

Analysis of the Financial Ecological Environment of Kaifeng City under the Background of Financial Geography

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Abstract: Finance is at the heart of the modern economy. Through the results of the location Gini coefficient, it is known that from 2012 to 2019, under the background of the trend of financial space agglomeration in China, the Yellow River Basin and Henan Province, Kaifeng's financial industry has continued to rise in the national city rankings, and the development of the financial industry has shown progress. Based on the DPSIR-TOPSIS model. Overall, the security of the financial ecological environment in Kaifeng City from 2012 to 2019 has shown an upward trend, but it has been in an unsafe state, and its security situation is still not optimistic, and there is still a huge gap from the security state. As far as each subsystem is concerned, the security status of each subsystem of ecological environment security in Kaifeng City has shown a gradual upward trend, and the driving force system, state system and response system have changed from the unsafe state in 2012 to the critical security state in 2019; The affected system has been in an insecure state and showing a downward trend; The pressure system has changed from a safer state in 2012 to an unsafe state in 2019. Therefore, suggestions are put forward for the development of the financial ecological environment of Kaifeng City.

Keywords: Financial geography, Kaifeng City, DPSIR-TOPSIS model method, Location Gini coefficient.

1. Introduction

The Yellow River is the mother river of the Chinese nation, the protection and development of the Yellow River Basin has always been the country's major plan [1-2], from 2019 to 2020, General Secretary Xi Jinping has repeatedly made major arrangements to strengthen the governance and protection of the Yellow River and promote the high-quality development of the Yellow River Basin. In the 14th Five-Year Plan, the ecological protection and high-quality development of the Yellow River Basin are included in the "in-depth implementation of major regional strategies". Up to now, there are many studies on the ecological protection and high-quality development of the Yellow River Basin [3-8], but few studies have paid attention to the role of local finance in the ecological protection and high-quality development of the Yellow River Basin. In fact, finance has increasingly become the core of the modern economy, the most active and permeable sector of the modern economy, and the geography of money and financial institutions has increasingly become a clear part of the economic organizational structure of various countries, forming a financial network with great power and global coverage [9]. Since the 1990s, due to the needs of China's economic development and the pressure of international financial competition, China has begun a real market-oriented reform of the banking industry, including the abolition of credit plans, large-scale merger of banking institutions, the collection of credit approval powers from local branches of state-owned commercial banks, and the strengthening of risk management [10-12]. In the past two years, in the face of fierce competition, banking institutions have begun to change their strategies, no longer withdrawing and merging outlets, but adjusting the layout of outlets or increasing operating outlets. These reforms have led to major

changes in the location of banking institutions, accelerated the speed of capital flows, and the system has become less and less restrictive on the flow of financial resources between regions, and has caused a series of financial geographical and regional development problems.

In this context, the study explores the position of Kaifeng City in the financial geography of the country (Henan Province)? As well as constructing an index model to evaluate the financial ecological environmental protection of Kaifeng City under the new development pattern, to analyze the development of financial ecological environmental protection in Kaifeng City in recent years.

2. Data Sources and Research Methods

2.1. Data Sources

The data in this paper are from the "China Regional Financial Operation Report" (2012-2019), "China Urban Statistical Yearbook" (2012-2019) and "Henan Statistical Yearbook" (2012-2019), etc., and the calculation of some data indicators is carried out in accordance with the relevant standards of the statistical yearbook. When calculating urban cities, this paper uses only the data of 294 cities in 2018 above the "China Urban Statistical Yearbook" as the basis for calculation, which does not include municipalities directly under the central government, county-level cities, autonomous prefectures and other urban units.

2.2. Research Methods

2.2.1. Location Gini Coefficient

Gini coefficient was originally used to measure the degree of imbalance, industrial space agglomeration is also an imbalance phenomenon, this paper uses the Gini coefficient to measure the degree of spatial agglomeration of the financial industry, the Gini coefficient value range is between

0 and 1, the closer to 1, the more it indicates that the industrial space agglomeration is high, the calculation formula is as follows.

$$AG = \frac{1}{2N^2\mu} \sum_j \sum_k \left| \frac{x_j}{X} - \frac{x_k}{X} \right|$$

In the formula, x_j or x_k is the added value of the financial industry, the number of employed people in the financial industry in j or k province (or city) financial industry added value or employment number, the financial industry Gini coefficient is calculated using the added value of the financial industry in each region, the number of employed people in the financial industry, X is the total number of provinces and cities in the country for the added value of the financial industry and the number of employed people in the financial industry, the μ is the average of the proportion of provinces and cities, and N is the number of provinces and cities.

2.2.2. DPSIR-TOPSIS Model

Financial ecological environment security is a complex giant system with multiple factors interacting with each other and interacting, involving many elements, and reasonable evaluation index systems and methods have an important impact on its results. The "Driving Force-Pressure-State-Impact-Response" (DPSIR) concept model proposed by the European Environment Agency after the revision of the PSR model looks at the interrelationship between people and the environment from a systematic perspective, has the characteristics of systematic, comprehensive and other characteristics, and can monitor the continuous feedback mechanism between various indicators[13], which is conducive to reflecting the systematic process of land ecological security. Based on this, this paper attempts to organically combine the DPSIR conceptual model with the TOPSIS evaluation method based on multi-dimensional recombination, and finally forms a DPSIR-EES conceptual model, and takes Kaifeng City as an example to systematically evaluate its financial ecological environment security, in order to provide a reference for the effective management of its financial ecological environment security.

3. Analysis of the Results of The Evolution Trend of Financial Geography

3.1. Analysis of The Evolution Trend of National Financial Geography

3.1.1. Analysis of Spatial Agglomeration of China's Financial Industry

The location Gini coefficient of the added value of the financial industry and the number of financial employment at the provincial level is shown in Figure 1, and the location Gini coefficient of the added value of the financial industry and the number of financial employment at the municipal level is Figure 2. From Figure 1 and Figure 2, at the provincial and municipal levels across the country, the spatial distribution of added value and financial employment in China's financial industry has the following characteristics.

