusive Finance in different countries. Gupte (2012) starts with the content of financial infrastructure, choosing indicators such as the number of financial infrastructure, the number of financial institutions and the number of bank accounts. Arora (2010) constructs the Generalized Financial Development Index (GFDI) which selects the related factors such as bank loan interest rate, account annual fee, account management fee and so on. The index is selected according to the two dimensions of financial services use and cost standards. Anderloni (2008) divides the influencing factors of Inclusive Financial development into labor market situation, social assistance policy, fiscal policy, anti-money laundering policy, the degree of financial market liberalization, income gap, population and other external factors.

With the in-depth study of inclusive finance, domestic scholars try to use different methods to measure the level of Inclusive Finance in a region, so as to conduct quantitative analysis. Xu Min (2012) selected three dimensions of financial institutions and personnel penetration, the availability of major financial products and the coverage of financial products to construct the rural financial GSP index. She measured the level of rural financial GSP in 83 counties of Xinjiang in 2010, and used Tobit 7 model to analyze the factors influencing the level of rural financial GSP. The analysis is carried out. Wang Jing and Hu Guohui (2013) used coefficient of variation (CV) method and the IFI calculation method proposed by Sarma (2008) to process the data to construct the GSP financial index. They constructed the GSP financial index from the two dimensions of supply (scope of financial services) and demand (use of financial demand) to measure China's GSP financial situation, and will affect the GSP financial situation. The factors of preferential finance can be divided into four categories — macro-economy, income disparity, convenience of contact, financial regulation and control. The regression analysis shows that the pull rate of the first and second industries and the degree of transportation convenience are positively correlated with the development of inclusive finance. Yang Junxian and Zhang Juan (2015) selected four indicators to construct inclusive financial index, namely, 10000 financial institutions network points, 100 square kilometers network points, loan to GDP ratio, deposit to GDP ratio. They measured the inclusive financial level of 96 counties (cities) in Shanxi Province in 2011, and used the method of systematic clustering to classify and analyze. Gao Peixing and Wang Xiuhua (2011) also analyzed the regional differences of rural financial exclusion based on provincial data and constructed the Rural Financial Exclusion index. Considering the quantitative degree and overlapping relationship of the indicators, he simplified Kempson (1999) 6-dimensional model to 4-dimensional analysis method, and used coefficient of variation to construct weights to calculate the value of Inclusive Finance in China's provinces; when considering the influencing factors, he selected the per capita

net income of rural households, 100 yuan GDP loans in rural areas. The contribution rate, the number of rural employment and the level of agriculture are taken as variables. Xiang Jing (2013) analyzed the factors affecting the development of China's financial inclusiveness, and concluded that demand factors include consumer exclusion, low income, low savings, no collateral, lack of financial knowledge; supply factors include the mode of operation of financial institutions, financial product complexity, and geographical location. Restrictions, conditional constraints; financial infrastructure factors include payment and settlement system and credit system is not perfect; macro-financial legal system and regulatory system will have an impact on the development of financial inclusiveness. Dong Xiaolin and Xuhong (2012) through the population, income levels of urban and rural residents, consumer goods retail sales, telephone users and financial expenditure and other factors, and ultimately concluded that population and income factors affect the distribution of commercial banks, and population factors mainly affect the distribution of rural credit cooperatives. Zhai Shuai (2015) selected macroeconomic, income level, transportation convenience, education level as four major factors affecting the development of inclusive finance.

To sum up, the research on the establishment of inclusive financial evaluation system in foreign countries started earlier, empirical research methods and means are more mature. The new ideas provide an important reference for our country to promote inclusive finance and reform the finance. Although the domestic research on Inclusive Finance started relatively late, it attached great importance to a high degree, research has been deepened. Some research results are accumulated which put forward more meaningful countermeasures and suggestions. However, most of the domestic research is aimed at the national scope or individual regions, the study of Hubei Province is still in the exploratory stage which lacks of corresponding data and theoretical support. In view of this, this paper constructs an evaluation system of the development level of Inclusive Finance by mathematical statistics, measures and evaluates the development level of Inclusive Finance in Hubei Province, and makes an empirical analysis of the factors affecting the level of Inclusive Finance in Hubei Province, with a view to drawing an objective and comprehensive conclusion.

III. HUBEI PROVINCE INCLUSIVE FINANCIAL'S DEVELOPMENT LEVEL MEASUREMENT

A. Establishment of Index System

According to the principle of "operability and quantification" and the IFI index proposed by Sarma, this paper constructs the evaluation index system of Inclusive Financial development level from the three dimensions of availability, usability and effectiveness.

1) *Availability*: Under the premise of a certain population, the more financial institutions and employees, the more convenient residents to obtain financial services, the greater the financial availability of the region. Availability is measured by the number of financial

institutions networks, the number of employees in financial institutions, the number of financial institutions networks owned by every 10,000 people, and the number of employees in financial institutions owned by every 10,000 people.

