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A Study on the Convergence of Financial Development on Province Level in China

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Abstract: ***Based on the theory of economic convergence and the convergence test method, this paper makes an empirical analysis of the convergence of China's financial development. It is found that in recent years, the gap between 1978 and 2016 has not been narrowed automatically, but China's financial level is on the rise in the total amount. The differences of financial development between provinces and cities are increasing. There is no σ-convergence in general, but there is absolute β-convergence in the financial development.***

Keywords: financial development, σ -convergence, β-convergence

1. Introduction

Finance is the core of modern economy and the core competitiveness of the country. The healthy development of finance can promote the stability and coordination of the national economic development. China is in the "new normal" period of economic development. The economic growth rate is slowing down, but the structure is more reasonable and the driving factors are more diversified. Financial industry plays an important role in the overall economy of our country. In recent years, the financial system has been continuously improved and the reform in related fields has been carried out in an orderly manner. Financial development has made a series of significant achievements. In 2016, China's GDP was 74.41 trillion yuan, increasing 6.7% over the same period last year .The added value of the tertiary industry is 29.62 trillion yuan, accounting for 51.6% of GDP, an increase of 1.4 percentage points over the previous year. In July 2017, Xi Jinping, at the National Conference on Finance Work and the General Secretary put forward: "We should follow the law of financial development, make finance return to its origin and serve the real economy. We should constantly optimize the economic and financial structure, strengthen financial supervision, improve the allocation efficiency of financial resources, and promote a virtuous circle of economy and finance."

There are significant regional differences in the level of financial development in China. The level of financial development differs greatly between the eastern, central and Western regions, urban and rural areas, especially among provinces. Starting from the inter-provincial level, this paper studies the convergence of China's financial development, in order to find out the main problems existing in China's financial development, make rational use of financial resources, deepen the financial structure and financial system reform, and make finance serve the real economy. This will help to reduce the disparity of China's economic development and promote the stability of China's overall economy. Qualitative analysis, improving people's quality of life and ultimately achieving common prosperity are of great practical and theoretical significance.

"Convergence" is defined as the eventual convergence of economic and financial development in different regions. Convergence of financial development refers to the region with low initial level of financial development, which will develop faster than the region with high initial level, and eventually catch up with the region with high level to reach the same stable level. "Divergence" means that the differences of economic and financial development among different regions are gradually increasing. For developing countries, it is inevitable that there are differences in financial development in different regions, but the degree of differences in each region is different.

2. Literature Review and Theoretical Basis

Domestic and foreign scholars have made a series of research results in financial development and convergence. Apergis et al. (2012) used Phillips and Sul (2007) methods to club five indicators of 50 countries from 1970 to 2003: the ratio of central bank assets to GDP, the ratio of monetary bank assets to GDP, the ratio of current liabilities to GDP, the ratio of bank liabilities to GDP, and the ratio of financial system liabilities to GDP. Convergence test shows that there is club convergence in financial development and per capita output in these countries. Fung (2009) confirmed the existence of conditional convergence among countries. The per capita GDP and financial development of middle-income and high-income countries converged, and the financial sector of low-income countries had a higher financial development speed than that of developed countries. Dekl and Punt (2015) analyzed the financial depth and efficiency of 23 regions and countries in Asia, and found that from 2004 to 2011, countries with low level of financial development were gradually catching up with those with Hong Kong, China, Japan, South Korea and Singapore as the benchmark countries or regions. Hu Zongyi et al. (2016) used the non-linear time-varying factor model to study the convergence of China's rural financial development. The results show that there is no convergence in China's rural financial development as a whole. Through the club convergence test, endogenous identification of China's rural financial development has four convergence clubs, and verify each of them. The Convergence Path of music department. Zhou Lili et al. (2014) compared and analyzed the regional economic growth rate and regional financial development speed of China through the β-convergence model, and found that the convergence rate of

China's financial development is much faster than that of economic growth.

The above research focuses on the convergence at the national level or in the eastern, western and Eastern regions, mainly using σ -convergence orβ-convergence to test. In view of this, by calculating the ratio of deposit and loan to GDP, i.e. financial interrelations ratio as an index to measure the level of financial development, this paper verifies the σ-convergence and β-convergence of inter-provincial financial development in China.

3. Model Establishment

3.1 σ-convergence

σ- convergence means that the deviation of economic variables decreases with time going. The disparity of financial development among provinces is decreasing year by year. We believe that there exists σ-convergence in inter-provincial financial development. On the contrary, we believe that there is no σ-convergence in provincial financial development, which means divergent. Variation coefficient, standard deviation and Theil index are used to test σ-convergence. Standard deviation (Barro, 1992; Barro, Sala-i-Martin, 2003) is used to test σ-convergence in this paper as follows:

$$y_{i,t} = In(Y_{i,t}) \quad (3\text{-}1)$$

$$\overline{y_{i,t}} = \frac{1}{N}\sum_{i=1}^{N} y_{i,t} \quad (3\text{-}2)$$

$$\sigma_t = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(y_{i,t} - \overline{y_{i,t}}\right)^2} \quad (3\text{-}3)$$

Among them, $Y_{i,t}$ represents the financial correlation ratio of the first region in time t, $y_{i,t}$ is the comparative value of the financial correlation ratio of the first region in our country in time t; N represents the number of days in our country, t is the time length; σ_t is the standard value of the financial correlation ratio of each province and city in our country in the year t.

According to the above formulas, if the σ-value shows a decreasing trend, we can think that the gap of financial development in these areas is gradually narrowing, and the financial development of provinces and cities has convergence; if the σ-value changes little or increases, then the financial development of provinces and cities is divergent.