Judging from the change of the Gini coefficient of the location of the financial industry in Figure 1 and Figure 2, the spatial agglomeration trend of China's financial industry at the provincial and municipal scales is not significant, and even a slight spatial dispersion feature appears. At the provincial level, the spatial agglomeration degree of added value of the financial industry is higher than that of employed persons, but all of them show a downward trend and the decline is small, among which the fluctuation of the Gini coefficient of the added value location is greater than that of the Gini coefficient of the location of the employed persons. The Gini coefficient of the added value of the financial industry decreased by 0.017 from 0.468 in 2012 to 0.451 in 2019; The Gini coefficient for the location of employed persons in the financial sector decreased by 0.007 from 0.365 in 2012 to 0.358 in 2019. On the municipal scale, the spatial agglomeration degree of added value of the financial industry is higher than that of employed persons, but the spatial agglomeration degree of added value of the financial industry shows a slight downward trend, and the employment of personnel shows a growth trend. The Gini coefficient of the added value of the finance industry decreased from 0.599 in 2012 to 0.592 in 2019, a decrease of 0.007; The Gini coefficient for the location of employed persons in the financial sector decreased from 0.452 in 2012 to 0.496 in 2019, an increase of 0.043.

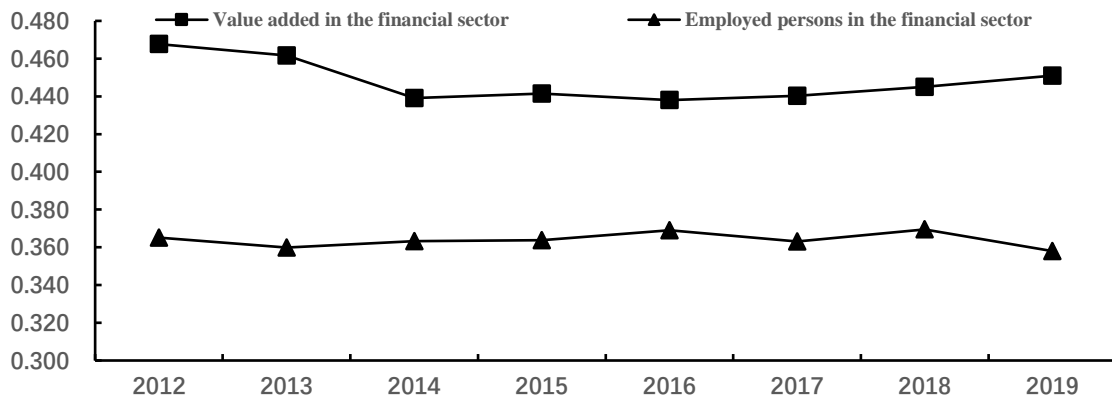


Figure 1. Gini coefficient of China's (provincial) financial industry from 2012 to 2019

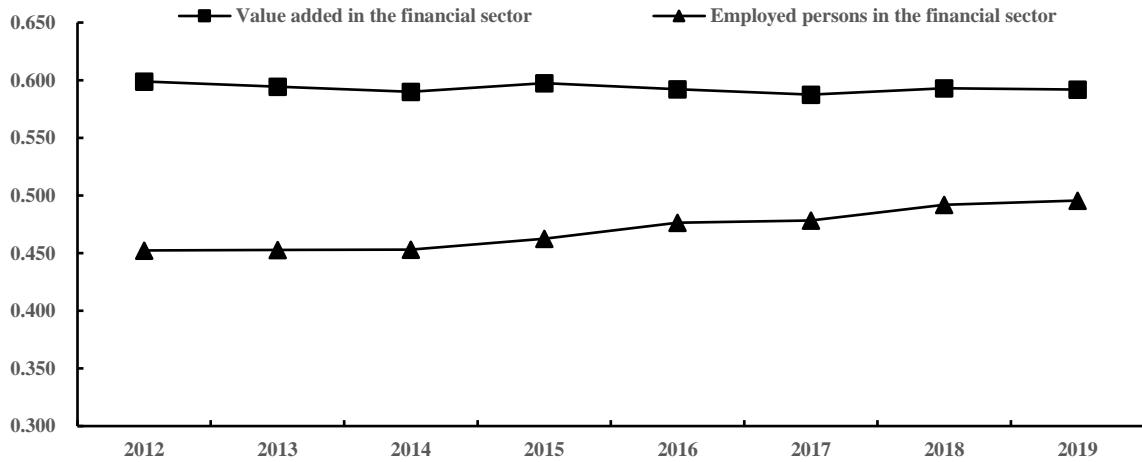


Figure 2. Gini coefficient of China's (city) financial industry from 2012 to 2019

Under the special national conditions of China, the development of the banking industry can further reflect the spatial agglomeration and spatial dispersion trend of China's financial industry, according to the data on the "China Regional Financial Operation Report" released by the People's Bank of China, the location Gini coefficient of 2012-2019 is calculated by using the data of bank outlets, employees and total assets in the province, and the results are shown in Figure 3. From the perspective of the niche coefficient of China's banking industry, the spatial agglomeration of bank assets is much higher than that of bank

outlets and practitioners, but bank assets and practitioners also show slight spatial dispersion characteristics. The Gini coefficient of bank asset location is greater than that of bank outlets and employees, which fell from 0.436 in 2012 to 0.428 in 2019, a decrease of 0.008; The Gini coefficient of bank branch locations has remained stable from 0.330 in 2012 to 0.330 in 2019, with slight fluctuations; The Gini coefficient of employee location decreased by 0.010 from 0.341 in 2012 to 0.331 in 2019, a decline greater than that of bank assets and bank branches.

