

Study on the Agglomeration of Financial Resources in Metropolitan Area

Chutong Chen

Business School, East China University of Political Science and Law, China

Abstract

As a service industry of the real economy, finance can effectively promote the rational allocation of resource factors, which determines the development of modern economy to a large extent. With the rapid development of Internet technology, the modern financial industry, relying on Internet technology, has realized the interworking of transactions on a global scale and greatly improved the efficiency of financial transactions. With the rapid flow of financial capital and financial resources in the world, financial resources will gather in some specific areas. At the same time, along with the phenomenon of financial industry cluster, financial cluster has become the basic form of financial industry. The development of China's financial industry is mainly concentrated in the metropolitan area. China has the Yangtze River Delta, the Pearl River Delta and the Beijing-Tianjin-Hebei metropolitan area. The financial agglomeration in the metropolitan area is the focus of people's attention. In order to study the degree of financial agglomeration in China's metropolitan area, this paper selects the representative financial indicators of the Yangtze River Delta metropolitan area as the research object. In order to make the research scope more extensive and the data conclusion more credible, this paper adds the prefecture-level cities in Anhui Province which were not included in the original 26 prefecture-level cities in the Yangtze River Delta metropolitan area. The purpose of this paper is to measure the overall and local autocorrelation level of financial agglomeration in the Yangtze River Delta metropolitan area by using the spatial econometric analysis software and the financial agglomeration spatial econometric model built by predecessors. The results show that the development of the financial industry in the Yangtze River Delta region has obvious spatial dependence and heterogeneity. In order to make the financial agglomeration in the metropolitan area better drive the development of China's finance, this paper puts forward specific suggestions such as strengthening financial innovation, increasing the introduction of financial talents, promoting inter-regional financial cooperation, expanding the degree of opening up to the outside world and strengthening the supervision of the financial system.

Keywords

Financial Agglomeration; Moran 'I Index; The Yangtze River Delta Metropolitan Area.

1. Introduction

1.1. Background and Significance of the Topic

Metropolitan area is the advanced form of urban development to a certain stage, and it is the inevitable result of the continuous development of urban industrialization. Developed countries all have relatively mature metropolitan areas, and the economic level of metropolitan areas usually determines the level of a country's economy. The formation of metropolitan area is conducive to gathering talents, innovation, science and technology, capital and other factors, relying on its vast economic hinterland, drive the development of the whole surrounding area

and even the development of the whole country. The financial industry is the pillar industry of the modern economy, and the higher the financial level, the more developed the economy. The core city of metropolitan area is usually the financial center of the region, and its radiation effect will drive the development of the financial industry of the whole metropolitan area. The agglomeration of financial resources in metropolitan area is crucial for the metropolitan area to drive the development of surrounding areas. Therefore, it is necessary for us to study the spatial correlation of financial agglomeration in metropolitan area and understand the influence mechanism of the cities in metropolitan area on the surrounding cities, so as to better promote the development of the financial industry of the whole country.

China has three metropolitan areas: the Pearl River Delta, the Yangtze River Delta and the Beijing-Tianjin-Hebei metropolitan area. Among them, the Yangtze River Delta metropolitan area is the second largest metropolitan area in China, and its development degree is second only to that of the Pearl River Delta metropolitan area, while the Yangtze River Delta metropolitan area is one of the six most famous metropolitan areas in the world. The Yangtze River Delta region has unique geographical advantages and rich historical and cultural deposits. Shanghai and Zhejiang Province are the key provinces and cities designated for development along the Belt and Road. Shanghai, Zhejiang, Jiangsu and Anhui provinces cover a total area of 359,000 square kilometers, accounting for about 3.8 percent of China's total land area. In 2018, the total GDP of the three provinces and one municipality reached 21,147,924 billion yuan. The Yangtze River Delta, though occupying a small area, contributed nearly a quarter of the country's total GDP. Jiangsu's GDP ranks second among all provinces in China, second only to Guangdong's, while Anhui's GDP growth rate is higher than the national average and it is full of development momentum. In general, the economic momentum of the Yangtze River Delta is developing well. Shanghai is the most developed city in China except for Hong Kong and Macao. The economic level of Zhejiang Province and Jiangsu Province has always been at the forefront of the country, and Anhui Province, driven by the surrounding provinces and cities, has shown great development potential.

In order to promote the integrated development of the Yangtze River Delta, China promulgated the Yangtze River Delta Regional Plan in 2015, but the integration degree of the Yangtze River Delta has not reached the original expectation. With the improvement of the economic level of the Yangtze River Delta region, the integrated development of the Yangtze River Delta region is the inevitable result. In November 2018, the first China International Import Expo was held in Shanghai, and the state officially proposed to support the integrated development of the Yangtze River Delta as a national strategy to promote the economic development of the entire Yangtze River Delta region. In order to better promote the integration construction of the Yangtze River Delta, it is necessary to study the concentration degree of finance, a special resource element, in the Yangtze River Delta region, and how to make better use of financial resources to contribute to the economic development of the region. Traditional empirical studies on the level of financial agglomeration in metropolitan areas mainly focus on the interaction and influence of different cities in financial agglomeration. Most of these studies are based on the basic assumption that cities are independent of each other, while ignoring the influence of spatial factors on financial resource agglomeration. In this paper, 41 cities in the Yangtze River Delta metropolitan area are taken as examples to study the dependence and heterogeneity of the development of financial industry in the Yangtze River Delta region, and how to effectively use the agglomeration effect of financial resources to improve the utilization efficiency of financial resources.

