The Research on the Features and Influential Factors of Industrial Transfer in Beijing-Tianjin-Hebei Region

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Abstract: *Beijing-Tianjin-Hebei region is an important strategic region that drives China's economic growth, but its internal development is seriously imbalanced. Especially Beijing undertakes excessive non-capital functions, resulting in a series of "big city disease". Relieving non-capital function becomes the primary task of the coordinated development of Beijing-Tianjin-Hebei region. This article uses the industrial gradient coefficient as a measurement, analyzing the general, industrial and location choice features of industrial transfer in Beijing-Tianjin-Hebei region. Furthermore, this paper takes the electronic industry as an example to analyze the influencing factors of industrial transfer in the region by using panel data. Finally, some suggestions on promoting the industrial transfer of the region of Beijing-Tianjin-Hebei put forward on the conclusion of empirical research.*

Keywords: Beijing-Tianjin-Hebei, Industrial Transfer, Industrial Gradient Coefficient, Influencing Factors

1. Introduction

Beijing-Tianjin-Hebei region is an influential metropolitan area in China and a core growth pole that supports the Chinese economy, especially in the north area. However, its development faces many problems, such as its internal development is seriously unbalanced. Beijing has assumed too many non-capital functions and limited its engine function of driving China's economic development. In 2014, with the coordinated development of Beijing, Tianjin and Hebei rising to the national strategic level, coordinated development accompanied by the flow of elements and industrial chains, its primary purpose was to ease the function of Beijing's non-capital. The transfer of industries has significant advantages both for undertaking and for transferring to other places. Beijing's easement of non-capital functions helps to focus on the development of sophisticated industries and technological innovations, industrial upgrading, intensive use of resources and reduction of environmental pollution. For Tianjin and Hebei, by undertaking industrial transfer to achieve regional economic growth, can narrow the regional disparity. Reasonable industrial transfer has an important impact on promoting the coordinated development of the region. The reason why the regional industrial transfer in China is not easy to judge is mainly due to the lack of suitable data and not too much quantitative research. The existing quantitative research is mainly divided into two categories. One is to judge the transfer of industries through indicators. The common measures are FDI, industrial output, domestic capital, relative output value, location quotient and industrial gradient factor. Such as Feng Genfu (2010), Tan Chenglin (2013), Liu Hongguang (2014), Liao Hongwei (2016), etc. were analyzed by different methods; the second is the analysis of the factors influencing the industrial transfer such as Jiang Wei (2009), Zhang Wei 2010), Liu Hongman (2016). However, few people associate the two. This article attempts to combine the above two kinds of thinking, select the industrial gradient coefficient as a measure index, first of all through the calculation and

measurement, analysis of the status quo of the current industrial transfer in Beijing, Tianjin and further sum up the industry Finally, taking the electronic information industry as an example, this paper analyzes the influencing factors of the industrial transfer, and puts forward the policy recommendations on how to promote the industrial transfer and integration of Beijing, Tianjin and Hebei based on the coordinated development of Beijing, Tianjin and Hebei in light of the existing problems

2. Empirical Method

The industrial gradient coefficient (IGC) can comprehensively judge the production situation of an industry in the selected area and reflect the aggregation and diffusion of industry. Therefore, based on the measurement of the gradient factor of the three industries in Beijing, Tianjin and Hebei, the article uses the gradient index of industry to judge Industrial Transfer and Acceptance in Beijing, Tianjin and Hebei. The gradient coefficient of the industry was first proposed by Dai Hongwei (2003). Chen Rui and Xiong Bilin (2007) improved it.

The formula for calculating the industrial gradient coefficient is:

$$IGC_{mn} = LQ_{mn} \times CPOR_{mn} \times CCOR_{mn}$$

among them

$$LQ_{mn} = \frac{P_{mn} / P_n}{P_m / P},$$

$$CPOR_{mn} = \frac{\Delta P_{mn} / \Delta P_n}{E_{mn} / E_n},$$

$$CCOR_{mn} = \frac{\Delta P_{mn} / \Delta P_n}{A_{mn} / A_n},$$

Respectively, IGC, LQ, CPOR, CCOR, m, n, P, E, ΔP, Are presents industrial gradient coefficient, location quotient, comparative labor productivity, comparative capital productivity, region, industry, sales output, employees, value added of annual output value, The average capital.