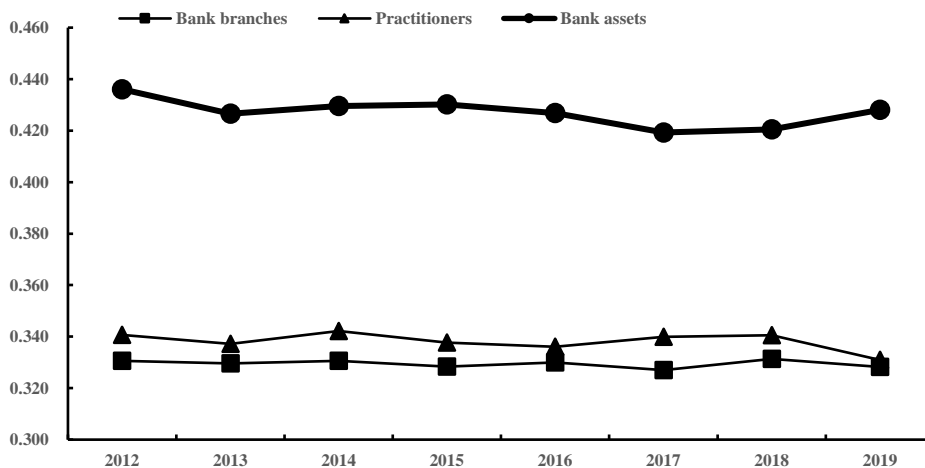


Figure 3. Change of Gini coefficient of the location of financial institutions of Bank of China from 2012 to 2019 (provincial area)

3.1.2. Analysis of China's Financial Industry Pattern

From the perspective of location Gini coefficient, since 2012, the spatial agglomeration trend of China's financial industry has not been significant, but from the perspective of the four regional patterns, the regional differences in the development of the financial industry are still more obvious. China's banking industry is the main body of the financial industry, this article takes the banking institutions as an example, the number of banking financial institutions in the eastern region, the number of employees, total assets accounted for the highest proportion in the country, and continue to grow. The central and northeastern regions have declined to varying degrees, of which the number of legal entities in the central region has decreased from 23.33% of

the national proportion in 2012 to 20.55% in 2019, the most significant decline. All the growth in the western region is mainly manifested in the increase in the number of legal entities and the proportion of total assets, the decline in the number of bank outlets and the proportion of employees, and the strengthening of the spatial agglomeration of the banking industry in the western region.

From the perspective of the 6 provinces in the central region, the status of different aspects of the financial industry in the country has risen or decreased to varying degrees, of which the banking industry in Henan Province is larger, the proportion of all aspects is greater than that of other central provinces, and Henan Province has contracted the number of banking institution outlets and employees, and realized the expansion of banking institution assets, and the spatial

agglomeration trend of the banking industry in Henan Province has increased in 8 years. From the perspective of the national proportion of banking financial institution outlets in 2012 and 2019, the six central provinces of Hunan and Henan are declining, Hunan has fallen the most, from 4.53% to 4.34%, 8 years down 0.19%, the other four provinces are increasing, Anhui has increased the most, from 3.27% to 3.80%, 8 years increased by 0.53%, in stark contrast to Hunan (Table 1). Judging from the proportion of employees in

banking financial institutions nationwide, only Hunan and Shanxi have risen to varying degrees, and the other four provinces are declining. From the perspective of the national proportion of assets of banking financial institutions, only Shanxi Province is declining in the six central provinces, and the other five provinces are increasing, of which Henan Province has increased the most, with an increase of 0.48% in 8 years.

Table 1. Regional distribution of financial institutions in China's banking industry (%)

Region	The proportion of the number of institutions		The proportion of employees		Proportion of total assets		Proportion of the number of legal entities	
	2012Year	2019Year	2012Year	2019Year	2012Year	2019Year	2012Year	2019Year
eastern	39.49	39.98	44.26	45.59	58.91	57.81	33.41	36.60
Central	23.39	23.68	21.09	20.44	14.87	16.41	23.33	20.55
northeast	9.40	9.59	10.57	9.99	7.14	6.46	9.69	7.59
westward	27.72	26.74	24.08	23.98	18.50	18.76	33.57	35.26

Table 2. Proportion of banking financial institution networks, employees and assets in the six central provinces in the country (%)

Region	Cell specific gravity		The proportion of employees		Proportion of total assets	
	2012Year	2019Year	2012Year	2019Year	2012Year	2019Year
HuNan	4.53	4.34	3.34	3.41	2.40	2.65
HuBei	3.48	3.50	3.46	3.17	2.87	3.22
JiangXi	3.14	3.15	2.61	2.60	1.73	2.10
AnHui	3.27	3.80	3.11	3.09	2.39	2.84
ShanXi(Jin)	3.05	3.12	3.13	3.21	2.32	1.98
HuNan	5.91	5.76	5.43	4.96	3.15	3.62

3.2. Results of Regional Financial Geography Evolution Trends

3.2.1. Spatial Agglomeration Analysis of Financial Industry in the Yellow River Basin

The Yellow River Basin has a long economic and cultural history, and through a total of 9 provinces, the location Gini coefficient analysis can better understand the location advantages of Henan Province at the provincial and municipal scales.

Judging from the change of the Gini coefficient of the location of the financial industry in the Yellow River Basin in Figure 4 and Figure 5, the spatial agglomeration trend of the financial industry in the Yellow River Basin at the provincial and municipal levels has been decreasing. At the provincial level, the spatial agglomeration of added value in the financial industry is higher than that of employed persons, but it has declined in fluctuations. The Gini coefficient of the added value of the financial industry first fell from 0.426 in 2012 to 0.393 in 2015, reaching the lowest value, and then began to

grow to 0.411 in 2019, but the overall decline was 0.015; The Gini coefficient of the location of employed persons in the financial industry has risen from 0.358 in 2012 to 0.383 in 2016, reaching the highest value of employment in the financial industry, and also the highest spatial agglomeration of the number of employed people in the financial industry in the Yellow River Basin, after which the location Gini coefficient has decreased until 0.343 in 2019, which has generally decreased by 0.008. On the urban scale, the spatial agglomeration of the added value of the financial industry in the Yellow River Basin is higher than that of employed persons, but the spatial agglomeration of added value of the financial industry shows a slight downward trend, while the employment of personnel shows an increasing trend. The Gini coefficient of the added value of the financial sector has decreased slowly from 0.549 in 2012 to 0.545 in 2019, a decrease of 0.004; The Gini coefficient for the location of employed persons in the financial sector decreased from 0.410 in 2012 to 0.487 in 2019, an increase of 0.078.

