

## **Spatial Research on the Degree of Coupling and Coordination Between Logistics Industry and Financial Industry**

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**ABSTRACT:***Based on coupling theory and synergy theory, build a coupling coordination model for the logistics industry and the financial industry, establish an evaluation index system for the two industries from the perspectives of scale, operation, and sustainability, and adopt a combination of entropy weight method and principal component analysis method for weighting Empirical research on the status and reasons of the coordinated development of the two industries in my country in 2018 from the three spatial dimensions of the country, region, and province. The results show that my country as a whole has broken away from the serious imbalance between the logistics industry and the financial industry, and the level of coordination between the East-Central-Western and Northeastern regions is decreasing. In the province, the provinces in the three regions of the East, Central and West show two industries. The ternary distribution situation of high, medium and low coordination level, the northeast region presents a binary distribution situation of higher and lower coordination level. Finally, it puts forward corresponding policy recommendations for the low level of coordination between the two industries and the unbalanced development of inter-regional and inter-provincial coordination, so as to improve the level of coordinated development of my country's logistics industry and financial industry and accelerate the construction of economic integration.*

**KEY WORD:** *Logistics industry, Financial industry, Coupling coordination degree, Coordinated development*

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Date of Submission: 20-06-2021

Date of Acceptance: 05-07-2021

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### **I. INTRODUCTION**

With the optimization and upgrading of China's industrial structure, it is particularly critical to promote sustainable economic development through producer services. As the supporting industries in China's service industry, the importance of mutual integration and coordinated development of logistics industry and financial industry has gradually attracted the attention of the state. In July 2016, the National Development and Reform Commission (NDRC) issued the Opinions on Effective Implementation of the "Internet", which proposed to promote the interaction, integration and coordinated development of logistics, manufacturing, commerce, finance and other industries (Chu & Qian, 2019). In April 2020, the National Development and Reform Commission (NDRC) issued the Implementation Plan on Promoting the "Cloud Enabling Intelligence with Numerals" to Cultivate New Economic Development, which clearly pointed out that the traditional business model should be broken and the cross-border integration of digital industry, financial industry and logistics industry should be supported.

With the promotion and support of relevant policies, the coordinated development of China's logistics industry and financial industry has achieved remarkable results, but there are still problems of low development level and unbalanced development degree among regions and provinces.

In 2018, Guangdong and Zhejiang alone accounted for 45.6% of China's express delivery business. Among the 8.0345 million financial employees in China, only 1.4602 million came from Sichuan, Chongqing, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi and Inner Mongolia. Therefore, in order to deeply implement the new principles of innovative, coordinated, green, open, and shared development, promote the supply-side structural reform and the integrated development of the logistics industry and other industries, it is necessary to clarify the current situation and causes of the coordinated development of the logistics industry and the financial industry at the national, regional and provincial levels. On this basis, the paper puts forward targeted policy suggestions to comprehensively improve the unbalanced situation of the coordinated development of China's logistics industry and financial industry, and promote the development of economic integration.

### **II. LITERATURE REVIEW**

In the definition of the coordinated development level of China's logistics industry and financial industry, scholars have great differences. Based on the macro data of the logistics industry and the financial

industry from 2003 to 2017, Li (2019) demonstrated that the two industries have gradually transitioned from the maladjustment recession stage to the high-level coordination stage. However, some scholars believe that the coordination level between the logistics industry and the financial industry in China is only moderate. For example, Li (2019) used grey correlation analysis to study the linkage degree and development level of the logistics industry and the financial industry in the 18 provinces along the "One Belt And One Road" from 2008 to 2017, and concluded that the coordination level between the logistics industry and the financial industry in the 18 provinces is average. From the perspective of sustainable development, Zhang et al. (2020) pointed out that the economy, logistics and ecology in most regions of China are in the medium coordination stage.