1.2. Review of Existing Literature

1.2.1. Foreign Literature Review

Marshall (1890) believed that the industrial cluster mainly depends on the industrial scale, that is, the external economic scale of the industry. The motivation for enterprises to pursue external economy is to reduce transaction cost and improve transaction efficiency.

Kindleberger (1974) believed that financial people would trade in a specific region because of external economies of scale. Over time, more financial professionals will be attracted to trade there, and banks and other financial institutions will also develop there, which is the strengthening effect of external economies of scale. Alfred Weber (1909) believed that centralized production can effectively reduce the cost of production, and the economies of scale mainly come from the reduction of production costs. Krugman (1991) believed that the factors affecting industrial clusters include scale economy, accidental events and path dependence effect. Kindleberger (1974) believed that during the development of financial centers, financial resources would not only gather but also spread in space. He believed that the main reason for the formation of financial centers was the improvement of trans-regional financial transaction efficiency and liquidity of financial resources. Krugman (1991) believes that the result of financial industry clusters is the emergence of regional financial centers. Thrift (1994) believed that finance is often clustered in the information hinterland and information center with relatively high information level. Porteous (1995) believed that the most important reason of financial concentration was the path-dependent effect. Other factors such as information asymmetry and changes of information hinterland also contributed to the concentration or diffusion of financial industry. Pandit (2002) believed that the agglomeration of financial resources would attract new entrants, increase the number of financial practitioners and financial institutions, and promote economic development. Krugman (1991) used the spatial Gini coefficient to measure the agglomeration degree of different industries, and found that industries with higher technical requirements are more prone to agglomeration in spatial distribution. Compared with other industries, the financial industry is more prone to agglomeration.

1.2.2. Chinese Literature Review

Liang Ying (2006) believes that there are two main reasons for financial agglomeration, one is the development of the real economy, and the other is the support of government policies for cities with conditions. Ren Yinghua, Xu Ling and You Wanhai (2010) hold that the improvement of regional innovation level and economic foundation can promote financial agglomeration, and the opening to the outside world promotes financial agglomeration in the early stage and inhibits it in the later stage, while there is no obvious correlation between human capital and the level of financial agglomeration. Li Lin, Ding Yi and Liu Zhihua (2011) analyzed the national financial agglomeration and concluded that the division mode of administrative regions in China hindered the voluntary flow of finance throughout the country and was not conducive to the development of China's financial industry.

Based on the analysis of finance-related indicators in 16 cities in the Yangtze River Delta, Li Weijun and Sun Yanli (2011) concluded that the development of financial industry among cities in the Yangtze River Delta is independent of each other, and the level of financial agglomeration around cities with a high level of financial agglomeration is low. This is because cities with high administrative levels can provide powerful information resources. In terms of spatial evolution, there is a trend of differentiation between production centers and information centers.

Liu Ji and Ma Linlin (2019) conducted an empirical study on the financial agglomeration level of 30 provinces and cities in China by using the Moran index model and the spatial Durbin model, and concluded that the financial agglomeration is spatially positively correlated across

the country, and the "agglomeration effect" and "radiation effect" of financial agglomeration can significantly promote China's economic growth. However, due to the different levels of economic development in different regions, spillover effects of financial agglomeration show heterogeneity in different regions.

1.2.3. Literature Review

From the above literature, we can see that domestic and foreign scholars' research on financial agglomeration mainly focuses on the causes and effects of financial agglomeration. Foreign scholars' theoretical research on financial agglomeration is relatively mature, and they mainly analyze the development motivation of financial agglomeration. For example, the industrial agglomeration theory is analyzed from the perspective of individual enterprises, and believes that the external economies of scale effect of enterprises is the main cause of financial agglomeration. Economic determinism analyzes from the perspective of the economic level of the whole region, combines the economic level of a region with the element of financial resources, currency, and holds that the higher the economic level of the region, the higher the degree of financial agglomeration. Financial geography theory, from the perspective of information non-standard and asymmetric, holds that region limits the transmission of information, leading to the emergence of financial centers, which in turn promotes the improvement of financial agglomeration level.

Since China's domestic financial industry started relatively late and opened to the outside world for a short time, Chinese scholars' theoretical research on financial agglomeration is mainly based on the research of foreign scholars. In China, more emphasis is placed on the empirical analysis of financial agglomeration by using panel data model. For example, location entropy and market concentration are used to measure the level of financial agglomeration. The spatial Durbin model is used to study the specific factors affecting financial agglomeration. Moran index model is used to study the spatial characteristics of financial agglomeration in the whole region.

1.3. The Meaning of Financial Agglomeration

The financial industry is a service industry whose function is to serve the public needs of society. The concept of industrial agglomeration was first concerned and proposed by Western scholar Marshall (1890). It refers to the phenomenon that an industry will be highly concentrated in a specific area with the continuous improvement of production efficiency and the reduction of production cost. As a result, the elements of the industry continue to accumulate in a specific space, which makes the industry develop rapidly in this region, thus driving the rapid economic development of the region. Later, the economist Alfred Weber (1909) studied the factors of industrial agglomeration, quantified the formation process of industrial agglomeration, and introduced location analysis into the analysis of industrial spatial agglomeration, laying the foundation for location analysis. Krugman (1991) discussed the causes and effects of industrial clusters through a dynamic model, arguing that industrial clusters will produce agglomeration and diffusion effects. As a resource factor, financial resources are less subject to regional control than other industrial factors, and their flow speed is higher than other industrial factors, so agglomeration is more likely to occur.