In order to fully understand the actual situation of industrial transfer in Beijing, Tianjin and Hebei area, this paper chooses 38 industrial enterprises above designated size in all parts of Beijing, Tianjin and Hebei by the period of 2012-2015 to judge the characteristics and trend of industrial transfer in Beijing, Tianjin and Hebei. According to the main input types of production factors, they are divided into resource-intensive industries, labor-intensive industries, capital-intensive industries and technology-intensive industries. The resource-intensive industries, representing the coal mining and washing industry, oil and gas exploration industry, ferrous metal mining industry, non-metallic mining industry, the labor-intensive industries, Respectively, on behalf of the agricultural food processing industry, food manufacturing, wine, beverage and refined tea manufacturing, tobacco products industry, textile industry, textile and garment, apparel industry, leather, fur, feathers and their products and footwear industry, wood processing And wood, bamboo, rattan, palm, straw products, furniture manufacturing, paper and paper products, printing and recording media reproduction, culture and education, industrial arts, sports and entertainment products industry, the capital-intensive industries, Representing the petroleum processing, coking and nuclear fuel processing, chemical raw materials and chemical products manufacturing, pharmaceutical manufacturing, chemical fiber manufacturing, rubber and plastic products, non-metallic mineral products, ferrous metal smelting and rolling processing industry, nonferrous metals Metal smelting and rolling processing industry, metal products industry, general equipment manufacturing industry, special equipment manufacturing industry, the technology-intensive industries, representing the automotive industry, iron Roads and ships Aerospace and other transport equipment manufacturing, electrical machinery and equipment manufacturing, computer, communications and other electronic equipment manufacturing, instrumentation manufacturing, other manufacturing, comprehensive utilization of waste resources, repair of fabricated metal products, machinery and equipment Industry, electricity, heat production and supply, gas production and supply, water production and supply. The data in this paper are mainly from China Industrial Statistical Yearbook.

3. Data and Results

Calculated by calculating the Beijing-Tianjin-Hebei IGC and the trend of change in recent years, due to space limitations, not listed in this article. Among the seven resource-intensive industries, Beijing transferred five industries in 2012 and the non-metallic mining and dressing industry shifted out in 2013. Power and heat production and supply have so far not been transferred from Beijing and there is still a tendency of

agglomeration. Among the 12 labor-intensive industries, Beijing transferred six industries in 2012 and four industries in 2013. The tobacco industry has not yet been rolled out. Among the 11 capital-intensive industries, Beijing transferred 9 industries in 2012, special equipment manufacturing industry started to move out of Beijing in 2013, chemical fiber manufacturing industry did not turn out from Beijing, and the existing scale is small. Among the eight technology-intensive industries, three industries were transferred out in 2012 and 2013, two in 2014, and the automobile manufacturing industry shifted out of the Beijing-Tianjin-Hebei region.

The above shows that in the order of transfer of industries within the Beijing-Tianjin-Hebei region, capital-intensive industries precede labor-intensive and resource-intensive industries and run counter to the theory of classic industrial transfer: "resource-intensive → labor-intensive → capital-intensive → technology-intensive" Order, Probable Reasons There is a deviation between the actual background and the classical gradient transfer theory. Labor force in Beijing-Tianjin-Hebei region can flow freely, make up for the shortage of cheap labor resources in Beijing, delay the transfer time of Beijing's labor-intensive industries and the flow of labor between countries Sexual deficiencies form a key condition for the transfer of classical industries. On the other hand, the key to the transfer of capital-intensive industries is that capital and capital flow better than those with immolative characteristics. At the same time, the relevant policies promulgated by the state are also a priority for some capital-intensive industries in the process of industrial transfer in the Beijing-Tianjin-Hebei region Reasons for the transfer of resources and labor-intensive industries.

