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Research on Effect of Industrial Transfer on Industrial Structure of Resource-based Cities

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Abstract

Industrial transfer is an important force to promote the reallocation of social resources. Taking seven resource-based cities in Henan Province such as Sanmenxia, Luoyang, Jiaozuo as research objects, and combining the statistics of Henan Province from 2010 to 2016 to explore the impact of industrial transfer on the industrial structure, the following indicators are transformed: (1) In the process of undertaking industrial transfer International and domestic industrial transfers have different effects on industrial structure optimization. (2) The optimization of industrial structure is affected by various factors. The regional economic level has the greatest impact and has played an important role in optimizing the industrial structure. International trade has a significant negative effect. The effect of innovation-driven development is also not obvious.

Keywords

Industrial transfer, Industrial structure optimization, Resource-based cities.

1. Introduction

Resource-based cities have played an important role in China's economic development, but the development based on mineral resources is ultimately unsustainable. In recent years, the development of resource-based cities has faced tremendous economic and policy pressures. On the one hand, the decrease in resource reserves and the increase in production costs have slowed down the development of resource-based cities; on the other hand, due to environmental pressures, resource-based production has been severely restricted. The resulting loss of talents and funds has further worsened the development of resource-based cities, and industrial transformation and upgrading are imperative.

At present, industry transfer research is increasingly shifting from industry transfer models and drivers to industry transfer effects (Maria Savona et al., 2004). Scholars have conducted a large number of case studies on Turkey (Tokatli, 2007;), Brazil (Fally et al., 2010), and East Asia (Yeung, 2009).

Studies by Chinese scholars mainly include Guo Kesha's research showing that foreign investment economy has a positive impact on China's economy, especially the adjustment of industrial structure. Zhang Fan's research indicates that the investment of multinational corporations in capital and technology-intensive industries promotes the more efficient allocation of resources between industries in China. Zhang Qin's research shows that international industrial transfer is conducive to the optimization of China's industrial structure. Dai Hongwei and Wang Yunping also believe that the industrial transfer in various regions of China plays an extremely important role in "undertaking the industrial transfer in underdeveloped areas to improve the industrial structure." Undertaking industrial transfer is an opportunity for economically backward regions to be embedded into the global value chain.

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The upgrading of the local industrial structure “evolves from a low value-added value chain to a high value-added value chain.”

With the deepening of industrial division of labor and the development of modern industrial system construction, international and domestic industrial transfers have also begun to rise. As seven resource-based prefecture-level cities in Henan Province, Sanmenxia, Luoyang, Jiaozuo, Hebi, Puyang, Pingdingshan, and Nanyang are facing a wave of large-scale industrial transfers. Can we take this opportunity to adjust the industrial layout and realize the upgrading of the industrial structure and its future Economic development and even the steady growth of Henan's economy have important implications. Taking seven resource-based cities in Henan Province, such as Sanmenxia, Luoyang, and Jiaozuo, as research objects, this paper analyzes the status quo of industrial transfer and industrial structure, and explores their impact relationships in order to provide references for regional development.

2. Definition of Related Concepts

2.1. Industry Transfer

Industrial transfer refers to the phenomenon of spatial transfer of industries in a general sense. And its specific meaning, domestic scholars have different understanding. Chen Jianjun (2003) believes that "industrial transfer often occurs after long-term international trade, international investment or interregional trade and interregional investment activities." Wei Houkai believes that “with the large-scale transfer of industries, production factors such as capital, labor, and technology will gradually move to the place of transfer. Therefore, it can be considered that industrial transfer is the carrier of various factor flows. Chen Honger pointed out that "interregional industrial transfer refers to the development of industries in developed regions in response to changes in competitive advantages under the conditions of a market economy, and the transfer of production in some industries to developing regions through direct investment across regions." Industrial transfer is a concept of "process", which includes the entire process of industrial physical and non-physical space movement; and the flow of funds is the starting point of industrial transfer and also runs through the entire process of industrial transfer. Combining the above concepts, we can use the funds in the province and foreign direct investment to represent the transfer of industries from different sources.

