Assimilated Industrial Structures of Changchun and Jilin

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Abstract

Nowadays, industry integration has become a trend for economic and social development. It has become a new model of current regional development to consolidate resources across administrative regions, and competition between regional city groups would replace competition between single cities. As the construction process of Changchun-Jilin-Tumen Open Development Pilot Zone speeds up, Changchun-Jilin integration and the industry integration issues between the two cities have gradually draw attention. The similarity of industrial structures between Changchun and Jilin is the foundation of their industry integration. This article employs Location Quotient, Agglomeration Index and Similarity index to analyze the industrial structures of both cities using quantitative methods. The research has exposed some issues of the industrial structures of Changchun and Jilin, such as distinctive heavilization of industrial structures, convergence of industrial structures, as well as having single core industries, etc. The analysis of the assimilated industrial structures of Changchun and Jilin lays a foundation for providing them an industrial integration path and related strategies.

Key words: Changchun-Jilin; Industry; Integration

INTRODUCTION

Under the background of regional cooperation, the industry integration issues of Changchun and Jilin have been brought to notice. Based on growing and strengthening industries of the two cities, Changchun-Jilin industry integration will optimize the industrial structure and arrange industrial spaces reasonably for center Jilin and eventually the whole Jilin province. This will be accomplished according to the regular patterns of industrial development and changes, using enterprises as objects for integration; Factors of production will be re-allocated across space, geographies, industries and ownership, and new capital organization and technology organization will be adjusted and built. Through this effort, competitive leading industries and related industrial structures can be formed with big enterprises and enterprise groups as their cores. Then with Changchun and Jilin leading the development, a full implementation of the Changchun-Jilin-Tumen and Northeast revitalization strategy could be expected.

Regional governments have approached and practiced industry integration from different angles. "Guangzhou-Foshan" initiative from Guangdong, "Changsha-Zhuzhou-Xiangtan" initiative from Hunan and "Shenyang-Fushun Integration" from Liaoning are successful examples of regional integration practice within a single province. Researchers have also explored the industry integration during regional integration from different angles. Hu, Zhang, and Hu (2012) have analyzed how enterprise mergers and acquisitions across provincial borders impact regional industrial structures and economic growth. Nie (2012) believes that severe industry convergence between cities has weakened the overall competence of city circles. The competence can be enhanced through integration of scattered resources within the region, targeted cooperation between industries, industry chain extension and

specialized production. In addition, researchers also focus on institutional barriers during integration and integration paths. Regarding the industry integration of Jilin province, Piao and Jin (2009) as well as Wang and Zhang (2008) have used separated examples—Yanji-Longjing-Tumen area in the Yanbian Korean autonomous prefecture and core areas of center Jilin, respectively—to argue and propose regional industry integration's features, key points of execution and strategies, as well as to discuss regional industry integration's effect on enhancing competence of under-developed regions and methods to use. This article, however, analyzes the foundation of Changchun-Jilin industry integration by analyzing the similarities of the two cities' industrial structures.

1. DATA AND METHODS

1.1 Definition of Researched Regions and Data Description

The researched regions were downtown areas of Changchun and Jilin, as well as 9 counties and cities under the jurisdiction of Changchun and Jilin, including Jiutai, Dehui, Nong'an, Yushu, Yedian, Jiaohe, Shulan and Yongji.

All data came from Changchun Statistical Yearbook, Jilin Social and Economic Statistical Yearbook and Jilin Province Statistical Yearbook between 2006 and 2012. Among all industries presented in the yearbooks, due to the small output value of Changchun Black Metal Mining Industry, Non-Ferrous Metal Mining and other Mining, Jilin's Tobacco Industry, Culture, Education and Sporting Goods Manufacturing Industry and Wasted Resource and Material Recycle Industry, they were excluded from calculations of Location Quotient and Agglomeration Index. The calculation only takes into account the other 37 industries of Changchun and Jilin.

1.2 Measurement Methods

1.2.1 Similarity Coefficient

Formed during National Key Project construction period, the industrial systems of Jilin Province are infused with a pronounced color of Planned Economy, with a severe tendency towards regional division. Driven by the notions of "Large and All-Inclusive" and "Small and All-Inclusive", both Changchun and Jilin governments had been continuously competing for projects and investment out of self-interest. Their vicious competition has resulted in the similar industrial structures of both cities. We

hereby adopted the Similarity Coefficient proposed by UNIDO (United National Industrial Development Organization) to analyze the similarity of the two cities' industrial structures. The formula is as followed:

$$S_B^A = \sum_{i=1}^{k} X_{Ai} X_{Bi} \Big/ \sqrt{\sum_{i=1}^{k} X_{Ai}^2 \sum_{i=1}^{k} X_{Bi}^2} \qquad (1)$$

Location Quotient

$$LQ = \left[d_i \Big/ \sum_{1}^{n} d_i \right] \Big/ \left[D_i \Big/ \sum_{1}^{n} D_i \right] \qquad (2)$$

wherein, LQ represents the Location Quotient of the ith industry in the region against its higher-level reference region; d_i represents employment or output value of the ith industry; $\sum_{1}^{n} d_i$ represents total employment or output value of all n industries in the region; D_i represents employment or output value of the ith industry of the higher-level reference region; $\sum_{1}^{n} D_i$ represents total employment or output value of all n industries in the higher-level reference region.