There is no obvious difference between domestic and foreign scholars on the research scope of the coordinated development of logistics industry and financial industry. They all take a country or a region as the research scope for empirical analysis. For example, Mačiulis (2009) takes the degree of interaction and coordination between the logistics industry and the financial industry in Lithuania as the research object, and uses qualitative analysis to prove that the logistics industry has brought a positive impact on the financial industry in terms of reducing costs and increasing efficiency and solving traffic congestion problems, but there are also some negative effects. Sainz (2009) took Aragon region of Spain as an example to illustrate once again that the construction of logistics infrastructure, such as expressway, port and airport, can have different degrees of impact on the economy. Domestic scholars such as Li and Xia (2013) have used the panel data of Fujian Province in recent years to quantitatively analyze the coordinated development relationship between logistics industry and financial industry (Xia & Lv, 2018). Zhang and Yin (2019) qualitatively described the necessity of the coordinated development of the logistics industry and the financial industry in Shaanxi Province, and through calculations, they concluded that the impact of the logistics industry on economic growth is higher than that of the financial industry.

On the research perspective of coordinated development of logistics industry and finance, there are obvious differences between early and recent literatures. There are obvious differences between the early and recent literature. Early scholars are more inclined to discuss the integration and development of the logistics industry and the financial industry. For example, in the 1950s, Dunham (2019) summarized and discussed the business model, risk control methods, and warehousing forms after the integration and development of the logistics industry and the financial industry. Lacroix et al. (1966) subsequently verified that the logistics financial business model formed by the integration of the logistics industry and the financial industry has a positive effect on the development of the logistics and financial industries in countries that are undergoing development and transformation. In the near future, more and more scholars begin to analyze the coordinated development trend of the two industries from the time dimension. Supported by the relevant data of the two industries from 1995 to 2011, Ding (2014) pointed out that the financial industry has a promoting effect on the logistics industry. Chu and Qian (2019) believe that from 2003 to 2017, the coordinated development level of the logistics industry and the financial industry has been rising, and some indicators of the logistics industry and the financial industry are the key factors affecting the degree of coordination between the two.

To sum up, scholars have accumulated a lot of experience on the level definition, research scope and research angle of the coordinated development of logistics industry and financial industry, but there are still some shortcomings: First, there is no unified conclusion to the level of coordinated development of logistics industry and financial industry in China. Second, most literatures only study the current situation of the coordinated development of logistics industry and financial industry in a certain country or region, and it is difficult to grasp the overall development trend of the two industries from the macro, meso and micro levels. Third, early and recent scholars have deeply explored the integration development mode and coordinated development trend of logistics industry and financial industry, rarely from the perspective of space to promote the sustainable and coordinated development of the two industries. In view of this, based on the statistical data of logistics industry and financial industry in 31 provinces of China in 2018, this paper constructs an evaluation index system that can reflect the development level of the two industries. This paper uses entropy weight method and principal component analysis method to comprehensively determine the index weight, and analyse the current situation and reasons of the coordinated development of China's logistics industry and financial industry from the national, regional, provincial and other levels, and puts forward some suggestions for improvement, so as to promote China's regional economic development and enhance the process of economic integration.

### **III. MATERIALS AND METHODS**

#### **3.1 The Coordinate Coupling Measurement**

The concept of coupling originated from physics. It refers to the phenomenon that two or more subsystems or motion forms affect each other under the premise of interaction (Gong, 2017). The degree of coordination in synergy theory emphasizes the degree of harmony between two or more subsystems in the process of development and evolution (Meng & Han, 1949). The coupling coordination degree model combines

the coupling theory and the collaboration theory, which can well reflect the degree of interdependence and mutual restriction between systems, and has the characteristics of scientificness and simplicity. Therefore, this paper will use the coupling coordination degree model to analyze the coordinated development status of China's logistics industry and financial industry.