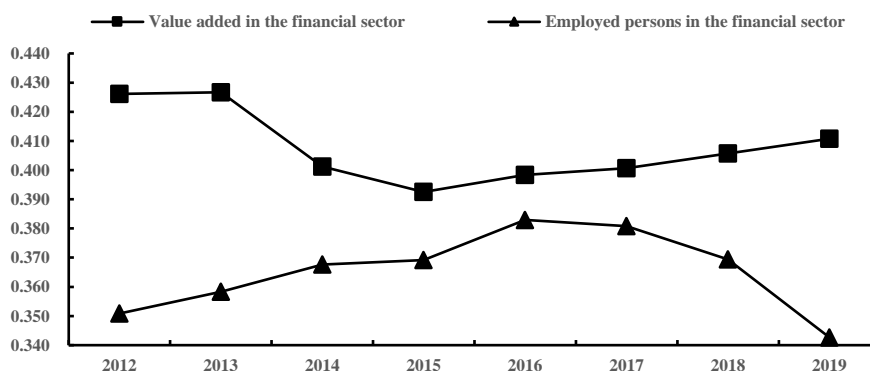


Figure 4. Gini coefficient of the location of the financial industry in the Yellow River Basin from 2012 to 2019 (provincial)

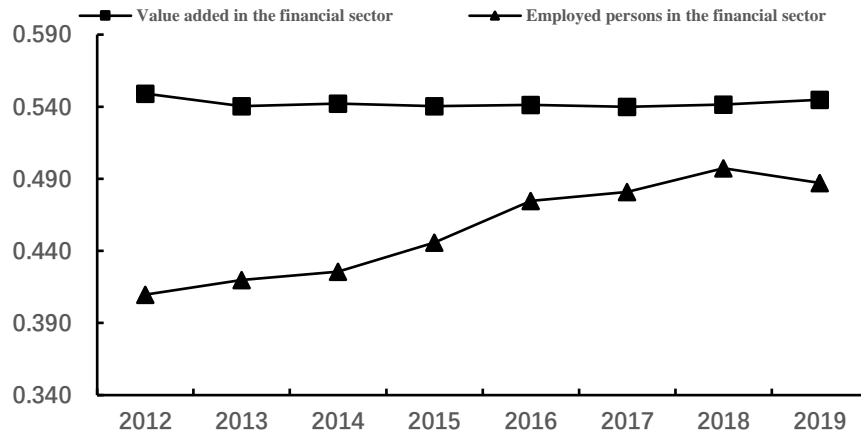


Figure 5. Gini coefficient of the location of the financial industry in the Yellow River Basin from 2012 to 2019 (urban area)

The change of Gini coefficient in the location of banking financial institutions in the Yellow River Basin from 2012 to 2019 is shown in Figure 6. From the perspective of the Niki coefficient of the banking location in the Yellow River Basin, in the Yellow River Basin, the spatial agglomeration of bank assets is higher than that of bank outlets and practitioners, but the regional differences are narrowed, of which the branches and practitioners of banking institutions also show slight

spatial dispersion characteristics. The Gini coefficient of bank asset location is greater than that of bank outlets and employees, slowly rising from 0.380 in 2012 to 0.384 in 2019, an increase of 0.003; The Gini coefficient of bank institution branch location has decreased from 0.347 in 2012 to 0.342 in 2019; The Gini coefficient of employee location decreased from 0.351 in 2012 to 0.345 in 2019, a decrease of 0.006, a decline greater than that of bank branches.

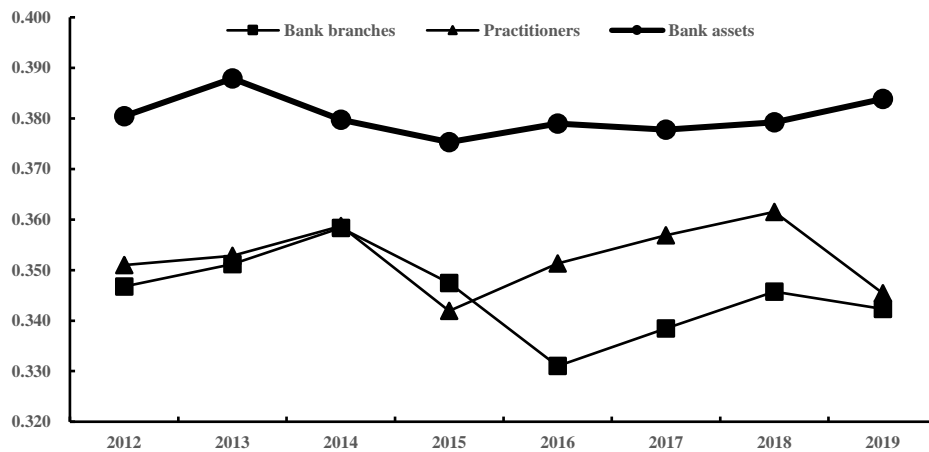


Figure 6. Change of Gini coefficient of the location of banks and financial institutions in the Yellow River Basin from 2012 to 2019 (provincial)

3.2.2. Analysis of the Pattern of The Financial Industry in the Yellow River Basin

From the perspective of location Gini coefficient, since 2012, the spatial agglomeration trend of the financial industry in the Yellow River Basin has decreased significantly, and its banking industry has also shown a downward trend. In the Yellow River Basin, in addition to the increase in legal entities since 2012, an increase of 0.034 in the 8-year period, other such as the number of banking institutions, the number of employees and the total amount of assets have shown a downward trend, of which the number of employees has fallen the most, the number of banking employees in the Yellow River Basin accounted for 29.27% of the national banking industry in 2012, and fell to 28.47% in 2019.

From the perspective of the 9 provinces in the Yellow River Basin region, the status of different aspects of the financial industry in the basin has risen or decreased to varying degrees, of which Shandong, Sichuan and Henan provinces are higher

than other provinces in all aspects, and are the vanguard of the development and progress of the Yellow River Basin. From the proportion of banking financial institutions in the Yellow River Basin in 2012 and 2019, the five provinces of Qinghai, Sichuan, Gansu, Shaanxi and Henan are all declining, of which Gansu has fallen the most, with a decline of 0.60% in 8 years; Ningxia, Inner Mongolia, Shanxi and Shandong all increased, with Shanxi and Shandong increasing the most, with Shanxi increasing from 9.73% to 10.11% and Shandong increasing from 21.60% to 21.88%. Judging from the proportion of employees of banking financial institutions in the Yellow River Basin, Sichuan, Inner Mongolia and Henan provinces are in decline, of which Henan Province has fallen the most, from 18.54% to 17.43%, down 1.11%; Other provinces are increasing, with Qinghai rising slightly and Shaanxi rising significantly. From the perspective of the proportion of assets of banking financial institutions in the Yellow River Basin, the total assets of

Gansu, Ningxia and Henan have increased since 2012, and Henan has increased the most, with an increase of 2.53% in 8 years; Other provinces have seen their total assets decline

since 2012, with Shanxi falling the most, down 1.46% in 8 years, and Sichuan falling the least, falling by only 0.01% in 8 years.