During 2012-2013, Beijing did not show a clear preference for similar industries in Tianjin. There were 15 industries that were transferred out during the period in Beijing and 7 in Tianjin and Hebei respectively A In terms of quantity, Hebei undertook more industrial transfer from Beijing during this period. However, if we measure the location preference of Beijing from the transfer scale (that is, the added value of the gradient gradient of the target industries), the industry average of Beijing and Tianjin is 5.55 and 0.65 respectively. From a scale point of view, Beijing does not prefer to turn industry in Hebei. Looking further, from 2013 to 2014, Beijing had 11 and 7 industries turning to Tianjin and Hebei respectively. In terms of quantity, Tianjin undertook more industrial transfer from Beijing during this period. From a scale point of view, Beijing outnumbered Tianjin by 9 to 9 in size. Beijing turned to Hebei with more industries than Tianjin with 4, Beijing with Tianjin averaged 0.45 and turned to Hebei with industry average of 0.07. From a scale point of view, Tianjin undertook a more effective industrial transfer during this period. Looking again, between 2014 and 2015, Beijing moved to Tianjin and Hebei with 5 and 2 industries respectively. From a scale point of view, the scale of Beijing's shift to Tianjin exceeded 5 in Hebei. One of Beijing's larger industries turned to Hebei than Tianjin. The average size of Beijing's move to Tianjin was 17.39, and the average shift to Hebei was 0.44. During this period, similar to the previous

period, Tianjin undertook more industrial transfers both in quantity and size.

In general, the location choice of Beijing's transfer out of the industry is in line with the characteristics of the gradient transfer of traditional industries. First, it is transferred to areas with similar gradient gradient from Beijing → Tianjin → Hebei. From the perspectives of different types of industrial undertaking location selection, Beijing's capital-intensive, labor-intensive and resource-intensive industries do not have obvious preference for undertaking regional selection, while technology-intensive industrial location selection shows obvious preference for Tianjin.

4. Further Empirical Analysis

According to the theory of industrial location, traditional and new economic geography, and related literature review, we select labor force quality, infrastructure construction, market size, traffic conditions, the government from six aspects: factor endowment, capital, transportation, market, government and externality Tax and leisure environment six explanatory variables for analysis, the specific measurement indicators in the table 1.

Table 1: The measure of influencing factors of industrial transfer

Variable	Indicators	Symbol
Degree of industrial transfer	Industrial gradient coefficient	IGC
Labor quality	Number of students	Qual
infrastructure	Total investment in fixed assets	Infr
Market size	The total retail sales of social consumer goods	Mark
Traffic Conditions	Cargo turnover around	Tran
Government tax	Government revenue	Gov
Leisure environment	Urban green area	Green

In order to eliminate the influence of heteroscedasticity and unit, logarithm of explanatory variables is taken to establish the panel model as follows:

$$IGC = \beta_1 \ln Qual + \beta_2 \ln Infr + \beta_3 \ln Mark + \beta_4 \ln Tran + \beta_5 \ln Gov + \beta_6 \ln Green + \mu$$

Table 2: Measurement of the Factors Influencing the Transfer of Electronic Information Industry

symbol	modelI		Model II	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Qual	3.957(0.0000)	6.582	3.803 （0.0000）	6.315
Infr	2.124 （0.0341）	2.232	2.320 （0.0238）	2.39
Mark	-9.012 （0.0006）	-3.885	-7.660 （0.0006）	-3.845
Tran	0.435(0.3289)	0.994		
Gov	2.513(0.0241)	2.390	1.573 （0.0167）	2.546
Green	4.055(0.0139)	2.630	3.012 （0.0125）	2.671
Adjusted R-Squared	0.823409		0.822788	

P values in brackets.

The empirical results show that the economic significance of all the variables of Equation I passed the test and the traffic conditions did not pass the statistical significance test. Therefore, the traffic conditions were excluded. This may be due to the following reasons: the products of the electronic information industry are of high value, small size and light weight, Good storage and other advantages, the requirements of the transport conditions is not high; the other hand is to illustrate the current traffic conditions in Beijing, Tianjin and more mature, little room for improvement. Therefore, the improvement of transport conditions is not significant. After removing the traffic conditions, the equation II is obtained. Except for the negative correlation between the market size and the industrial choices in Beijing-Tianjin-Hebei region, the remaining variables are positively correlated with the industrial transfer and are in line with the expectation. Labor quality, infrastructure, market size and leisure