**Entropy Method:** Entropy weight method determines the weight of each index according to the amount of information contained in the index. Because it has the objectivity of weight measurement, it is widely used in the measurement of coupling synergy degree.  $Y_{ij}$  is the standardized value of the  $j$ -th index corresponding to subsystem  $i$ . In order to avoid meaningless calculation results, the proportion of each index  $p$  is calculated first.

$$P_{ij} = \frac{Y_{ij}}{\sum_{i=1}^m Y_{ij}} \quad (i=1, \dots, m; j=1, \dots, n) \tag{1}$$

Then, the amount of information contained in each index is measured,  $e_j$ , which is used as the basis for weight calculation.

$$e_j = [-1/\ln m] \times \sum_{i=1}^m P_{ij} \ln P_{ij} \quad (i=1, \dots, m; j=1, \dots, n) \tag{2}$$

Let  $w_j$  be the final weight value of the index, then it can be calculated by the following formula.

$$w_j = \frac{1-e_j}{\sum_{j=1}^n (1-e_j)} \quad (j=1, \dots, n) \tag{3}$$

**Principal Component Analysis:** The basic principle of principal component analysis (PCA) is to gather the information scattered on several different indexes by using linear transformation method. On the basis of retaining the original information as far as possible, dimensionality reduction is carried out on the research problem. In this paper, SPSS25.0 is used to calculate the weight of each index based on the initial factor load and characteristic root.

**Comprehensive Weight:** In order to accurately calculate the coupling coordination degree between the logistics industry and the financial industry, the weighted average method is used to get the comprehensive weight of each index, and the weight calculated by the entropy weight method is  $W_1 = [w_{11}, w_{12}, \dots, w_{1n}]$ ,  $0 < W_1 < 1$ ,  $\sum_{i=1}^n w_{1i} = 1$ ; The weight calculated by the principal component analysis is  $W_2 = [w_{21}, w_{22}, \dots, w_{2n}]$ ,  $0 < W_2 < 1$ ,  $\sum_{i=1}^n w_{2i} = 1$ .

$$W = \alpha W_1 + \beta W_2 \tag{4}$$

$\alpha$  and  $\beta$  represent the importance degree of weight obtained by using entropy weight method and principal component analysis method respectively. In this paper, it is considered that the weight obtained by the two methods has the same research value, so let  $\alpha=\beta=0.5$ .

**Coupling Coordination Degree Model:** Coupling coordination degree model can measure the coupling coordination degree between multiple subsystems. Coupling degree of logistics industry and financial industry can be expressed as:

$$C = \frac{2\sqrt{U_1 U_2}}{U_1 + U_2} \tag{5}$$

Among them,  $U_1$ 、 $U_2$  represent the comprehensive development level of logistics industry and financial industry respectively, and are the sum of the product of each index value ( $Y_i$ 、 $Y_j$ ) and the corresponding weight value ( $w_i$ 、 $w_j$ ). If  $C = 1$ , the two systems are in the resonance state with the highest coupling degree, and  $C = 0$ , the two systems are in the independent state. In order to fully reflect the degree of coupling coordination between systems, it is necessary to calculate the degree of coupling coordination  $D$ .

$$T = mU_1 + nU_2, \quad D = \sqrt{C \times T} \tag{6}$$

In the formula,  $T$  is the comprehensive evaluation index, and the undetermined coefficients  $m$  and  $n$  are the importance of the logistics industry and the financial industry, respectively. Here, assuming that the two industries are equally important,  $\alpha=\beta=0.5$ . In order to better reflect the level of coordination between the logistics industry and the financial industry, the degree of coupling coordination is now divided into six levels, as shown in Table 1.

**Table 1. The standard of the coupling coordination degree**

Coordination Degree (D)	Coordination Level
$0 < D \leq 0.3$	Unbalanced (V1)
$0.3 < D \leq 0.4$	Almost unbalanced (V2)
$0.4 < D \leq 0.5$	Basic coordination (V3)
$0.5 < D \leq 0.6$	Primary coordination (V4)
$0.6 < D \leq 0.7$	Intermediate coordination (V5)
$0.7 < D \leq 1$	Quality coordination (V2)

### 3.2 Indicator Construction and Research Scope Selection

The establishment of the evaluation index system should be scientific(Liu & Dong, 2016), relevant and complete. On the basis of previous research results(Sun&Wang, 2019), this paper focuses on the characteristics of the logistics industry and the financial industry, and constructs a comprehensive evaluation system of the logistics industry and the financial industry from the perspectives of scale, operation and sustainability. By using formula (1) to formula (4), the comprehensive weight of each index is calculated, as shown in Table 2.