As for the meaning of financial agglomeration, domestic and foreign scholars have made different definitions from different aspects. A more comprehensive definition is given by domestic scholars Huang Jieyu and Yang Zaibin (2006), who believe that financial agglomeration can be comprehensively explained from two aspects: dynamic process and static result. According to the static results, financial agglomeration is a state in which the number of financial institutions grows rapidly in a certain area, thus making all kinds of financial resources develop together in a certain space. From the perspective of dynamic process, financial agglomeration refers to the dynamic evolution process of financial industry cluster formed by

the combination of financial industry and location factors in a certain area. By synthesizing the above two aspects, Zhang Qingzheng (2013) believes that financial agglomeration refers to the dynamic change process in which financial resources and location conditions coordinate and develop together after market and non-market regulation, thus promoting the regional financial agglomeration and forming financial industry agglomeration in geographical space.

2. Data Selection and Model Construction

2.1. Data Indicators and Sources

This paper mainly analyzes the spatial distribution of the number of financial employees in 41 cities in China's Yangtze River Delta metropolitan area from 2009 to 2016. In order to make the data source more accessible and practical, this paper uses the number of financial industry employment in each city to measure the financial development level of each city. This paper first introduces the index of location entropy, which is used to measure the relative concentration degree of each city's financial industry. The greater the location entropy, the higher the specialization rate of the financial industry. The location entropy can reflect the concentration of financial resources in different cities. The calculation method is as follows:

$$FIN = (E_{ij}/E_i)/(E_{kj}/E_k)$$

Where, it represents the number of employment in the financial industry of j city, the number of employment in urban units of each city, the total number of financial employment in the metropolitan area of the Yangtze River Delta, and the total number of employment in urban units of the Yangtze River Delta region. E_{ij}/E_i and E_{kj}/E_k stand for the value of location entropy of the financial industry. The basic data used in this paper are all from China Urban Statistical Yearbook from 2010 to 2017.

2.2. Spatial Metrology Model

2.2.1. Research Indicators and Use Software

In order to measure the difference of financial resource concentration in various cities, this paper quotes the research methods of other scholars and analyzes the global spatial autocorrelation coefficient and local spatial autocorrelation coefficient of all cities in the Yangtze River Delta.

The global spatial autocorrelation coefficient, also known as the global Moran 'I index, is used to quantitatively analyze the spatial agglomeration of the entire financial industry in the Yangtze River Delta metropolitan area. The analysis of the local autocorrelation coefficient mainly comes from the Moran 'I scatter plot and the tripartite map, which mainly investigates the spatial correlation degree and agglomeration degree of financial agglomeration among cities in the Yangtze River Delta metropolitan area. The software used in this paper includes ArcGIS10, Geoda0.9.5i and Excel2010 to calculate and test the corresponding data indicators.

2.2.2. Global Spatial Autocorrelation

The global Moran 'I index, also known as the global spatial autocorrelation index, is mainly used to analyze the global spatial autocorrelation. In this paper, it can show the concentration level of the total financial resources in 41 cities in the Yangtze River Delta and reflect the spatial autocorrelation trend of the financial concentration in the whole region of the Yangtze River Delta. The global Moran 'I index ranges from -1 to 1. , if the value of the global Moran 'I index is between -1 and 0, it indicates that the concentration of financial resources is negatively correlated throughout the region, indicating that all cities show a trend of differentiated development. If the value of Moran 'I index is between 0 and 1, it indicates that the

concentration of financial resources is positively correlated in the whole region, indicating the trend of centralized development of all cities. If the Moran 'I index is 0, it means that the development of each city is not related, indicating that the financial resources of each city are not dependent on each other in space, showing a trend of mutual independence. The global Moran 'I index is calculated by the following formula:

$$I = \frac{n \sum_{i=1}^n \sum_{i \neq j}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{S^2 \sum_{i=1}^n \sum_{i \neq j}^n w_{ij}}$$

In the formula, $S^2 = \frac{1}{2} \sum_i (x_i - \bar{x})^2$, $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$, x_i is the observed value of the variable, in this case the location entropy of each city in different years; w_{ij} represents the proximity relationship between cities i and j , and adopts the first-order Queen adjacency space weight matrix.

$$w_{ij} = \begin{cases} 1 & \text{When city } i \text{ and city } j \text{ are adjacent} \\ 0 & \text{When city } i \text{ and city } j \text{ are not adjacent} \end{cases}$$

Where, $i=1,2,\dots,m; j = 1, 2,\dots,n; m \neq n$, then all diagonal elements of w are 0.