Table 3. Proportion of banking financial institutions, employees and assets in the Yellow River Basin of nine provinces in the Yellow River Basin (%)

Region	Cell specific gravity		The proportion of employees		Proportion of total assets	
	2012Year	2019Year	2012Year	2019Year	2012Year	2019Year
QingHai	1.62	1.62	1.62	1.65	1.84	1.64
SiChuan	20.85	20.25	20.99	20.86	20.05	20.04
GanSu	7.00	6.72	5.81	6.19	5.20	5.73
NingXia	1.85	2.05	2.11	2.18	1.90	1.92
NeiMengGu	8.25	8.52	9.60	8.78	7.17	6.96
ShanXi(Shan)	10.27	10.17	8.87	9.66	11.42	10.91
ShanXi(Jin)	9.73	10.11	10.70	11.28	11.02	9.56
HeNan	18.84	18.68	18.54	17.43	14.93	17.47
ShanDong	21.60	21.88	21.75	21.97	26.46	25.77

3.3. Spatial Agglomeration Analysis of Financial Industry in Henan Province

The location Gini coefficient analysis of Henan Province can clearly analyze the financial industry status of Kaifeng City on the urban scale.

Judging from the change of the Gini coefficient of the location of the financial industry in Henan Province in Figure 7, the spatial agglomeration trend of the financial industry in

Henan Province on the urban scale is increasing. The spatial agglomeration of the added value of the financial industry in Henan Province is greater than that of employed persons, and all of them are showing growth. The Gini coefficient of the added value of the financial industry has slowly risen from 0.430 in 2012 to 0.471 in 2019, and the Gini coefficient of the location of employed persons in the financial industry has risen from 0.326 in 2012 to 0.378 in 2019, an increase of 0.052.

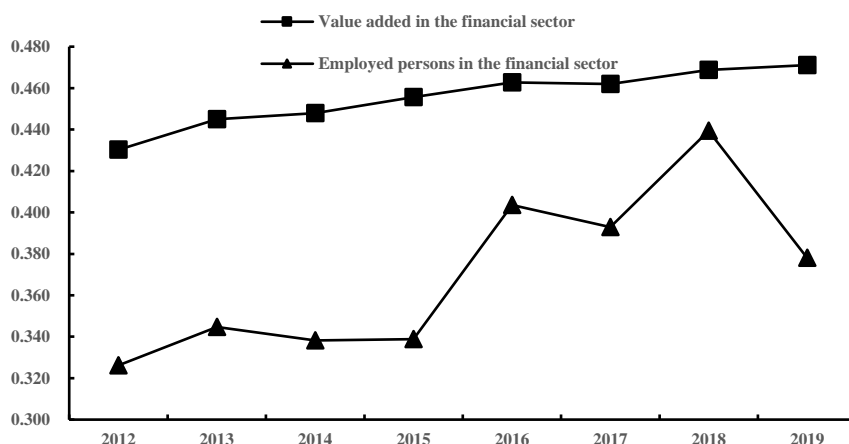


Figure 7. Gini coefficient of the financial industry in Henan Province from 2012 to 2019

3.4. Analysis of Changes in The Financial Status of Kaifeng City

In summary, in China's financial industry location Gini coefficient declined, in the Yellow River Basin and the central provinces observed that Henan Province has a trend of financial industry agglomeration enhancement, and in terms of Henan Province's location Gini coefficient, its location Gini coefficient is also in the process of strengthening. China's financial industry in the provincial and municipal scale of the spatial agglomeration trend is not significant, and even a slight spatial dispersion feature appears. As a prefecture-level city in Henan Province, Kaifeng City has seized the opportunity since 2012 and has also achieved the development of its own financial industry, from the perspective of the added value of the financial industry, in the ranking of the national market, Kaifeng City has risen from 179 in 2012 to 160 in 2019; Judging from the ranking of the Yellow River Basin city, Kaifeng City has risen from 60th to

53rd in 8 years; In Henan Province, it has only risen one place in 8 years. At the time when the spatial agglomeration of the domestic financial industry is declining, Henan Province has strengthened the spatial agglomeration of the financial industry and promoted the economic development of the province, so Kaifeng City has shown that the development of the financial industry has risen greatly in the ranking of cities in the country and the Yellow River Basin, but its rise in Henan Province is small.

4. Construction and Analysis of Financial Ecological Environment Indicators in Kaifeng City

4.1. Construction of Financial Ecological Environment Security Evaluation Index System in Kaifeng City

Financial ecological environment assessment is a more

complex problem, this paper attempts to use the DPSIR conceptual model to evaluate and analyze its safety evaluation, on the basis of reference to relevant research results [14-20], mainly select the following indicators for the construction of Kaifeng financial ecological environment security evaluation index system (Table 5). In this paper, the entropy method and

the coefficient of variation method are combined to assign the combined weights of the indicators to improve the accuracy of the weight assignment and reduce the error caused by the single weight assignment, and the weights of each index are shown in Table 5. This method is more common and its formula is not described in this article.