**Table 2. Comprehensive evaluation system of logistics industry and financial industry**

System	Level indicators	The secondary indicators	Weight
Logistics subsystem	Scale indicator	(X1) Number of employees in the logistics industry (ten thousand people)	0.141
		(X2) Postal volume (million Yuan)	0.202
		(X3) Cargo transportation volume (million tons)	0.094
	Operational indicator	(X4) Total transportation mileage of highway and railway (km)	0.076
		(X5) Cargo turnover (million tons/km)	0.142
		(X6) Passenger turnover (million peoples/km)	0.124
	Sustainability indicator	(X7) The proportion of the population employed in the logistics industry in the total population of the province (%)	0.096
		(X8) Growth rate of freight volume (%)	0.054
		(X9) Postal business depth (%)	0.070
Financial subsystem	Scale indicator	(Y1) Number of employees in the finance industry (ten thousand people)	0.094
		(Y2) Total balance of deposits and loans (million Yuan)	0.095
	Operational indicator	(Y3) Premium income (million Yuan)	0.260
		(Y4) Loan balance (million Yuan)	0.100
		(Y5) Deposit balance (million Yuan)	0.033
	Sustainability indicator	(Y6) The proportion of the population employed in the finance industry in the total population of the province (%)	0.094
		(Y7) Financial efficiency	0.080
		(Y8) Insurance business depth	0.244

*Postal business depth = Postal volume /GDP; Financial efficiency = Loan balance / Deposit balance; Insurance business depth = Premium income / GDP*

The original data are taken from the Statistical Yearbook 2019, National Economic and Social Development Report 2019 issued by the National Bureau of statistics of 31 provinces, part of the data of logistics subsystem comes from China Logistics Yearbook 2019. Based on the division of China's geographical regions in China Statistical Yearbook 2019, the scope of this study is shown in Table 3.

**Table 3. Research Scope**

Regions	Number of provinces and cities	Provinces and Cities
Eastern Region	10	Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan
Central Region	6	Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan
Western Region	12	Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang
Northeastern Region	3	Liaoning, Jilin, Heilongjiang

#### IV. COUPLING COORDINATION DEGREE MEASUREMENT AND ANALYSIS

Based on the Comprehensive Weight in Table 2 and the index data related to logistics industry and financial industry, the development level of logistics industry  $U_1$  and the development level of financial industry  $U_2$  in each province, the coupling degree C and the coupling coordination degree D of logistics industry and financial industry are calculated by using formulas (5) and (6), as shown in Table 4. On this basis, the coupling coordination level of the two industries in each province is divided according to table 1, as shown in Table 4.

**Table 4. Coupling coordination degree between logistics industry and financial industry**

Regions	Provinces and Cities	$U_1$	$U_2$	C	D
Eastern Region	Beijing	0.196	0.304	0.976	0.494
	Tianjin	0.137	0.190	0.987	0.402
	Hebei	0.353	0.677	0.949	0.699
	Shanghai	0.434	0.229	0.951	0.562
	Jiangsu	0.33	0.281	0.997	0.552
	Zhejiang	0.543	0.288	0.952	0.629