2) *Usability*: At present, the business of deposit and loan is dominant in both quantity and scale, and the financial needs of residents are also concentrated in deposit and loan. So this paper uses the two indicators of per capita deposit and per capita loan to measure the usability.

3) *Utility*: The ultimate goal of developing Inclusive Finance is to promote economic growth, so the ratio of household savings to GDP and the ratio of household loans to GDP can accurately measure the participation of residents in economic activities and the effectiveness of inclusive finance. The specific indicator system is shown in "Table I".

TABLE I. INDEX SYSTEM OF HUBEI INCLUSIVE FINANCIAL DEVELOPMENT LEVEL

Dimension	Index
The availability of financial services	Number of financial institutions per 10,000 square kilometers
	Number of employees in financial institutions per 10,000 square kilometers
	Number of financial institutions per 10,000 people
	Number of employees per 10,000 persons owned by financial institutions
The usability of financial services	Per capita deposit balance
	Per capita loan balance
The utility of financial services	Deposit balance accounts for GDP share
	Loan balance accounts for GDP share

B. Method of Calculation

This paper uses the method of measuring the index of financial inclusion created by Sarma to calculate the index of financial inclusion in Hubei Province. In the selection of index weight, the coefficient of variation method is used to determine the weight of each index in the index of financial inclusion. First, the coefficient of variation of each index v_i is calculated, that is, the standard deviation of each index σ_i is divided by the average \bar{x}_i , then the coefficient of variation

of each index is summed up $\sum_{i=1}^n v_i$, and finally the weight of

$$w_i = \frac{v_i}{\sum_{i=1}^n v_i}$$

each index is calculated. The values calculated by normalization of each index are recorded as d_i . The specific formula is as follows:

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

C. Index Calculation

Based on the financial indicators of Hubei Province from 2009 to 2017, this paper finds out the relevant data from Hubei Statistical Yearbook, China Regional Financial Operation Report and Hubei Statistical Bulletin of National Economic and Social Development, and calculates the IFI value of Hubei Province's general financial development level index by using the above method, as shown in "Table II".

TABLE II. INCLUSIVE FINANCIAL DEVELOPMENT INDEX IN HUBEI PROVINCE

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
IFI	0.5123	0.6116	0.6961	0.7543	0.7932	0.818	0.8714	0.9174	0.9836

Sarma defined the IFI between 0.5 and 1.0 as the high level of financial services, between 0.3 and 0.5 as the medium level of financial services, and between 0.0 and 0.3 as the low level of financial services. According to the measurement results in "Table II", the IFI value of Hubei Province in 2009 was in the middle level, and began to enter a high level of financial services after 2010, and increased year by year. The low level of development of Inclusive Finance in 2009 is mainly due to the impact of the global financial crisis, on the one hand, major financial institutions for risk prevention considerations, greatly reducing the lending business, shrinking financial institutions and outlets. On the other hand, due to the impact of the domestic economy by the financial crisis, the loan balance declined. In order to promote the development of national economy, the No. 1 document of the Central Committee in 2010 and the 12th Five-year Plan in 2011 have clearly pointed out that to increase capital input and improve the level of financial services, the Third Plenary Session of the 18th Central Committee in 2013 will promote the development of Inclusive Finance to the national strategic level. Based on this, Hubei Province gradually attaches importance to the development of Inclusive Finance, accelerates the pace of innovation in financial products and services, and continuously lowers the threshold of financial access to expand the opportunities for low-income groups to enjoy financial products and services. Since 2011, the development level of Inclusive Finance in Hubei Province has been improved obviously, especially after 2013.

IV. ANALYSIS OF THE FACTORS AFFECTING THE DEVELOPMENT OF INCLUSIVE FINANCE IN HUBEI PROVINCE

A. Variable Selection

In order to deeply explore the influencing factors of the development level of Inclusive Finance in Hubei Province, this paper compares the existing academic achievements and the availability of data, and finally selects seven factors to analyze, including the economic development level, deposit resources utilization level, urbanization level, urban-rural income gap, informationization level, transportation convenience and education level according to the actual situation of Hubei Province. Specific variables are shown in "Table III".

TABLE III. VARIABLES OF INFLUENCING FACTORS

Variable name	Variable meaning	computing method
IF1	development level of Inclusive Finance	Inclusive Financial evaluation index system
X1	economic development level	GDP/Total number
X2	deposit resources utilization level	Total loans / Total deposits
X3	urbanization level	Town population / total number
X4	urban-rural income gap	Per capita disposable income of urban residents / Per capita disposable income of rural residents
X5	informationization level	Internet usage / Total number
X6	transportation convenience	Highway mileage
X7	education level	Number of senior secondary school educated / Total number

B. Model Building

The regression models are as follows:

$$\ln IFI = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \varepsilon$$

Among them, β is coefficient of each variable, and ε is the error term.