After the calculation result of Moran 'I scatter plot is obtained, the normal distribution hypothesis is used to test it to see whether there is spatial autocorrelation in n regions. The calculation formula of Z is as follows:

$$Z_n(d) = \frac{1 - E_n(I)}{\sqrt{VAR_n(I)}}$$

$$E_n(I) = -\frac{1}{n-1}$$

$$VAR_n(I) = \frac{n^2 w_1 + n m_2 + 3 w_0^2}{w_0^2 (n^2 - 1)} - E_0^2(I)$$

Where, $w_0 = \sum_{i=1}^n \sum_{j=1}^n w_{ij}$, $w_1 = \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^n (w_{ij} + w_{ji})^2$, $w_2 = \sum_{i=1}^n (w_{ij} + w_{ji})^2$, w_i and w_j is the sum of rows i and j in the spatial weight matrix respectively.

The significance criterion is judged by the Z-value of the normal statistic of the Moran 'I exponent. The Z value of the normal distribution function is known at the critical value 1.96 at the 95% confidence level. If the Z-value is greater than 1.96 at 95% confidence level, it means that the concentration of financial resources is obviously positively correlated in spatial distribution. A positive spatial correlation indicates that the values in the region show a clustering trend, if not, there is no spatial autocorrelation.

2.2.3. Local Spatial Autocorrelation

Moran 'I scatterplot is used in this paper to study the spatial differences of financial resources development among cities in the Yangtze River Delta metropolitan area. The development of financial resources of each city and that of the surrounding cities can be divided into four related models. Positive spatial autocorrelation cities are distributed in the first and third quadrants. The city in the first quadrant has a higher level of its own financial resources agglomeration, and the financial industry agglomeration level of the surrounding cities is also relatively high, which is expressed by HH. The third quadrant indicates that the level of financial development of the city itself is relatively low, and the level of financial agglomeration of the

surrounding cities is also relatively low, which is represented by LL. The cities with negative spatial autocorrelation are distributed in the second and fourth quadrants. The financial development level of cities in the second quadrant is relatively low, while the financial resource concentration level of surrounding cities is relatively high, which is expressed by LH. The fourth quadrant indicates that the financial development level of the city itself is relatively high, while the financial agglomeration level of the surrounding cities is relatively low, expressed by HL.

3. Data Analysis

3.1. Global Moran 'i Index Analysis

Table 1. The global Moran 'i index of 41 cities in the Yangtze River Delta

A given year	Moran'I	E(I)	Standard Deviation <i>Sd</i>	Normality Statistic <i>Z</i>	<i>P</i> value
2009	0.0224	-0.0250	0.0919	0.4257	0.3370
2010	-0.0101	-0.0250	0.0963	0.0789	0.4560
2011	-0.0510	-0.0250	0.0956	-0.3174	0.3850
2012	-0.0110	-0.0250	0.0977	0.2060	0.4130
2013	0.1847	-0.0250	0.0975	2.1480	0.0290
2014	0.2946	-0.0250	0.0988	3.2431	0.0020
2015	0.2819	-0.0250	0.0987	3.0727	0.0060
2016	0.2485	-0.0250	0.0984	2.7710	0.0070

Data source: China Urban Statistical Yearbook (2010-2017).

It can be seen from the Moran 'i index from 2009 to 2016 that the level of financial resources agglomeration in the three cities is on the rise on the whole. The Moran 'i index from 2010 to 2012 is negative, and the Moran 'i index from 2013 to 2017 is positive. In general, the trend of financial resources agglomeration in the Yangtze River Delta metropolitan area is on the rise, and the autocorrelation index fluctuates greatly. The largest year of Moran 'i index is 0.2946 in 2014, the smallest year is -0.0510 in 2011, and the financial resources agglomeration shows a negative correlation trend during the minimum period of Moran 'i index. Compared with the large Moran 'i index from 2013 to 2016, the level of financial resources agglomeration was higher. The Z-value of the normal statistic of Moran 'i index from 2009 to 2012 failed to pass the test of the critical value of 1.96 under the confidence level of 0.05, indicating that the results of financial agglomeration in these four years are not significant. The Z-value of the normal statistic of Moran 'i index from 2013 to 2017 is all greater than the critical value of 1.96 of the normal distribution function under the confidence level of 0.05, indicating that the financial agglomeration phenomenon in the Yangtze River Delta metropolitan area in the recent four years is spatially dependent. On the whole, the spatial distribution of financial resources in 41 cities in the Yangtze River Delta metropolitan area is not completely random, but tends to gather in space, which fully indicates that the development of the financial industry in the Yangtze River Delta presents a significant agglomeration trend.

3.2. Local Spatial Autocorrelation Analysis

From the above analysis, we can know that the development of the financial industry in the Yangtze River Delta metropolitan area has obvious spatial autocorrelation. We use Moran 'i scatter plot to analyze the relationship of financial development among cities in the Yangtze River Delta and the spatial spillover effect of financial agglomeration.

We selected the recent Moran 'I index scatter plot of 2016 and 2013 for comparative analysis. They are Figure 1, Figure 2. In addition, the local autocorrelation of financial agglomeration in each city in 2016 and 2013 is compared in a table.