	Fujian	0.232	0.147	0.974	0.430
	Shandong	0.487	0.247	0.945	0.589
	Guangdong	0.811	0.369	0.927	0.740
	Hainan	0.116	0.080	0.983	0.311
Central Region	Shanxi	0.214	0.212	1	0.461
	Anhui	0.339	0.196	0.963	0.508
	Jiangxi	0.271	0.116	0.916	0.421
	Henan	0.446	0.154	0.874	0.512
	Hubei	0.307	0.149	0.939	0.463
	Hunan	0.294	0.165	0.959	0.469
Western Region	Inner Mongolia	0.167	0.147	0.998	0.396
	Guangxi	0.18	0.090	0.944	0.357
	Chongqing	0.228	0.120	0.951	0.407
	Sichuan	0.326	0.169	0.949	0.485
	Guizhou	0.184	0.144	0.992	0.403
	Yunnan	0.178	0.105	0.967	0.370
	Tibet	0.179	0.060	0.868	0.323
	Shanxi	0.22	0.121	0.957	0.404
	Gansu	0.178	0.153	0.997	0.407
	Qinghai	0.147	0.133	0.999	0.374
	Ningxia	0.069	0.134	0.948	0.311
	Xinjiang	0.219	0.124	0.961	0.407
	Northeastern Region	Liaoning	0.289	0.137	0.934
Jilin		0.168	0.103	0.970	0.362
Heilongjiang		0.152	0.118	0.992	0.366

**Table 5. Grade distribution of coupling coordination degree**

Coordination Level Regions	V1	V2	V3	V4	V5	V6
Eastern Region		Hainan	Beijing Tianjin Fujian	Shanghai Jiangsu Shandong	Zhejiang Hebei	Guangdong
Central Region			Hunan Hubei Jiangxi	Anhui Henan		
Western Region		Inner Mongolia Guangxi Yunnan Tibet Qinghai Ningxia	Chongqing Sichuan Guizhou Shanxi Gansu Xinjiang			
Northeastern Region		Jilin Heilongjiang	Liaoning			

According to the results shown in Table 4 and Table 5, this paper analyzes the current situation and reasons of the coupling and coordination between China's logistics industry and financial industry from the national, regional and provincial levels.

#### 4.1 National Level

On the whole, the coupling coordination level of logistics industry and financial industry in 31 provinces of China is in the range of high - quality coordination (V6) to moderate imbalance (V2), and no province is in serious discoordination (V1). It shows that the two industries have made breakthrough progress in policy support, market environment, business volume, personnel training and other aspects. In this process, the degree of mutual integration and correlation between the two industries is gradually strengthened.

#### 4.2 Regional Level

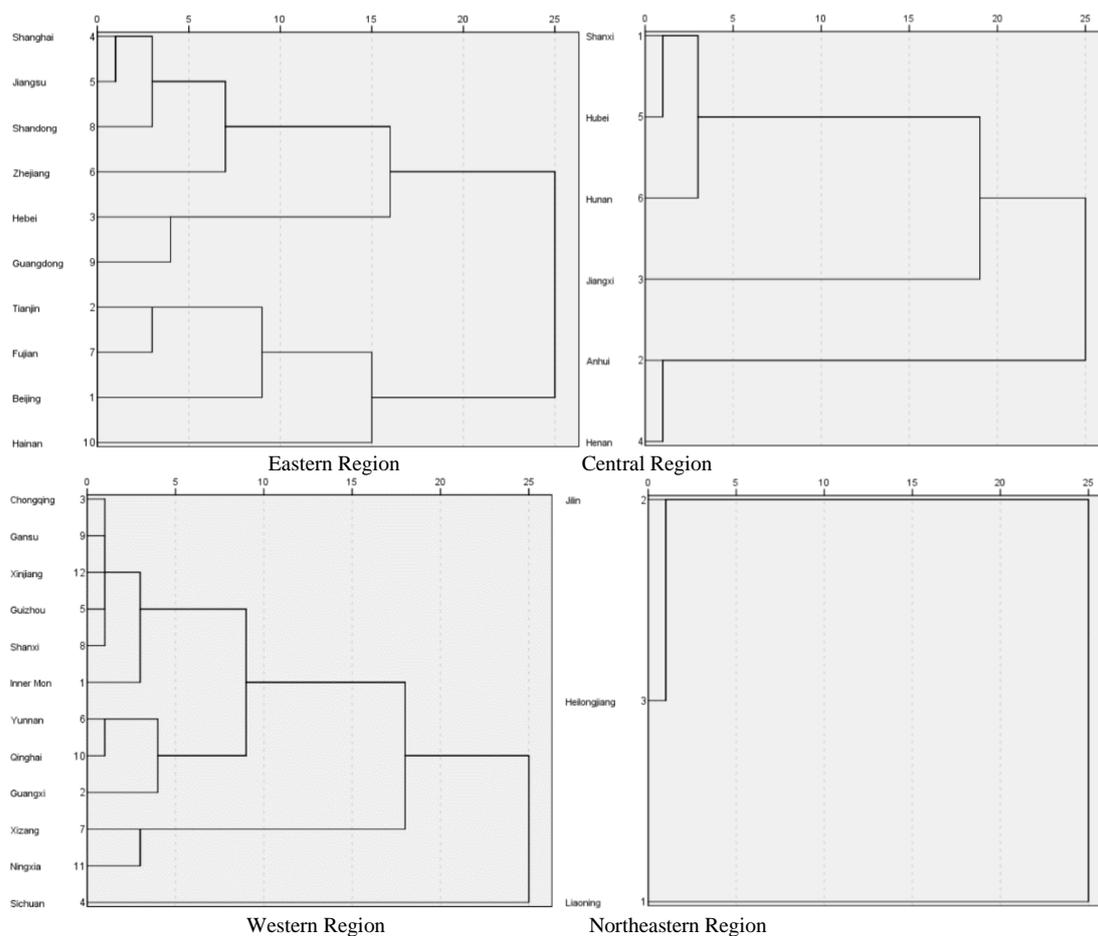
The coupling coordination level between the logistics industry and the financial industry in the eastern region has a large span, ranging from moderate discoordination (V2) to high - quality coordination (V6),