C. Empirical Results

The OLS regression analysis was carried out with the data of Hubei Province from 2009 to 2017, and the model was tested with Eviews 8.0. The specific process is shown in "Table IV".

TABLE IV. EMPIRICAL ANALYSIS OF INFLUENCING FACTORS OF HUBEI INCLUSIVE FINANCIAL INDEX

Variable	Coefficient	Std.Error	t-Statistic	Prob.
β_0	1.863468	0.775436	0.763247	0.0086
X1	0.743376	0.937268	0.837262	0.0065
X2	0.714764	0.392899	0.8273537	0.0484
X3	0.493729	0.293874	0.5382902	0.0257
X4	-0.539276	0.483782	-1.2837368	0.0169
X5	0.456469	0.729283	2.3837390	0.0654
X6	0.362853	0.023637	0.5838298	0.0353
X7	0.075468	0.082635	0.6382920	0.4685
R-squared	0.936746		Adjusted R-squared	0.98654
S.E.of reg	0.115264		F-statistic	15.76546
Log likelihood	12.65365		Durbin-Watson stat	2.654678

As can be seen from "Table IV", $R^2 = 0.98$, equation has a high degree of fitting, indicating that the independent variables in the model can better interpret the changes of dependent variables. The statistic $DW=2.65$ shows that the error term does not appear first-order autocorrelation and satisfies the condition of OLS regression. The experimental results show that:

- The level of economic development and the utilization level of deposit resources are significantly

positively related to Inclusive Finance. Increasing the level of economic development will increase the disposable income of residents, stimulate the enthusiasm of residents to participate in financial activities and accept financial services, thus stimulating financial institutions to provide more financial services, enrich financial products and improve the level of inclusive finance. The utilization level of deposit resources reflects the efficiency of financial institutions in converting deposits into loans. The higher the efficiency, the stronger the demand for loans, and the faster the development of inclusive finance.

- The level of urbanization is positively related to the development of Inclusive Finance. Urbanization will transfer population from rural areas to cities, so that farmers can diversify their income sources and increase their income. The labor force transferred to cities will use the services of financial institutions more frequently, and deposit surplus income into financial institutions to form available deposit resources.
- The income gap between urban and rural areas is negatively related to Inclusive Finance. The large income gap between urban and rural areas and the large number of rural poor seriously affect the demand and use of financial products and services by low-income rural population, thus further reducing the number of financial institutions and financial services.
- The level of informatization and the convenience of transportation are positively related to the development of Inclusive Finance. With the development of information technology, Internet Finance and third-party payment are developing rapidly, which affects the way residents get financial services. The more convenient the transportation, the more convenient the financial supply and demand can be to improve the convenience of contacts, thus reducing the cost of financial institutions to open branches in remote areas and the cost of residents in remote areas to use financial services, thus enhancing the level of inclusive financial development.
- There is no significant link between the level of education and the development of Inclusive Finance.

V. CONCLUSION

The results show that the economic development level, deposit resources utilization level, urbanization level, informatization level, transportation convenience level and Inclusive Financial level are positively correlated among the influencing factors of inclusive financial development in Hubei Province, and the income gap between urban and rural areas is negatively correlated with Inclusive Financial level. So in order to further promote the development of Inclusive Finance in Hubei Province, we must proceed from the following aspects:

- Vigorously develop the regional economy and raise the income of residents. The development of regional economy is conducive to the improvement of the income level of residents and the expansion of financial institutions, increasing the opportunities for residents to enjoy financial products and services, thus enhancing the level of inclusive finance.
- Improve the financial services system and facilities. We will further strengthen the network construction of financial institutions, promote the diversification of inclusive financial institutions, constantly innovate inclusive financial products and businesses, innovate credit guarantee methods, lower the threshold of financial access, and meet the needs of people at all levels for financial services. We will continue to strengthen innovation, improve efficiency while reducing costs, and expand the coverage and inclusiveness of financial services.
- Enhance the popularity of the Internet and develop the advantages of Internet finance to promote the further development of inclusive finance. Hubei Province's network penetration rate has been at a high level, on this basis should vigorously develop Internet financial services and products to meet the needs of small-scale investment and financing and payment. Financial institutions should strengthen cooperation with Internet enterprises and telecommunications companies to innovate service channels and services, and enhance payment and settlement, financing and other functions with the help of Internet technology, which can cover a large area of people through the Internet and trade at a lower cost, thus effectively promoting the promotion of inclusive finance.
- Promote urbanization and transport infrastructure, and Inclusive Financial development as well. Speed up the process of urbanization and lay a good foundation for the development of Inclusive Finance. We will step up the construction of rural transport infrastructure, facilitate access to financial institutions and services for a wider range of rural people, and comprehensively promote inclusive financial development.

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