3.2.1. Moran 'I Scatterplot Analysis

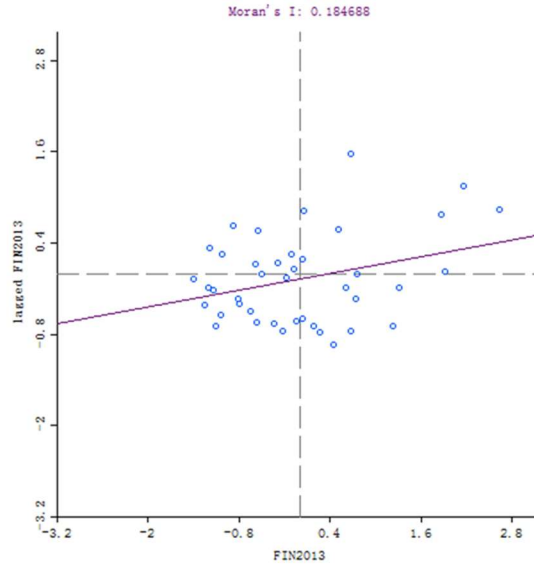


Figure 1. 2013 Moran Scatter chart

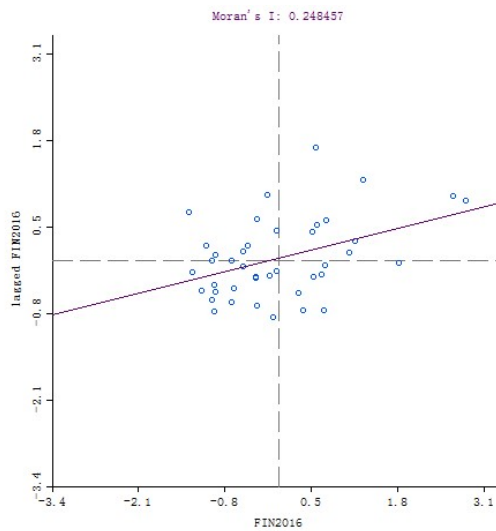


Figure 2. 2016 Moran Scatter chart

A dot in the graph represents a city. In the Figure, the urban financial agglomeration in the first and third quadrants has an obvious positive correlation, while the urban financial agglomeration in the second and fourth quadrants has an obvious negative correlation. Compared with Figure 1, the points in Figure 2 are more concentrated, indicating that the financial resources of all cities are more concentrated as time goes by. In Figure 1, there are 22 cities in the first and third quadrants, and 17 cities in the second and fourth quadrants. In Figure 2, there are 24 cities in the first and third quadrants, and 15 cities in the second and fourth quadrants. This shows that among the 41 cities in the Yangtze River Delta, the number of cities showing positive correlation is more than the number showing negative correlation. Compared with 2013, the number of cities with positive correlation in financial agglomeration increased

in 2016, indicating that with the economic development of the Yangtze River Delta region, financial resources are more concentrated.

3.2.2. Analysis of Urban Spatial Correlation Patterns

Table 2. Spatial correlation patterns of 41 cities in the Yangtze River Delta2

City	2013	2016	City	2013	2016	City	2013	2016
Shanghai	HL	HL	Wuxi	LL	LL	Huainan	LH	HH
Hangzhou	HH	LH	Changzhou	LL	LL	Ma'an'shan	HL	HL
Ningbo	HL	HL	Yangzhou	LL	LL	Huaipei	LH	LH
Wenzhou	HH	HH	Zhenjiang	HL	LL	Tongling	LH	LH
Jiaxing	LH	LL	Nantong	LL	LL	Anqing	LH	LL
Huzhou	HL	LL	Xuzhou	LL	LL	Huangshan	HH	HH
Shaoxing	LH	LH	Taizhou	LL	LL	Fuyang	LL	HL
Jinhua	HH	LH	Yancheng	LL	LL	Suzhou	LL	LL
Quzhou	HH	HH	Huai'an	LL	LL	Chuzhou	HL	HL
Taizhou	HH	HH	Lianyungang	HL	HL	Lu'an	LL	LH
Lishui	HH	HH	Suqian	LL	LL	Xuancheng	LH	HH
Zhoushan	-	-	Hefei	-	-	Chizhou	HH	HH
Nanjing	LL	LH	Bengbu	HL	HL	Bozhou	HL	HH
Suzhou	LL	LL	Wuhu	LH	LH			

Cities that were in the first quadrant in both 2013 and 2017 were Chizhou, Huangshan, Lishui, Quzhou, Taizhou and Wenzhou. This indicates that the financial agglomeration level of these five cities is very high, and there is an obvious spatial spillover effect, which promotes the financial development of the surrounding cities to a certain extent. These five cities are connected in space, which indicates that there is a certain spatial clustering phenomenon of financial resources in the Yangtze River Delta. By 2016, Xuancheng City, Bozhou City and Huainan City also entered the first quadrant, indicating that the financial industry of the two cities has achieved relatively good development during this period. The cities of Wenzhou, Taizhou and Lishui in Zhejiang Province have promoted the financial development of the whole province. Shanghai is the only financial center in the Yangtze River Delta metropolitan area, but it has always been in the fourth quadrant during the two years of the survey, which indicates that Shanghai has a high level of financial development, but has no significant spatial spillover effect on the surrounding cities, and the financial agglomeration is spatially heterogeneous. The spatial neighbors of Shanghai include Jiaxing, Suzhou, Wuxi and Nantong, and it can be seen that their own financial development level is far lower than Shanghai's. This indicates that although Shanghai has attracted a large amount of financial resources from the Yangtze River Delta region, its financial resources are not saturated, so Shanghai has not played a significant role in promoting the development of the financial industry of the surrounding cities. On the contrary, it restrains the development of the surrounding cities.