Table 5. Kaifeng financial ecological environment security index system

The target layer	Criteria layer	Metric layer	Indicator orientation	Weight
Kaifeng City's financial ecological environment security	Driving Force (D)	Green Coverage Area (hectares)	+	0.0495
		GDP per capita (RMB)	+	0.0546
		Proportion of secondary industry (%)	-	0.0495
		Deposits (10,000 RMB)	-	0.0485
		Energy conservation and environmental protection expenditure accounted for the proportion of fiscal expenditure (%)	-	0.0471
	Pressure (P)	GDP growth rate (%)	+	0.0678
		Urbanization rate (%)	-	0.0505
		Various loans (10,000 yuan)	-	0.0464
	State (S)	Park green area (hectares)	+	0.0411
		Economic density (10,000 RMB/km ²)	+	0.0334
		Total retail sales of consumer goods per capita (RMB)	+	0.0411
		Financial density (people/km ²)	+	0.0517
		Loan-to-deposit ratio (%)	+	0.0694
	Impact (I)	Fiscal revenue (10,000 yuan)	+	0.0428
		Per capita disposable income (yuan)	+	0.0500
		Electricity consumption of the whole society (100 million kWh)	-	0.0480
	Response (R)	Afforestation area (hectares) in the current year	+	0.0327
		Proportion of tertiary industry (%)	+	0.0632
		Employed in Financial Sector (Person)	+	0.0616
		Added value of the financial industry (10,000 yuan)	+	0.0510

4.2. Comprehensive Evaluation Model

The steps of the TOPSIS evaluation method are, in order:

(1) Determination of weighted normalized decision matrix U:

$$U = |u_{ij}|_{n \times m} = W_j X_{ij}$$

wherein: w_j refers to the indicator weight; X_{ij} is the matrix after the standardization of the indicator; n is the number of years; m is the number of indicators.

(2) According to the above formula, calculate the positive ideal solution and determine the negative ideal solution.

The positive ideal solution U^+ refers to the maximum value in the weighted normalized decision matrix U , while the negative ideal solution U^- represents the minimum value.

Positive ideal solution,

$$U_j^+ = \{\max u_{ij}\} (j = 1, 2, \dots, m)$$

Negative ideal solution,

$$U_j^- = \{\min u_{ij}\} (j = 1, 2, \dots, m)$$

(3) Calculate the distance Q^+ between the evaluation object and the positive ideal solution and the distance Q^- of the negative ideal solution of each year.

$$Q^+ = \sqrt{\sum_{j=1}^m (u_{ij} - U_j^+)^2} (i = 1, 2, \dots, n);$$

$$Q^- = \sqrt{\sum_{j=1}^m (u_{ij} - U_j^-)^2} (i = 1, 2, \dots, n).$$

In the formula: The smaller the Q^+ value, the closer the distance between the evaluation unit and the positive ideal solution, that is, the higher the security level of the financial ecological environment in Kaifeng City; The smaller the Q^- value, the closer the evaluation unit is to the negative ideal solution, that is, the lower the security level of the financial ecological environment in Kaifeng City.

(4) Calculate the proximity of each evaluation unit to the positive and negative ideal solutions F_i .

$$F_i = \frac{Q^-}{Q^+ + Q^-}$$

Medium: the closeness of F_i is the financial ecological environment security value of Kaifeng City, which is 0 to 1, and the larger the value display, the safer the financial ecological environment security status of Kaifeng City, and vice versa, the more dangerous it is.

4.3. Judging Criteria

Whether the evaluation criteria of the financial ecological environment security status of Kaifeng City are appropriate, whether the grading setting can accurately represent the actual situation, and directly affect the correctness and reliability of the evaluation results, this study refers to relevant literature and combined with the actual situation of Kaifeng City, and divides the financial ecological environment security status of Kaifeng City into 5 evaluation levels according to the proximity F_i in a non-equal spacing manner (Table 6).

Table 6. Evaluation criteria for the safety of the financial ecological environment in Kaifeng City

Fi	Grade	Security status
[0, 0.4)	I	Insecurity
[0.4, 0.6)	II	Relatively security
[0.6, 0.7)	III	Critical security
[0.7, 0.9)	IV	Relatively security
[0.9, 1]	V	Security

4.4. Results and Analysis

4.4.1. Comprehensive Assessment of Financial Ecological Environment Security

The results of the financial ecological environment security status of Kaifeng City from 2012 to 2019 were obtained through calculation (Figure 8, Figure 9). As can be seen from the figure, the financial ecological environment of Kaifeng City from 2012 to 2019 is generally in a trend of continuous improvement. Q^+ shows a gradual decreasing trend, constantly approaching the positive ideal solution, and Q^- shows an upward trend, gradually deviating from the negative ideal solution. Kaifeng City's financial ecological environment security value (paste progress) has risen from 0.4520 in 2012 to 0.5451 in 2019, an increase of 0.0931, and the financial ecological environment security status has been at the II level, that is, a relatively unsafe state. Among them, the security level in 2013 was the lowest, in an unsafe state, and then the security situation continued to improve, but its rise was relatively slow, and it has been in a relatively unsafe state, which is related to the rapid development of the economy and the relatively slow development of its financial industry. From 2014 to 2017, although it was in a less safe

state, the security situation improved rapidly, from 0.4543 in 2014 to 0.5439 in 2017, an increase of 0.0896. This is because with the increasing impact of the ecological protection and high-quality development strategy of the Yellow River Basin, Kaifeng City began to gradually examine the argument that its own development is only for GDP development, began to pay attention to the coordination of economic development and ecological protection, the area of park green space and afforestation began to expand continuously, and the financial density continued to rise, providing strong support for the increase in the number of employees in the financial industry and alleviating the tense contradiction between financial development and ecological protection. 018-2019 Kaifeng City's financial ecological environment security growth is relatively slow, in a relatively unsafe state, indicating that with the concept of sustainable development, the concept of beautiful China gradually penetrated the hearts of the people, government financial support, etc., the importance of financial ecological environmental protection is increasingly valued, but limited by the topography of Kaifeng City, the surge in electricity consumption in the whole society and other factors, the growth is relatively slow.