environment are the major explanatory variables that affect the transfer of the industry. Among them, the most influential factor is the size of the market. Empirical results show that the size of the undertaking market is negatively correlated with the transfer of enterprises. The possible reason is that the market for electronic information industry is extensive, not only satisfying the local market, but also meeting the needs of the surrounding areas even after the scale is formed Big market The second major factor is the quality of the labor force. The main reason is that the electronic information industry is technology-intensive. High-quality personnel are the source of sustainable development of technology-intensive industries. Human capital is integrated into industrial development and the two promote each other. The third major impact is the leisure environment, the current serious pollution in major cities, people are more and more emphasis on the environment, the urban green space is conducive to people relax and help businesses

into. The fourth major impact is the construction of infrastructure, infrastructure construction is the external environment for business survival, business choices to undertake and the region is closely related to supporting assets. The government tax coefficient is positive, but the impact is small, probably because the government's taxation policy is unreasonable, hindering the rapid transfer of industries.

5. Conclusion and Policy Implications

Based on the calculation of the gradient index of Beijing-Tianjin-Hebei region, this paper concludes that a large-scale industrial transfer is taking place in the region at present, which shows the shift of capital-intensive industries before that of labor-intensive and energy-intensive industries. Among them, Most industries have an advantage in scale, and technology-intensive industries have shown a clear preference for Tianjin. The transfer of industries in Beijing-Tianjin-Hebei basically follows the gradient of "Beijing → Tianjin → Ji". Industries in Beijing and Hebei have great differences. Tianjin and Hebei have fierce competition in industries. Empirical test shows that market size, labor quality, leisure environment and infrastructure construction have a great impact on industrial transfer, and the impact of government tax is small. Market size reflects effective demand and is closely linked to wages. Rising wages can increase the cost of doing business, reduce the attractiveness of the business, and make the local government less vulnerable because of the wage cost of labor. Therefore, the following suggestions are made from the aspects of infrastructure, government revenue, leisure environment and labor quality. Industries in Beijing, Tianjin and Hebei should develop with their own advantages. All localities should improve their infrastructure, strengthen social fundraising, transform short-term tax-deductible behavior into a long-term incremental model, develop an ecological wetland park, improve the soft environment for investment, and strengthen human resources Cross-regional exchanges, the establishment of sharing mechanism

References

[1] Akamatsu, K.Synthetic Dialectics of Industrial Development of Japan [J].Journal of Nagoya Commercial High School, 1937, (15).pp.179-210

[2] Lewis, W. A. The Evolution of the international economic order. New Jersey: Princeton University press, 1978, pp.121-136.

[3] Myrdal G. Economic Theory and Under-developed Regions[M].London: Duckworth, 1957, pp.23-37.

[4] Vernon, R. International Investment and International Trade in the Product Cycle [J].Quarterly Journal of Economics, 1966, (80), pp.191-207.

[5] Kojima K. Direct Foreign Investment: A Japanese Model of Multinational Business Operations. London: Croom Helm, 1978, pp.22-24.

[6] Dunning, J. H. The Paradigm of international production [J].Journal of International Business Studies, 1988, pp.1～33.

[7] Tan Chenglin, Xiong Xuru. The Dynamic Evolution and Characteristic Analysis of China's Manufacturing Industry Transfer - Based on the Measurement of Relative Net Flow Index [J]. Industrial Economics Research, 2013, （1）.

[8] Zhang Gui, Wang Shuqiang, Liu Sha et al.. Study on the Coordinated Development of Beijing, Tianjin and Hebei Based on Industrial Docking and Transfer [J]. Economic Management, 2014, 28（4）：14～20.

[9] LIU Hong-Man, Lang Dan-ni. Analysis on the Influencing Factors of Manufacturing Industry Agglomeration in Beijing-Tianjin-Hebei Collaborative Context [J]. Journal of Hebei University of Economics and Trade, 2016, 37（4）: 104～109.

[10] XIONG Bi-Lin, CHEN Rui, YANG Shan-Lin. Analysis of Regional Industrial Transfer Based on Improved Gradient Coefficient [J]. Economic Theory and Business Management, 2007, （7）: 45～49.

[11] FujitaM, THisse JF. Economics of agglomeration: Cities, industry allocation, and regional growth [M]. Cambridge University Press, 2002.

[12] Fuchs VR. The Determinants of the Redistribution of Manufacturing in the United States Since 1929 [J]. The Review of Economics and Statistics, 1962, 44 (2): 167-177