In 2013, Hangzhou and Jinhua were also in the first quadrant, but in 2016, they both entered the second quadrant, showing an obvious negative correlation with the financial development of the surrounding cities. Both Hangzhou and Jinhua are attached to Zhejiang Province and are adjacent cities on the map. Considering the surrounding cities of Ningbo, Taizhou, Wenzhou, Lishui and Quzhou, the level of financial agglomeration in Hangzhou and Jinhua lags behind that of the surrounding cities, which does not form a radiation effect. The main reason may be that the Internet and other high-tech industries have developed rapidly in Hangzhou in recent years, while the financial industry lacks the space for growth. Moreover, the economic strength of the surrounding cities has developed rapidly in recent years, so the financial agglomeration level

of the cities around Hangzhou is high, while the financial level of the cities around Hangzhou is low.

Zhoushan City of Zhejiang Province and Hefei City of Anhui Province are on the horizontal axis in 2013 and 2016, indicating that their own financial development is not correlated with that of their surrounding cities. Zhoushan City is one of the two prefecture-level cities established in an archipelago in China. The main industries there are different from those in the mainland, and there is a certain degree of regional independence. Therefore, the financial development of Zhoushan city is not closely connected with the surrounding cities. Hefei is the capital of Anhui Province, but the development of its financial industry does not drive the development of the surrounding cities, but is independent from the surrounding cities. The reason may be that Hefei does not have a certain entity industry as the support, its economic development mainly relies on the support of the government, and the financial market lacks vitality.

3.2.3. Analysis of Financial Agglomeration Area in Yangtze River Delta

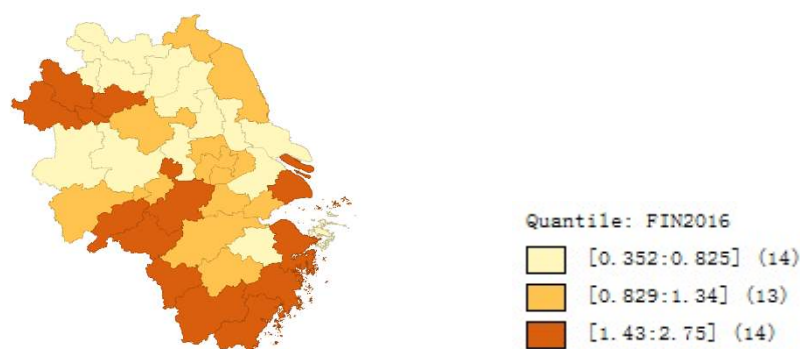


Figure 3. A three-digit map of the financial agglomeration level of 41 cities in the Yangtze River Delta in 2016

As can be seen from the Figure, the phenomenon of regional financial agglomeration in the Yangtze River Delta is obvious. In 2016, Shanghai, Ningbo, Taizhou, Wenzhou, Lishui, Quzhou in Zhejiang Province, Fuyang City, Haozhou, Bengbu City, Huainan City, Huangshan City, Chizhou City, Maanshan City and Xuancheng City in Anhui Province had a high level of financial resources agglomeration. Except for Shanghai, other regions with high financial concentration level are all geographically adjacent. This indicates that the financial agglomeration in the Yangtze River Delta region is not randomly distributed in space, but shows a strong correlation. It is mainly concentrated in the southern and western parts of the Yangtze River Delta.

As can be seen from the Figure, the level of financial agglomeration in the whole Zhejiang Province is very high, which is because Zhejiang's economy is very developed, and the number of listed enterprises is in the forefront of the country. Moreover, the cities with high financial agglomeration are Linhai City and western city of Zhejiang Province, and the level of financial agglomeration is inferior to the surrounding cities compared with the central part of Zhejiang Province. As the second and third largest cities in Zhejiang Province, Wenzhou and Ningbo are both port cities with well-developed foreign import and export trade, which are unique advantages for becoming financial centers and have obvious spatial spillover effects on the financial development of surrounding cities.

The results of Suzhou, Hangzhou and Nanjing, which are relatively developed, show that the degree of financial resources agglomeration is not high. The reason may be that the development of other industries in the three cities is higher than that in other regions, and the industry types are rich, while the city is large, and the proportion of financial industry is relatively not so high. We can see that Anhui Province has formed a good financial agglomeration area, and the financial agglomeration of several cities develops in tandem, with

significant spatial spillover effect. Generally speaking, although the scale of these cities is not large enough, the financial development is fast, and the number of financial employees accounts for a relatively high proportion. Moreover, they are mainly cities with abundant factor resources. For example, Maanshan City is rich in mineral resources and ranks among the top in the country in terms of steel production. Bozhou City, Huangshan City and Xuancheng City are famous historical and cultural cities in Anhui province, with well-developed tourism and cultural industries. Bengbu City is a famous comprehensive transportation hub with well-developed transportation industry. All these show that the financial development of Anhui province is mainly based on the real industry. The main reason is that we found that no cities in Jiangsu Province appeared in the areas with high agglomeration level. The possible reasons are that Jiangsu Province has not formed a distinctive financial agglomeration area and the capital market system is not perfect. It can be predicted that there is still a large space for the financial development of Jiangsu Province in the future.