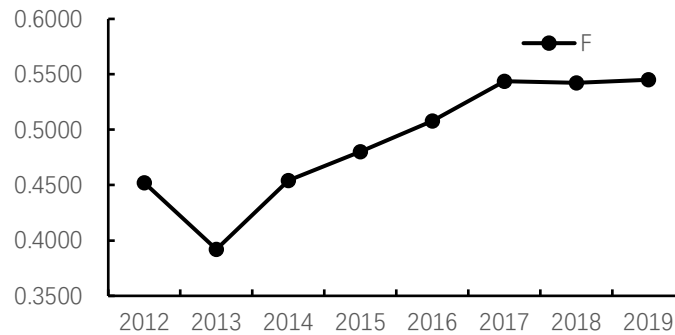


Figure 8. The development trend of financial ecological environment security in Kaifeng City from 2012 to 2019

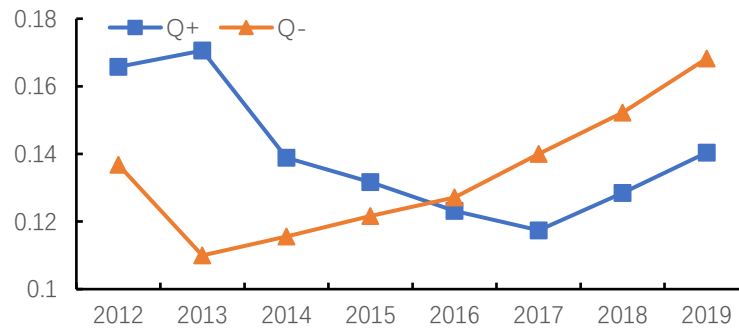


Figure 9. Q^+ and Q^- development trends of financial ecological environment security in Kaifeng City from 2012 to 2019

4.4.2. Analysis of the Security Status of The Financial Ecological Environment of Each Subsystem

Analysis of Figures 10-12 can be seen: (1) In terms of the driving force system, Q^+ becomes smaller and smaller year

by year, gradually approaching the positive ideal solution; Q^- increasing year by year, gradually deviating from the negative ideal solution, the financial ecological environment security situation tends to improve, the closeness slowly rises year by year, from 0.3577 in 2012 to 0.6467 in 2019, and the

security state is also changed from insecurity to critical security, which is closely related to the improvement of Henan's social and economic development level in recent years. In the past 8 years, Kaifeng City has made remarkable progress in all aspects of social and economic development, and the regional economy has developed rapidly, with per capita GDP increasing from 25,922 yuan in 2012 to 51,733 yuan in 2019; The area covered by greenery has increased

significantly, from 3,509 hectares in 2012 to 6,790 hectares in 2019. This provides strong support for the security of Kaifeng's financial ecological environment, drives the driving force system of the city's financial ecological environment security to show an upward development trend, and promotes the development of the city's financial ecological environment security in a better direction.

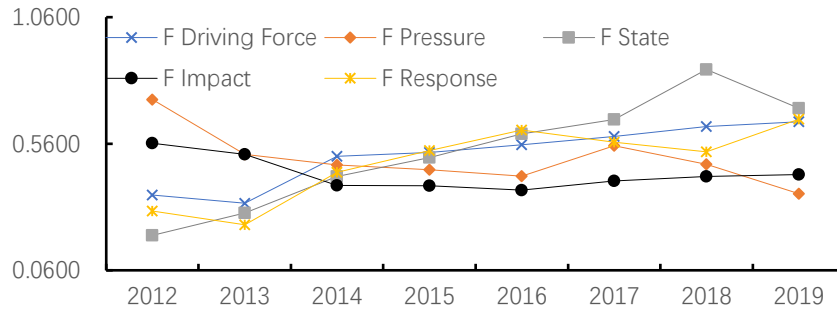


Figure 10. The change trend of the closeness of each subsystem of financial ecological environment security in Kaifeng City

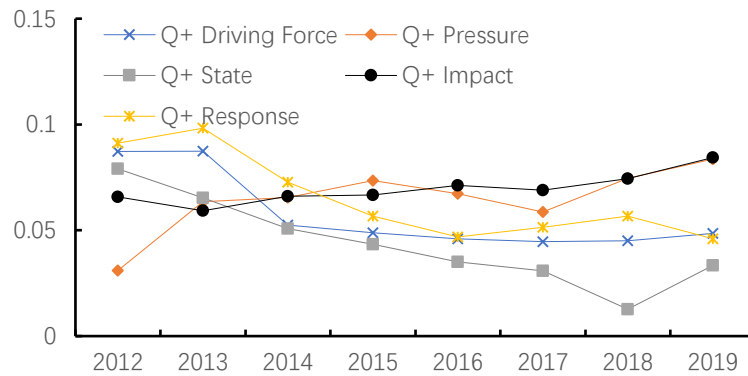


Figure 11. Q+ change trend of each subsystem of financial ecological environment security in Kaifeng City

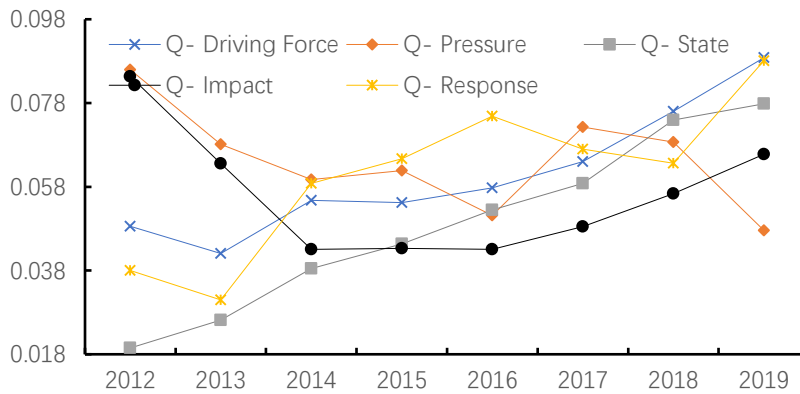


Figure 12. Q-change trend of various subsystems of financial ecological environment security in Kaifeng City

In terms of pressure system, Q+ is slowly and gradually larger year by year, Q- gradually becomes smaller and smaller, resulting in the closeness gradually becoming smaller, and the security of the financial ecological environment is getting bigger and bigger, gradually changing from a safer state in 2012 to an unsafe state in 2019. The socio-economic development of Kaifeng City, while driving the financial ecological environment to improve safely, has also brought heavy financial pressure to its development, such as energy conservation and environmental protection expenditures rising year by year, ensuring the rapid development of urbanization, bearing the pressure of interest payment and repayment of loans from all parties, and maintaining the rise in GDP growth, which poses a serious threat to financial

ecological security and makes it face more and more pressure. While maintaining the rapid development of social economy, ensuring continuous investment in energy conservation and environmental protection, rapid development of urbanization, and reducing its pressure on loans should become an important focus to alleviate the security situation of the city's financial ecological environment.