Agglomeration Index

$$A_{ij} = S_{ij} / S_i \qquad (3)$$

$$S_{ij} = (q_{ij} / q_{ij})^{1/t} - 1 \qquad (4)$$

$$S_{ijt} = (\sum_{i=1}^{m} q_{ij} \Big/ \sum_{j=1}^{n} q_{ij})^{1/t} - 1 \qquad (5)$$

wherein, A_{ijt} represents the Agglomeration Index of industry i of j region, (0-t) is the time period selected by this research, where qij represents the beginning and end output value of industry $i(i=1,2,…n)$ of region j (j=1,2,… m); S_{ijt} represents the average growth speed of industry i of region j during researched time period; S_{it} represents the average growth speed of industry i of region j's higher-level reference region during (0-t).

2. CALCULATION RESULTS AND ANALYSIS

2.1 Distinctive Heavilazation of Industrial Structures

We used Location Quotient and Agglomeration Index to study 37 industries in Changchun and Jilin regions. Results show that the below industries in Changchun and Jilin region are competitive industries in growth period.

Table 1
Competitive Industries of Changchun and Jilin

Competitive industries of Changchun			Competitive industries of Jilin		
Competitive industries	Location quotient	Agglomeration index	Competitive industries	Location quotient	Agglomeration index
Agro-food processing	1.456	1.269	Black metal mining industry	1.346	0.907
Food Manufacturing	0.636	1.735	Non-ferrous metal industry	3.302	1.055

To be continued

Continued

Competitive industries of Changchun			Competitive industries of Jilin		
Competitive industries	Location quotient	Agglomeration index	Competitive industries	Location quotient	Agglomeration index
Pharmaceutical Manufacturing	0.529	1.001	Non-metal mining industry	2.598	1.270
Non-metallic mineral products industry	0.674	0.692	Food Manufacturing	1.964	1.512
Fabricated metal products industry	0.885	1.003	Chemical materials and chemical products manufacturing	3.977	1.320
General equipment manufacturing	0.859	1.215	Chemical fiber manufacturing	4.814	1.030
Special equipment manufacturing industry	0.358	1.013	Non-ferrous metal smelting And rolling processing industry	3.132	1.195
Transportation Equipment Manufacturing	2.275	1.031	Electrical machinery And equipment manufacturing	1.943	1.473
Communications equipment, computers and Other Electronic Equipment Manufacturing	1.401	1.138	Communications equipment, computers and Other Electronic Equipment Manufacturing	1.027	1.007
			Fabricated metal products industry	2.024	1.258

According to the table above, heavy industries like transportation equipment manufacturing, general equipment manufacturing, chemical materials and chemical products manufacturing and chemical fiber manufacturing have taken up a higher proportion in the two cities' regional GDP. This shows that the development focus and foundation of Changchun and Jilin industries are heavy industries. In addition, as some industries in their growing period, such as transportation equipment manufacturing, chemical materials and chemical products manufacturing, chemical fiber manufacturing and pharmaceutical manufacturing, keep developing and strengthening, the features of a heavilized industrial structure will become more pronounced.

2.2 Similar Industrial Structures, Different Strengths

It is calculated that in 2005 and 2011 the similarity coefficients of industries of the two cities are 0.48 and 0.61, respectively. This indicates a convergence between their industries. Still, the strengths and natures of the same industries in the two cities differ. Take transportation equipment manufacturing as an example: This industry in Changchun is a competitive one, contributing to more than 96% of the respective industry's output in the whole Jilin province. The Economic Development Zone, Hi-tech Industrial Development Zone of Jilin also has the same industry, but their output is less than 3% of the respective industry's total output of Jilin province. The car manufacturing industry in Changchun claims a market share of 20% nationwide, its sales only second to Shanghai. It is the only northeastern city ranking within top 10 of China in terms of car sales. It is apparent that Changchun's Transportation equipment manufacturing industry is extremely strong.

2.3 Overly Concentrated Core Industries

The core industries of Changchun and Jilin are overly concentrated. For example, 74% of Changchun's output is created by its transportation equipment manufacturing industry, whereas more than half of the industry added value of Jilin is produced by chemical materials and chemical products manufacturing, non-metallic manufacturing and ferrous metal smelting and rolling industries from Jilin City. Such overly concentrated core industries will hinder the optimization and advancement of both cities' industrial structures.

The competitive industries analyzed above have been calculated based on the Location Quotient and Agglomeration Index within the range of Jilin province. Therefore, these industries would not necessarily lead the economic development of the cities alone. It is also necessary to determine their competitive industries according to the practical needs of economic development within the cities.

Non-ferrous metal smelting and rolling processing industry of Jilin has been confirmed as a competitive industry in growth period. This is mainly due to Jilin's non-ferrous metal reserves that weigh considerably within the province, such as Daheishan Molybdenum Mine of Yongji county, gold mine of Yedian city, and lead, copper, cobalt, zinc and other non-ferrous metal mines near Panshi city. However, since Jilin province is heavily developing recycling economy, the city cannot continue indulging in growing the economy by exploiting and exhausting resources anymore.

Currently, general equipment manufacturing, equipment manufacturing, transportation equipment manufacturing, and general equipment, computers and other electronic equipment manufacturing are industries with comparative advantages which are in the formation

and growth period in Changchun, but these industries have also developed to some extent in Jilin's Development Zone. However, we believe that after a few years these industries should be concentrated in Changchun. On one hand, it is because these industries have already built a decent foundation in Changchun and are also connected with Changchun's car manufacturing industry to some degrees. On the other hand, with Changchun's solid scientific and technological strengths, the city can take advantage of industrial cluster effects. Same applies to Changchun's chemical materials and chemical products manufacturing, chemical fiber manufacturing industries, which should be also concentrated in Jilin territory.

Changchun has the richest intellectual resources of the whole Jilin province. Its pharmaceutical industry has become well established, with its own unique biopharmaceutical industry in the formation period. Going forward, Changchun should make good use of its advantage in talents and technologies, and continue to promote the development of the pharmaceutical industry.

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