3.2 β-convergence

The economic variable is β-convergence, which means that if the variable is stable to a steady state level and has a smaller initial value, it will grow faster than a variable with a larger initial value. If the convergence of this variable is not affected by other economic variables, it is called absolute β-convergence, otherwise it is conditional β-convergence. In this paper, the absolute β-convergence is verified by the method of Islam (1995):

$$InY_{i,t} = \gamma InY_{i,t-1} + b_0 + \varepsilon_{i,t} \quad (3\text{-}4)$$

$$\gamma = e^{-\lambda} \quad (3\text{-}5)$$

Where b_0 is a constant term and λ is the rate of convergence. If $\lambda > 0$, there is absolute β-convergence; if $\lambda < 0$, there is no absolute β-convergence. According to (3-5), the convergence rate is:

$$\lambda = -In\gamma \quad (3\text{-}6)$$

4. The Convergence Test Results and Analysis of China's Provincial International Financial Development

4.1 σ-convergence test results and analysis

The financial interrelations ratios is defined as the sum of deposit and loan balances of regional banks divided by GDP. The formula is:

$$FIR = \frac{C + D}{GDP}$$

C represents the balance of bank deposits and D represents the balance of bank loans.

According to formulas (3-1), (3-2) and (3-3), the FIR of provinces and cities from 1978 to 2016 are calculated and their σ-values are calculated (see Figure 4-1).

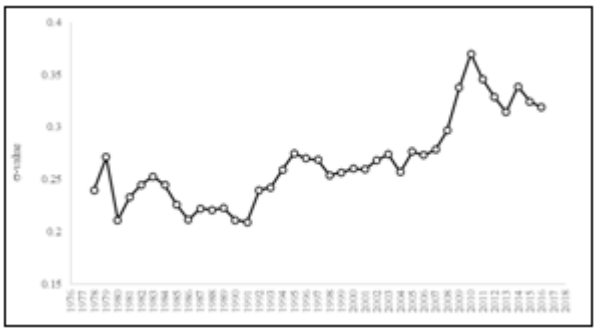

Figure 4-1: The σ-Value of Interprovincial Financial Interrelations Rate from 1978 to 2016

On the whole, from 1978 to 2016, the standard deviation σ-value of China's inter-provincial financial development shows an increasing trend, that is, there is no σ-value convergence. However, there are different trends in different periods of time: from 1983 to 1990, σ-value decreased significantly, from 0.2526 to 0.2089; after 1991, the value of σ increased gradually, reaching its maximum value of 0.3698 in 2010, and then remained at a relatively high level despite minor adjustments. Therefore, in the sample interval, although there is σ- convergence in individual years, the overall level of inter-provincial financial development diverges.

The reasons for this are as follows: at the beginning of reform and opening-up, because the overall level of our economy is relatively low, we adopted differentiated support policies for different provinces, trying to promote the development of other provinces by giving priority to the economic and financial development of some provinces; in recent years, China's economy has entered a "new normal" with downward

economic pressure. With the increasing year by year, in the process of pursuing the speed and scale of economic growth, some regions have caused the dislocation of funds from reality to emptiness, the disjunction between finance and real economy, and widened the gap of financial development among provinces.

4.2 β-convergence test results and analysis

According to (3-4), calculate the value of the financial Interrelations ratio of each province from 1978 to 2016, and then judge whether there exists β-convergence in the development of inter-provincial finance in China according to (3-5). If □ is greater than 0, it shows that there exists absolute beta convergence in the inter-provincial financial development in the sample interval; if □ is less than 0, it shows that the inter-provincial financial development in the sample interval is divergent and there is no absolute β-convergence.

Using the stata to calculate the panel data of the Financial Interrelations Ratio. The test results for beta convergence are as following sheet4-1:

Table4-1: The result of the absolute β-convergence estimation

Parameter	Estimated	t-value	R^2	F-value
γ	0.968612	89.97	0.9379	8095.05

Table 4-1 shows that R^2 of absolute convergence fitting is 0.9379, which is a very close array to 1. It shows that the fitting degree of fitting straight line is very good. F value is 8095.05, which indicates that the regression results are very significant. The estimated value of γ is 0.968612, which is a number greater than 0. At this time, the convergence rate is 0.03189. Therefore, there is absolute convergence in China's financial development from 1978 to 2016.

Due to the differences of social and natural conditions in different provinces, variables that do not change with time may be omitted and fixed-effect models are used (the test results are shown in Table 4-2). The number of samples was 1178 and the number of cross sections was 31. F statistic is 5559.41, which shows that the model is significant on the whole. The adjoint probabilities of independent variables are less than 0.05, which indicates that the explanatory variables pass the significance test.

Table 4-2: Fixed effect test of the absolute β-convergence estimation results

Parameter	Estimated	t-value	F-value
γ	0.951984	74.56	5559.41

The following fitting equation can be obtained by using the above fixed effect model test results:

$$\log Y_{i,t} = 0.951984 \log Y_{i,t-1} + 0.061289$$

The result of γ estimation is 0.951984, less than 1, and the corresponding convergence rate is 0.04921. It shows that there exists absolute β-convergence in the development of inter-provincial finance by using the fixed effect model.

5. Conclusion

Since the reform and opening up, China's financial development level has been significantly improved, but there are great differences between different regions, especially between different provinces. By calculating the financial Interrelations ratios of 31 provinces, municipalities and autonomous regions in China from 1978 to 2016, this paper uses the methods of σ- convergence and β-convergence to test the convergence of inter-provincial financial development. The results show that there is no σ-convergence in inter-provincial financial development as a whole, which indicates that there are great differences in the evolution path of financial development between different provinces. Secondly, there is absolute β-convergence, which indicates that the provinces with lower initial level of financial development develop faster than those with higher initial level of financial development.

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