2.2. Industrial Structure Optimization

The evolution of the industrial structure represents the development direction and approach of the regional economic structure, and there have been many theories in this regard. On the basis of William Petty's thoughts on the relationship between income differences and labor mobility, Clark pointed out that labor will gradually flow to the tertiary industry. On this basis, Kuznets puts forward new perspectives from the perspective of the proportion of output value and the proportion of labor force. The evolution of the industrial structure is not only a change in the proportion of employed population or output value, but also implies changes in production levels and personnel income. As the industrialization process advances, the labor efficiency of the industry will inevitably be improved, and the evolution direction of the industrial structure will be based on this.

Most domestic studies analyze the industrial structure from two aspects: rationalization and advanced industrial structure. Rationalization is measured from the perspective of coordination, and advanced is measured from the perspective of labor productivity.

The optimization of the industrial structure "is reflected in the high added value, high technology, high intensification and high processing of the industry" and "proportionate coordinated development among various industries", which is reflected in the improvement of the overall industrial level. Zhou Changlin and Wei Jianliang (2007) Combined with the current

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research situation in China, a method for measuring the industrial level coefficient was constructed. The specific formula is as follows:

$$H = \sum_{i=1}^{n} K_i \sqrt{P_i / l_I}$$

In the formula, H refers to the level of the regional industrial structure, n refers to the number of regional industrial sectors, and K_i refers to the proportion of the output value of the i industrial sector in the entire industrial sector system, which represents the industry's contribution to the industrial structure level calculation. P_i is the output value of the i industry, and $l_I$is the number of employees in the i industry; $\sqrt{P_i / l_I}$represents the level coefficient of the i industry, which is represented by M_i; the larger the value of M_i, the higher the degree of development of the i industry. The growth of the industrial structure can be used to represent the optimization of the industrial structure.

3. Factors Affecting Industrial Structure

Compared to the Yangtze River Delta region, which focuses on technological innovation and technological progress to promote the advanced industrial structure, the central region is more dependent on investment. For the existing industries in the central region, the industrial transfer on the one hand supplements the funding gap, and it is more meaningful to promote the improvement of local production technology. In the long run, it will inevitably drive the improvement of industrial labor productivity, and then promote the transformation and upgrade of traditional industries To stimulate the emergence of emerging industries; in addition to undertaking industrial transfers, the factors affecting the optimization of the industrial structure include the following:

economic level. The improvement of the economic level implies two contents, one is the improvement of labor productivity and the other is the improvement of individual labor skills; these two contents are important technical and human factors for the optimization of industrial structure. In addition, social consumption is a powerful driving force for the transformation and upgrading of the industry. The increase in the level of personal income brings the diversification of the personal consumption structure, thereby promoting the adjustment of the industrial structure. Regional per capita GDP is used to characterize the economic level.

international trade. International trade is closely related to changes in the domestic industrial structure. The product industry engaged in international trade must also occupy a favorable position in the region. The improvement of the level of regional industrial structure will inevitably affect the types of products in international trade, and thus expand the scale of trade. It should be noted that if the export structure does not change, it will be difficult for international trade to promote the adjustment of industrial structure. This is expressed by the total regional import and export.

Innovation-driven. Scientific and technological innovation is the core support of national strength. Scientific and technological innovation is conducive to the transformation and upgrading of traditional industries and the development of emerging industries, and is a key factor to promote the adjustment and optimization of industrial structure. Measured by internal per capita R &D expenditure.

Energy investment. The development characteristics of the energy industry determine that the economy of resource-based cities must undergo transformation and upgrading to achieve sustainable development. Energy investment has a certain promoting effect on the improvement of the existing energy industry technology, and it is also conducive to achieving

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professional development while improving the economic efficiency of the industry. In addition, electricity and gas are the basis of social production. The development of such industries will reduce the local production costs, increase the production vitality of enterprises, and promote the sustainable and healthy development of the industry.

4. Present Situation and Effects Analysis

4.1 Changes in Industrial Transfer Over the Years

Combining the statistical yearbooks of Henan Province over the years, the two indicators of actual utilization of foreign capital and extra-provincial funds were sorted out. The results are as follows.