indicating that the coordination level of the two industries in the eastern region is significantly different, while the central region mainly has two levels of mild discoordination (V3) and primary coordination (V4). Moderate disorder (V2) and mild disorder (V3) were mainly distributed in western and northeastern China. The above empirical research shows that the level of coordinated development between the logistics industry and the financial industry in China is not balanced. Because the eastern region has the unique geographical advantage of "connecting to the sea and land", compared with other regions, it has a diversification represented by developed port and shipping logistics. The logistics business model makes its comprehensive development capability and development level of the logistics industry superior to other regions. In addition, the reform and opening up policy in 1978 laid a policy environment foundation for financial and technological innovation and the emergence of outstanding enterprises such as Huawei, SF Express and GF Bank in the eastern region. Under the joint action of geographical advantages and policy support, the eastern region showed a good trend of coordinated development of logistics industry and financial industry. However, due to the small development scale of logistics industry and financial industry, insufficient policy support, geographical conditions and other factors in other regions, the coordination ability of the two industries is relatively low. Especially in the western region, the implementation of development strategies such as relatively poor natural environment, deep inland, far away from the sea, and the western development is later than that in the eastern region. As a result, the coordinated development level of logistics industry and financial industry is relatively backward.

**Provincial Level**

Using SPSS25.0 to cluster analysis of the coordination degree between the logistics industry and the financial industry in each province in the four regions, the results are shown in Figure 1.

**Figure 1. Cluster analysis results of each region**



**Eastern Region:** The eastern region can be divided into Guangdong and Hebei with the highest coordination level, Shanghai, Jiangsu, Shandong and Zhejiang with the average coordination level, and Tianjin, Fujian, Beijing and Hainan with the lowest coordination level. The reason may be that Guangdong and Hebei have stronger logistics storage and transportation capacity and better financial development environment than other provinces. In 2018 alone, Guangdong Port ranked first among all the ports in China with nearly 1.6 billion tons of cargo throughput. The booming development of logistics industry provides a new opportunity for the progress of Guangdong's financial industry, making it gradually become the first province in China to build