4. Conclusion and Suggestions

4.1. Conclusion

The 41 cities in the Yangtze River Delta have obvious spatial autocorrelation, and the cities with high degree of financial agglomeration will have spatial spillover effect on the financial development of surrounding cities. According to the distribution on the map, a financial agglomeration area has been formed in the Yangtze River Delta, which indicates that the financial agglomeration in the Yangtze River Delta is spatially dependent. Generally speaking, the financial agglomeration level in the Yangtze River Delta metropolitan area is high and the financial industry is developed, which has played a good role in promoting the economic development in the Yangtze River Delta.

4.2. Suggestions

4.2.1. Strengthen Financial Innovation

Financial innovation is conducive to the agglomeration and utilization of financial resources, and plays a crucial role in the development of local finance. The government should increase its support for financial innovation to enable the Yangtze River Delta metropolitan area to achieve better and faster development under the leadership of central cities such as Shanghai. To enhance financial innovation, first, we should expand the coverage of financial services to cover not only urban areas, but also township areas. Second, we should improve the efficiency of financial services and constantly improve the financial transaction system to make financial transactions more rapid. Third, accelerate economic structural transformation and deepen supply-side reform to provide favorable economic conditions for financial innovation.

In order to form an all-round diversified financial pattern with traditional financial institutions such as banks, insurance and securities as the main body and new financial forms such as private equity funds and financial leasing as the subsidiary, accelerating the agglomeration of various new financial forms and accelerating the innovation of new financial instruments is the key to promoting financial agglomeration. This requires the support of the government to encourage the development of various types of new financial institutions, guide the financial industry to serve the real economy and the national economy and people's livelihood, and speed up the construction of pilot and demonstration zones for financial innovation. We will promote financial integration through the development of fintech.

We should encourage the development of small and medium-sized enterprises and private enterprises, enable the financial market to allocate financial resources in accordance with the law of market development, carry out more reform and innovation for traditional financial

institutions such as banks, expand their investment channels, and adapt to the current trend of the development of Internet finance.

4.2.2. Strengthen the Introduction of Financial Talents

The agglomeration of financial resources is conducive to improving the utilization efficiency of financial resources, enabling more excellent financial practitioners to gather in places with high concentration of financial resources, promoting the development of the financial industry in the region, and thus driving the development of other real industries. It can be said that the number of high-tech talents in a region directly determines the degree of financial development in the region. The modern financial industry relies on the Internet industry to develop, and has a huge demand for high-tech and high-level talents. The government should pay attention to the training of high-quality financial talents, actively carry out cooperation with financial projects in colleges and universities, increase capital investment, consolidate the training of local financial talents, and prevent the loss of financial talents to the surrounding areas. Appropriate preferential tax policies should be adopted for some new financial enterprises to encourage the flow of talents to these innovative financial enterprises.

4.2.3. Speed up the Construction of Shanghai as a Global Financial Center

The financial center of a country represents the financial competitiveness of a country, and the construction of a global financial center can greatly improve the economic strength of a country. The development of financial center relies on the financial hinterland with good economic condition, and the formation of financial center can in turn promote the economic development of the region. Shanghai, as the most financially developed city in the Yangtze River Delta region, should speed up the pace of building Shanghai as a global financial center, integrate with international standards as soon as possible, build a capital market service base, and strengthen the construction of science and technology innovation board, which will help improve the urban service level of Shanghai and further gather and integrate global financial resources. Giving full play to Shanghai's scale advantage and optimizing the allocation of financial resources in the Yangtze River Delta can not only speed up the process of economic integration in the Yangtze River Delta, but also promote direct financing by enterprises, so that the financial market can better serve the real economy and promote the highly integrated industrial chain of the Yangtze River Delta.

4.2.4. Strengthen Financial Cooperation between the Regions

In order to make effective integration and utilization of financial resources, provincial governments should organize and coordinate more to improve the financial cooperation mechanism, thus forming a large-scale financial market and stimulating the power and vitality of the financial market. Promote the flow of financial resources in the region and realize the integrated development of financial industry. We should strengthen cooperation between trans-regional financial institutions and financial regulators, such as building trans-regional cooperative banks and formulating trans-regional financial supervision regulations. Improve the efficiency of financial services, break down barriers between cities, optimize the allocation of financial resources from the perspective of promoting regional integration, and work together to advance.

4.2.5. Open Wider to the Outside World

China's opening to the outside world is subject to many policy restrictions, and the level of opening to the outside world is strongly related to the level of financial development, so local governments should relax the restrictions on financial resources, so that financial factors can be rationally allocated in the market selection and give full play to their maximum effectiveness. Foreign investment institutions should not only gather in first-tier cities like Shanghai, but also introduce foreign investment institutions into the mainland, strengthen the cooperation

between the mainland and foreign investors, and comprehensively enhance the internationalization level of national financial development.