Table 1. Utilization of foreign capital and foreign capital in seven cities of Henan Province

City	Year	Actual utilized foreign capital (US $ 10,000)	Extra-provincial funds (100 million yuan)	Increase in actual utilized foreign capital	Increasein extra-provincial funds
Sanmenxia	2010	39849	114.4	167%	208%
Sanmenxia	2016	106296	352.2		
Luoyang	2010	120475	220	123%	223%
Luoyang	2016	268798	709.9		
Jiaozuo	2010	28832	191.7	187%	201%
Jiaozuo	2016	82733	577.1		
Hebi	2010	22481	90.1	262%	215%
Hebi	2016	81394	283.8		
Liyang	2010	9001	61.2	603%	244%
Liyang	2016	63301	210.8		
Pingdingshan	2010	16390	171.2	164%	199%
Pingdingshan	2016	43221	511.1		
Nanyang	2010	20111	168.5	199%	206%
Nanyang	2016	60228	515.9		

As of the end of 2016, the seven cities in Luoyang actually used the most foreign capital, about 2.688 billion US dollars, the lowest in Pingdingshan City, about 432 million US dollars; Liyang City had the largest increase, but the scale was small, about 633 million US dollars; The scale of funds outside the province was the largest, at 70.99 billion yuan, and the smallest in Liyang City, at 21.08 billion yuan. The increase in the seven cities was basically the same, about 200%.

4.2 Changes in the Level of Industrial Structure Over the Years

According to the classification method of the three industries, the statistical data of Henan Province over the years were collected, and the industrial structure level, K value, and M value of the seven cities in Henan Province were measured. The results are shown in Figures 1 and 2. From the perspective of industrial structure level, the seven cities are generally on the rise, with a relatively consistent range; it is worth noting that the levels of Sanmenxia in the two years of 2014 and 2015 have changed abruptly. Through data inspection, it was found that in 2014, the number of employees in the Sanmenxia secondary industry decreased by about 110,000

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compared with the previous year, while the number of employees in the tertiary industry increased by about 140,000. In 2015, the number of employees in the two types of industries suddenly decreased. Two about 100,000. Such a large difference is presumably not the actual situation, but a statistical classification problem. For the stability of the data, the average of the data from 2014 and 2016 is used as the data for 2015. The adjusted results are shown in the figure.