online banks, private banks and "long causeway" of financial street. Hebei provincial government actively promotes the development of logistics industry from the aspects of infrastructure construction, logistics park construction and international logistics channel construction. Relying on the unique logistics resources and financial resources brought by the coordinated development of the Beijing-Tianjin-Hebei region, more and more logistics enterprises in Hebei Province, such as China storage group, are seeking win-win cooperation with financial enterprises. Driven by the coordinated development of logistics industry and financial industry in Guangdong and Hebei, the coordination of logistics industry and financial industry in Shanghai, Jiangsu, Shandong and Zhejiang has gradually improved to the general level. It is worth mentioning that the coordinated development level of logistics industry and financial industry in Beijing, Tianjin, Hainan, Fujian and other provinces is constrained by the reality of space resources, transportation, energy environment and human resources due to geographical and location constraints, so the degree of cooperation between the two industries is lower than that in some eastern provinces.

**Central Region:**The central region can be divided into Henan and Anhui with the highest coordination level, Shanxi, Hubei and Hunan with the average coordination level, and Jiangxi with the lowest coordination level. Henan combines advantages in geography, transportation and industry. It is a big province of population, economy and agriculture in the central region. In recent years, the construction of Henan Free Trade Zone and the "Central Plains Economic Zone" has brought a steady stream of power to the sustainable development of its logistics and financial industry. The "four horizontal and eight vertical" highway network, complete railway network, air ports, water ports and other infrastructure in Anhui have promoted the rapid development of Anhui logistics industry, and also brought new opportunities for the financial industry. Major banks and other financial institutions have launched logistics financial products to help the sustainable development of small and medium-sized logistics enterprises, and promote Henan and Anhui to become provinces with high coordination level in the central region. However, Hubei and Hunan are inferior to Henan and Anhui in regional resources, population resources, logistics infrastructure construction and financial policy environment. Therefore, the coordination level of the two industries in these provinces is average. The main reasons for the low coordination between the logistics industry and the financial industry in Jiangxi are the high logistics cost, less leading logistics enterprises, a large number of idle funds of financial institutions and the small scale of the financial industry.

**Western Region:**The western region can be divided into Sichuan with the highest coordination level, Chongqing, Gansu, Xinjiang, Guizhou, Shaanxi, Inner Mongolia, Yunnan, Qinghai and Guangxi with the average coordination level, and Tibet and Ningxia with the lowest coordination level. The highest level of coordination between the logistics industry and the financial industry in Sichuan may be due to the Sichuan government's plan to complete the "eight major tasks" and "ten major projects" to build Sichuan Province into a logistics center in the western region and a logistics hub connecting the Silk Road Economic Belt and the Yangtze River economic belt. In addition, Sichuan have made great achievements in financial innovation, broadening the financing channels for logistics enterprises, logistics financial platform construction and other aspects of active exploration, to promote its growth into the western region logistics and financial industry coordinated development of the fortress province. The development level of logistics and financial industries has been greatly improved in the provinces of Chongqing, Gansu, Xinjiang, Guizhou, Shaanxi, Inner Mongolia, Yunnan, Qinghai, and Guangxi under the initiative of the "Belt and Road" strategy, reaching the average level of the western region. In comparison, Tibet and Ningxia are slightly inferior to other western provinces in terms of related employees, transportation infrastructure, financing diversity, and policy support. Therefore, their logistics and financial industries have the lowest level of coordination.

**Northeastern Region:**The north-eastern region is divided into Liaoning with a higher level of coordination and Heilongjiang and Jilin with a lower level of coordination. Liaoning, located in the Bohai rim, has a developed port logistics industry represented by Dalian port, and has a unique geographical advantage of connecting the Beijing Tianjin Hebei Economic Zone. The coordination level of its logistics industry and financial industry is higher than that of Heilongjiang and Jilin, which are geographically closed and have single regional resources.

Through the discussion and analysis at the provincial level, it is found that the distribution of logistics resources and financial resources among the provinces in the four regions is uneven. In addition, the distribution of the coordinated development of logistics industry and financial industry in the eastern, central and western regions presents a high, medium and low ternary distribution trend, while the northeastern region presents a binary distribution situation, led by Liaoning, followed by Heilongjiang and Jilin.