(3) In terms of the state system, Q+ is slowly getting smaller and smaller year by year, Q- is gradually slow and large, and the security state of Kaifeng's financial ecological environment is getting better and better, gradually changing from the unsafe state in 2012 to the critical security state in 2019. Its overall closeness is on the rise, 2012-2013 is in an

unsafe state, 2014-2016 has been in a less safe state, 2017 into a critical security state, 2018 into a more safe state, 2019 fell to a critical security state. This is because under the pressure system, under the premise of maintaining GDP growth and urbanization construction basically unchanged, thanks to the ecological civilization and sustainable development strategy of the Yellow River Basin, as well as the improvement of people's consumption awareness, the steady growth of economic density and financial density shows that the construction of a financial ecological environment requires a solid material guarantee and the improvement of people's lives.

4) In terms of affecting the system, with the gradual improvement of the security status of the state system, the impact on social and economic development also tends to decline, the proportion of deposits and loans has declined, the increase in fiscal revenue, the increase in per capita disposable income, etc. have a strong impact on social development, but its energy consumption is too huge, and the electricity consumption of the whole society has surged, resulting in the Q+ growth of the impact system year by year, Q-year by year, deviating from the security situation, has been hovering in the less safe state range, but showing a downward trend. This decreased from 0.5619 in 2012 to 0.4381 in 2019.

(5) In terms of the response system, with the increasing prominence of problems such as the ecological environment and financial management fraud in recent years, people's awareness of environmental protection and financial awareness have been significantly enhanced, the protection of financial ecological environment security has been increasingly valued by all sectors of society, the city's governance efforts have gradually increased, a series of measures have been introduced, the added value of the financial industry, the number of employment in the financial industry have been significantly improved, the proportion of the tertiary industry has increased year by year, the afforestation area accounts for the total area of land, and the security status of the response system has been significantly improved. From the insecurity state in 2012 to the critical security state in 2019.

5. Conclusions and Recommendations

Through the results of the location Gini coefficient, it is known that the spatial agglomeration trend of China's financial industry from 2012 to 2019 is not obvious, the regional differences are significant, and the status of Henan Province in the central and Yellow River basins has changed greatly, but the financial sector in Henan Province has shown a spatial agglomeration trend; From the perspective of the main banking industry in China's financial industry, whether it is the whole of China, or the central or the Yellow River Basin region, the spatial agglomeration of bank assets is much higher than that of bank outlets and practitioners, but bank assets and practitioners also show slight spatial dispersion characteristics. Henan Province is mainly manifested in the rise in bank assets and the contraction of banking institution outlets and employees. In this context, Kaifeng's financial industry has been rising in the national city rankings, and the development of the financial industry has shown progress. Based on the DPSIR-TOPSIS model, it can be seen that on the whole, the security of the financial ecological environment in Kaifeng City from 2012 to 2019 showed an upward trend, but it has been in an unsafe state, and its security situation is still not optimistic, and there is still a huge

gap from the security state. As far as each subsystem is concerned, the security status of each subsystem of ecological environment security in Kaifeng City has shown a gradual upward trend, and the driving force system, state system and response system have changed from the unsafe state in 2012 to the critical security state in 2019; The affected system has been in an insecure state and showing a downward trend; The pressure system has changed from a safer state in 2012 to an unsafe state in 2019.

In view of the above conclusions, the following suggestions are put forward: First, in the context of the development of the financial industry in the whole country, the Yellow River Basin and Henan Province, Kaifeng City should strengthen the spatial agglomeration of the financial industry in the city, form an absorption role in the city's financial industry, and prevent capital outflow. The trend of Henan Province's financial industry strongly concentrated in the provincial capital Zhengzhou is irreversible, so it is necessary to seize the geographical advantage of Kaifeng, promote the integration of Zhengbei finance, absorb Zhengzhou's idle capital into Kaifeng, and contribute to the construction of Kaifeng. In the Yellow River Basin city, Kaifeng City's financial industry is stronger than the western city but weaker than the eastern city, therefore, it is necessary to strengthen the ecological environmental protection of Kaifeng City, take the road of "green mountains and green waters are golden mountains and silver mountains", and attract the financial industry to settle down and develop with a good environment.

Second, accelerate the construction of Kaifeng City's financial center and rural inclusive finance. Strive to promote the construction of Lankao County Financial Inclusive Financial Reform Pilot Zone, while promoting other counties to strengthen financial reform, adjust the industrial structure, expand the total amount of financial assets, and enhance Kaifeng City's financial discourse power in Henan Province. Rural inclusive finance is a potential growth point for financial development, and strengthening the construction of rural inclusive finance in Kaifeng City can effectively reduce poverty, narrow the gap between the rich and the poor, allow the vast rural areas to participate in economic construction, ecological protection and high-quality development of the Yellow River Basin, mobilize the people, and improve grass-roots mobilization.

Third, promote the construction of the financial ecology of the Yellow River to create a beautiful Kaifeng. Improve the resource efficiency of the Yellow River Basin, provide financial and financial service support for the green upgrading of industries in the Yellow River Basin, and expand the financial density, economic density and green coverage area of Kaifeng City. Adjust the assessment indicators of the financial ecological environment in the administrative area along the Yellow River in Kaifeng City, and increase the weight of indicators such as forest land area, energy conservation and environmental protection expenditure, and park green area. Integrate ecological protection and financial and economic development to achieve sustainable and high-quality development.

Fourth, Kaifeng City should accelerate the planning and design of the coordinated development of high-quality economic development and ecological environmental protection in the Yellow River Basin. Fully understand the fact that the financial development of the Yellow River Basin is unbalanced, based on the basic facts of the ecological

environmental protection of cities in the Yellow River Basin, accelerate the introduction of systematic and scientific planning and design that matches the efficient and coordinated development of the Yellow River Basin, highlight the supporting role of finance in ecological protection such as water and soil protection, water resources allocation and protection, and wastewater waste gas discharge, build the Yellow River Ecological Corridor and the Yellow River Economic Corridor, and enhance the "Five Ones" of Kaifeng City along the Yellow Ecological Corridor Demonstration Belt and the Yellow River International Cultural Exchange Center. The construction of project carriers promotes the high-quality development of Kaifeng City's economy and ecology.

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