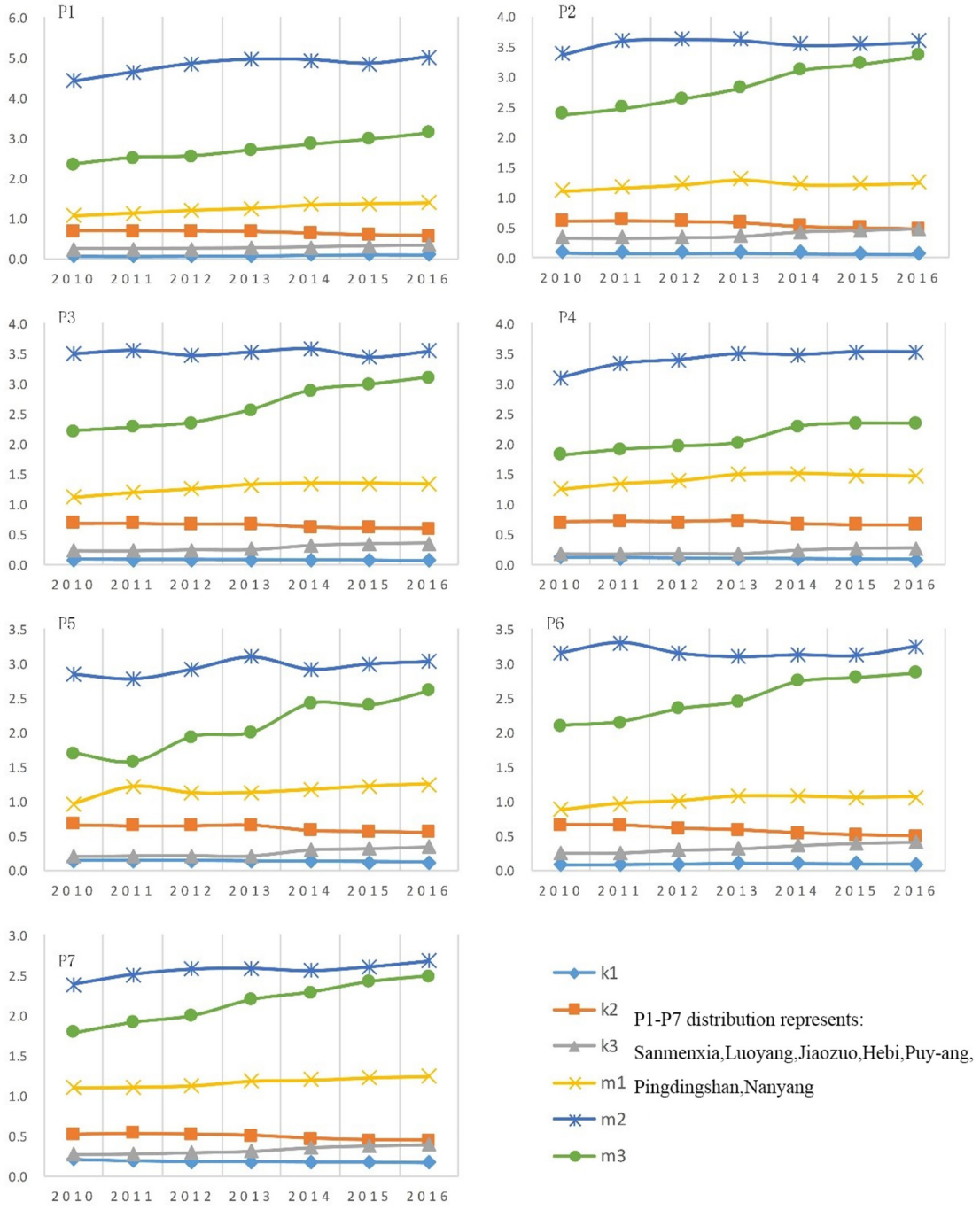

Figure 1. K and M value of each industry

From the perspective of industrial development level, the M value of the primary industry in the seven cities remained basically unchanged and rose slightly; the M value of the secondary industry increased more than the M value of the primary industry, but the growth rate in 2014 slowed down significantly. ; The M value of the tertiary industry has increased significantly, which is larger than that of the primary and secondary production. From the perspective of

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industry contribution, the K value of the first industry is basically flat and slightly decreased; the K value of the second industry is more obvious than that of the first industry; the K value of the third industry has increased significantly.

4.3 An Empirical Analysis of the Effect of Industrial Transfer on the Optimization of Industrial Structure

Based on the above analysis, the research period is selected as 2010-2016. Large-scale domestic industrial transfers have only begun since 2008; and statistics for 2009 are missing. The relevant data are all from Henan Statistical Yearbook. Set up a logarithmic model based on the Douglas production function:

$$\ln H = c + k_1 \ln FDI + k_2 lnUW + k_3 lnENG + k_4 lnPGDP + k_5 lnPR\&D + k_6 lnOP + u$$

Among them, H represents the level of industrial structure, c is the intercept term; FDI represents foreign direct investment, UW is extra-provincial funds, ENG is energy investment, PGDP is GDP per capita, PR&D is per capita R&D expenditure, OP is international trade; k is Corresponding coefficient, u random error term.

Table 2. The overall effect of the equation

Statistic	Value
R^2	0.94
Adjust R^2	0.93
F statistic	51.15
P value	0.0001

Table 3. Fixed-effect regression results

Variable	coefficient	T statistic	P value
LOGFDI	-0.03	-1.42	0.16
LOGENG	0.06	2.78	0.01
LOGOP	-0.06	-4.71	0.00
LOGPGDP	0.71	12.71	0.00
LOGPRD	-0.05	-1.46	0.15
LOGUW	0.06	2.02	0.05
C	-1.35	-9.73	0.00

Eviews software was used for estimation. The results are as follows: First, Hausman test is performed on the data, and the chi-square value is 36.54, and the P value is 0; the null hypothesis is strongly rejected; that is, the error term is related to the explanatory variable. It is believed that a fixed effect model should be used.