## V. POLICY SUGGESTION

According to the results of empirical analysis, this paper will put forward countermeasures and suggestions to promote the coordinated development of logistics industry and financial industry from the national, regional and provincial levels.

### **5.1 National Level**

The government should vigorously guide the regions and provinces with a low level of coordination between the logistics industry and the financial industry, and make full use of the "Belt and Road" strategy, the construction of the Beijing-Tianjin-Hebei urban agglomeration, the construction of the Pearl River Delta urban agglomeration, the Yangtze River Economic Belt, the construction of the Central Plains Economic Zone, and the Western Development the excellent development opportunities brought by other policies, following the development model of "economic development, logistics first", relying on emerging technologies such as artificial intelligence, Internet of Things, blockchain, and big data, vigorously promote the establishment of smart logistics and financial platforms, and actively Help financial companies seek financial business innovation, broaden financing channels, and provide support and guarantee for the long-term development of small, medium and micro logistics companies, On this basis, we should emphasize the environmental problems brought by the coordinated development of logistics industry and financial industry, comprehensively implement the development concept of green logistics and green finance, and ensure the sustainable coordinated development of logistics industry and financial industry.

### **5.2 Regional Level**

In view of the unbalanced development level of logistics and financial industry, the government should support the western and northeast regions with low coordination level from the aspects of improving logistics infrastructure, creating a good financial development environment, and promoting information technology innovation. In addition, we can also carry out the "One helps the other" supporting policy to form a good situation for the eastern region to help the northeast and central regions, and the central region to help the western region. Through the transportation of talents, resources, technology, and inter regional interconnection project cooperation, we can promote the formation of a good situation for the coordinated and balanced development of the regional logistics industry and the financial industry.

### **5.3 Provincial Level**

In the future, the eastern region can form a full coverage network pattern of logistics and financial resources circulation with Guangdong and Hebei as the export core and Shanghai, Jiangsu, Shandong and Zhejiang as the transportation fulcrum. From north to south, we will fully open up the "main artery" of logistics and capital flow in the eastern region. The central region should make use of the perfect transportation infrastructure and diversified financial development channels of Henan and Anhui to form a "two pole driving" situation with Henan and Anhui as the leading and other four provinces as the linkage. With the support of Sichuan, Gansu, Chongqing and Shaanxi, the western region can give full play to the advantages of complete logistics infrastructure, wide economic influence and deep tentacles, form a strong surrounding radiation for other provinces with low coordinated development level of logistics and financial industry in the western region, and comprehensively improve the coordinated development level of the two industries in the western region. Liaoning in northeastern region should gradually grow into a key hub to improve the technology, logistics and transportation, and capital strength of Heilongjiang and Jilin. At the same time, Heilongjiang and Jilin also need to seek breakthroughs in improving freight volume and postal business volume, optimizing transportation mode, cultivating innovative and compound talents, driving the prosperity and development of capital market, and strengthening credit support for logistics enterprises.

## **VI. CONCLUSION**

From the perspective of spatial analysis, based on the relevant data of logistics and finance in 31 provinces of China in 2018, this paper constructs a coupling coordination model of logistics and finance. This paper explores the current situation and reasons of the coordinated development of the two industries from the national, regional and provincial levels, and corresponding countermeasures and suggestions are put forward based on this.

The results show that: (1) National level: the coordination level of logistics industry and financial industry in China has completely broken away from the state of serious imbalance; (2) Regional level: there are differences in the coordination levels of the two industries between regions, showing a gradual decreasing trend in the coordination levels of east-central-west-northeast. (3) Provincial level: the provinces in the eastern, central and western regions present a ternary distribution trend with high, medium and low coordination levels between the logistics industry and the financial industry. In the northeast region, there is a binary distribution trend with high coordination level between Liaoning and low coordination level between Heilongjiang and Jilin.

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