4.2.6. Strive to Promote the Development of Port City Finance

The development of the Yangtze River Delta economic circle is inseparable from its geographical location near the sea, rich natural resources and convenient transportation network. In order to give full play to its location advantage, we should focus on developing port cities. Port cities have superior geographical conditions, rely on water transportation for international import and export trade, high incidence of international trade settlement, high monetary liquidity, strong financial demand, suitable for building into a financial center city. Such as Amsterdam in the Netherlands, London, the capital of the United Kingdom and New York, the most developed city in the United States. Looking at the developed cities in the world, most of them are port cities, so the path dependence can be used to gradually divide port cities into specialized international financial centers like Hong Kong, which will greatly improve the strength of China's financial level. The port cities in the Yangtze River Delta region have a long coastline of Jiangsu Province and a unique location advantage. However, the financial development level of Lianyungang City is obviously behind that of Ningbo City and Shanghai City, and it does not enter the list of large port cities in terms of scale. Therefore, we should vigorously support the construction of port cities in Jiangsu Province to promote the financial development of Jiangsu Province.

5. Epilogue

This paper studies the current situation of financial resources agglomeration in the Yangtze River Delta metropolitan area. Due to the limited space, it may be slightly insufficient to take only one metropolitan area of the Yangtze River Delta as an example. In terms of time span, only eight years of data are selected for processing, which is not long enough for the research. Due to the lack of data in the China Urban Statistical Yearbook in 2018, we studied the financial agglomeration of the Yangtze River Delta in 2016 at the latest. In the calculation of location entropy, only one indicator, the number of financial employees, is quoted in this paper, which contains the assumption that the efficiency of each producer is the same. However, the actual situation is that if there are significant differences in the business scope and technical level among financial industries, it is not comprehensive enough to reflect the industrial scale only by the proportion of the number of employees, ignoring such indicators as the amount of deposits and loans, the number of financial institutions and the added value of the financial industry, which cannot fully represent the concentration of financial resources. However, this paper still reveals the current situation of financial resources agglomeration in metropolitan areas and gives specific opinions and suggestions on how to improve the utilization of financial resources. I hope it can bring some favorable reference to the relevant departments.

References

- [1] Huang Xie Yu, Yang Zaibin. Financial Agglomeration Theory -- Theoretical and Practical Analysis on the Formation of Financial Center [M]. Beijing: China Social Sciences Press, 2006.
- [2] Liang Y. Macro-motivation of financial industry agglomeration [J]. Nanjing Social Sciences, 2006 (11):56-62. (in Chinese).
- [3] Ding Yi, Li Lin, Li Bin. Research on the relationship between financial agglomeration and regional economic growth. Statistics and Decision, 2009(06):131-134.
- [4] Ding Y. Theoretical and Empirical research on financial agglomeration and regional economic growth [D]. Hunan University, 2010.
- [5] Cheng Xinhua. Empirical Research on financial Agglomeration in the Greater Pearl River Delta [D]. Jinan University, 2010.

- [6] Ren Yinghua, Xu Ling, You Wanhai. [6] Spatial econometric model of influencing factors of financial agglomeration and its application [J]. *Research of Quantitative and Technical Economics*,2010,27(05):104-115.
- [7] Li Weijun, Sun Yanli. Financial agglomeration and its spatial evolution in urban agglomerations: A case study of Yangtze River Delta [J]. *Economic Economics & Weft*,2011(06):42-46.
- [8] Huang Xie Yu. Analysis on the internal motivation of financial agglomeration [J]. *Industrial Technical Economics*,2011,30(03):129-136. (in Chinese).
- [9] Li Lin, Ding Yi, Liu Zhihua. Spatial econometric analysis of spillover effect of financial agglomeration on regional economic growth [J]. *Journal of Financial Research*,2011(05):113-123.
- [10] Tan Duoduo. Research on evolutionary mechanism and effect of financial agglomeration[D]. Hunan University,2012.
- [11] Zhang Qingzheng. Research on Financial Agglomeration and Influencing Factors in China[D]. Jilin University,2013.
- [12] Gao Peng. Research on Influencing Factors of Financial Agglomeration [D]. Southwest University of Finance and Economics,2013.
- [13] He Yiqing, Wang Xizu, Zhou Yifan, Bai Caiquan. Empirical analysis on the coupling and coordination of financial agglomeration, economic growth and ecological efficiency in the Yangtze River Economic Belt [J]. *Finance and Economics*,2015(09):13-19.
- [14] Wang Wenjing, Zhang Guodong. Research on financial industry agglomeration in Bohai Rim Economic Circle: Based on spatial panel data of 44 cities [J]. *Journal of Tianjin University of Commerce*,2017,37(06):16-20.
- [15] Liu Ji, Ma Linlin. [J/OL] Research on economic spillover effect and spatiotemporal differentiation of financial agglomeration: a spatial econometric analysis based on inter-provincial data. *Financial development research: 1-9* [2019-03-07]. [https://doi.org/10.19647/j.cnki.37-1462 / f 2019.02.003](https://doi.org/10.19647/j.cnki.37-1462/f.2019.02.003).
- [16] Kindle Berger C.P.,*The Formation of Financial Centers: A Study in Comparative Economic History* [M].Princeton: Princeton University Press,1974.
- [17] Pandilt NR, Gary.A.S, Cook.G.M, Peter Swann., A Comparison of Clustering Dynamics in the British Broadcasting and Financial Services Industries [J].*International Journal of the Economics of Business*, 9(2): 195-224,2002.
- [18] Porteous D.J., *The Geography of Finance: Spatial Dimensions of Intermediary Behavior*[M]. Avebury: Aldershot, 1995.
- [19] Paul Krugman.,*History and Industry Location:The Case of the Manufacturing Belt*[J]*The American Economist*,1991.