It can be seen that the four variables of energy investment, international trade, economic level and extra-provincial funds all have an impact on the level of industrial structure at the level of 1%. From the perspective of symbols, international trade has an impediment to the optimization of the industrial structure. The improvement of energy investment, economic level, and extra-provincial funds will promote the improvement of the industrial structure level, while foreign direct investment and innovation drive have no significant effect on the industrial structure level Even have a negative effect. From the coefficients of various variables, every 1% increase in international trade will reduce the industrial structure level by 0.06 percentage

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points; every 1% increase in energy investment will increase by 0.06 percentage points; every 1% increase in the economic level will increase the industrial structure level An increase of 0.73 percentage points; each 1% increase in foreign capital will increase the industrial structure level by 0.06 percentage points.

The "negative" optimization effect of foreign direct investment on the industrial structure is not significant. Due to the large amount of cheap labor, foreign investment in the seven cities is mainly concentrated in chemical, energy-based industries and labor-intensive industries, such as chemical products and non-metallic mineral manufacturing, food processing, and electronic components. Concentrated on real estate, business, etc .; this non-technology-intensive enterprise has limited promotion of increasing the industrial level coefficient M. Moreover, foreign capital is increasingly appearing in the form of sole investment. Even if technology-intensive enterprises settle in the local area, it will be difficult to significantly promote the development of local industries in the short term.

Provincial funds have a significant role in optimizing the industrial structure. In the past seven years, in terms of investment invitation, the extra-provincial funds are mostly concentrated in the equipment manufacturing, new materials and optoelectronic industries. The development of the equipment manufacturing industry has always been an important basis for economic growth in Henan Province. The capital investment and enterprise transfer of the equipment manufacturing industry in developed regions not only opened up capital and technology gaps for the seven cities, but also promoted the technological upgrading of local equipment manufacturing enterprises and the improvement of social labor productivity; the improvement of the industrial chain will inevitably drive related productive services The development of the industry has driven the development of the service industry to modernization. New materials and optoelectronics are high-tech industries. Due to their high added value, the development of such industries will also greatly promote the optimization of the industrial structure.

The growth of energy investment in the seven cities is mainly due to the development of the production and supply of electricity, heat and gas. As a source of power for social production, the significant positive effect of energy investment variables explains the development of accompanying social production in some ways, and the industrial structure is always trending to a high level. The seven cities are mainly export-oriented in international trade, while the goods exported are mainly agricultural products, machinery and electronics, mineral products and chemical products. It can be seen that the technical content of exported goods is not high and the added value is low, and the negative impact of international trade on the optimization of industrial structure is not difficult to understand. As for the non-significant negative effect of innovation drive, it fully illustrates that the driving forces for economic development of the seven cities have not been converted, and innovation has not yet become the primary driving force for regional development, which is also the significance of China's active implementation of the innovation-driven development strategy Where.

5. Conclusion and Discussion

Taking seven resource-based cities in Henan Province such as Sanmenxia, Luoyang, and Jiaozuo as research objects, combined with Henan Province's statistical data from 2010 to 2016, analyzing the status quo of its industrial transfer and industrial structure, and exploring its impact relationship, the main conclusions are as follows: (1) In the process of undertaking industrial transfer in seven resource-based cities, different sources of funds and enterprises have very different effects on the optimization of the industrial structure. The increase in the actual utilization of foreign capital has a non-negative negative effect on the optimization of the industrial structure of the seven cities; while the use of foreign capital has significantly promoted the optimization of the industrial structure. This is mainly due to the type of industry

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in which funds are flowing. (2) The optimization of industrial structure is affected by various factors. The regional economic level has the greatest impact, and has played an important role in optimizing the industrial structure. International trade has a significant negative effect, and the effect of innovation-driven is not obvious.

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