Research on the Coordinated Development of Jiangxi Province Producer Services and Manufacturing Industries under the New Economic Normal

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Abstract

By measuring the industrial association and spatial co-agglomeration index producer services and manufacturing industries in Jiangxi province, this paper finds that the industrial association and spatial agglomeration degree of producer services and manufacturing industries in Jiangxi province are not high as a whole. It is proposed that the geographical advantages and factor advantages of Jiangxi should be brought into full play, the industrial and spatial integration of producer services and manufacturing industries should be strengthened, and the spatial distribution of producer services and manufacturing industries should be continuously optimized under the impetus of the government, so as to enhance the value chain of producer services and manufacturing industries and form an industrial chain with regional characteristics.

Keywords

Producer services; Manufacturing industries; Coordinated development; Jiangxi province

Introduction

In recent years, the coordinated development of producer services and manufacturing industries has been the focus of the government and academic circles, which has been widely discussed. The government has issued relevant policies and scholars have continuously provided solid theoretical support, which make the interactive integration of producer services and manufacturing industries move towards a higher level of development track. After the separation of producer services as an independent production department from manufacturing industries, the research on the relationship between them has attracted the attention of many scholars at home and abroad. In recent years, the research on the coordinated development of producer services and manufacturing industries has become the focus of academic attention. In the existing research, the theoretical research on the relationship between producer services and manufacturing industries mainly focuses on the levels of industrial association and spatial synergy.

To study the relationship between producer services and manufacturing industries from the perspective of industrial association, it mainly relies on the division of labor theory of classical economics, transaction cost theory of new institutional economics and social network theory. Among them, based on the division of labor theory of classical economics, the division of labor between producer services and manufacturing industries is due to the refinement of the division of labor, which makes producer services independent from the manufacturing industries. Based on the transaction cost theory of new institutional economics, the internal mechanism of producer services independent from manufacturing industries is that the production cost saved by the division of labor is higher than the transaction cost caused by the division of labor. Based on the social network theory, the nodes formed between manufacturing industries and their raw material suppliers, producer services, government departments, etc., as well as the nodes in their own production chains, are interwoven to form a network. In this network, there is a strong or weak correlation between producer services and manufacturing industries. In the aspect of empirical research, relevant research mainly uses input-output table, econometric regression model and questionnaire survey to analyze the interactive relationship between manufacturing industries and producer services through a large number of data and cases. The representative studies are Macpherson (1997), Se-Hark Park & Kenneth (1989), Se-Hark Park (1999) and Guerrieri & Meliciani (2005).

To study the relationship between producer services and manufacturing industries from spatial perspective, the existing research mainly focuses on analyzing the synergy between producer services and manufacturing industries. There are two main directions in this research. One is to explore the internal mechanism of spatial synergy co-agglomeration between producer services and manufacturing industries based on relevant theories, and the other is to explore the reasons for the differences in synergy co-agglomeration between producer services and manufacturing industries. The representative studies include Villar & Rivas (2001), Porterfeild & Pulver (1991) and Andersson (2004). The representative literature about China is the paper of Chen Jianjun and Chen Jingjing (2011).

Some scholars have made useful explorations on the relationship between producer services and manufacturing industries in Jiangxi. However, in the existing research, there are few literatures on the development of producer services and manufacturing industries in Jiangxi province from the aspects of industrial association and spatial synergy. On the basis of previous studies, this paper explores the coordinated development of producer services and manufacturing industries in Jiangxi province from the aspects of industrial association and spatial synergy, and on this basis this paper puts forward targeted policy suggestions to promote the coordinated development of producer services and manufacturing industries in Jiangxi province.

The Instructions of Data and the Selection of Measurement Indicators

The Instructions of Data

In this paper, Jiangxi Province Input-Output Table in 2012 and Economic Census Database in 2013 are selected to measure the coordinated development of producer services and manufacturing industries in Jiangxi province from the two dimensions of industrial association and spatial synergy. Among them, the data of Jiangxi Province Input-Output Table in 2012 is used to measure the industrial association between producer

services and manufacturing industries in Jiangxi province. Using the data of Economic Census Database in 2013, this paper measures the co-agglomeration degree of producer services and manufacturing industries in Jiangxi Province.

According to the classification description of manufacturing industries in National Economic Industry Classification Standard (2011), the two-digit code industry in the 13-43 interval of Economic Census Database in 2013 is defined as manufacturing industries, and the corresponding industries in Jiangxi Input-Output Table in 2012 are defined as 19 manufacturing industries,which are food and tobacco, textiles, leather down and products of textile clothing shoes and caps, wood processing products and furniture, paper printing and cultural and educational sporting goods, coking products and nuclear fuel processed products, chemical products, non-metallic mineral products, metal smelting and rolling processed products, metal products, general equipment, special equipment, transportation equipment, electrical machinery and equipment, communication equipment, computers and other electronic equipment, instrumentation, other manufacturing products, waste products, metal products, machinery and equipment repair services.

According to National Economic Industry Classification Standard (2011) and Producer Services Classification (2015), combined with the data, this paper defines the services of 20 two-digit code industries in the 2013 Economic Census Database as producer services. In order to process data conveniently , this paper combines railway transportation, road transportation, water transportation, air transportation, pipeline transportation, loading and unloading and transportation agency into transportation, and combines monetary and financial services, capital market services, insurance and other financial industries into financial industries, finally obtaining 12 productive service industries. At the same time, according to Jiangxi Input-Output Table in 2012, producer services are defined as transportation, warehousing and postal services, information transmission, software and information technology services, finance, leasing and business services, and scientific research and technical services.

The Selection and Processing of Measurement Indicators

(1) Industrial Correlation Index in Input-output Analysis

According to the Jiangxi Province Input-Output Table in 2012, this paper analyzes the industrial correlation between five producer services and nineteen manufacturing industries. Referring to Jiang and Xi (2014), Zhao (2018) on the calculation of industrial correlation between producer services and manufacturing industries, By measuring the direct input coefficients (a_{ij} and a_{ji}) and direct distribution coefficients (h_{ij} and h_{ji}) of producer services i and manufacturing industry j, this paper reflects the backward and forward correlation between producer service industry i and manufacturing industry j, and uses their arithmetic mean c_{ji} to measure the industrial correlation between Jiangxi producer services and manufacturing industries. The value of C_{ij} is larger, the industrial correlation between producer service industry i and manufacturing industry j is higher, and the connection between production and operation activities between the two industrial departments is closer.

(2) The Measurement Index of Industrial Spatial Co-Agglomeration based on the Analysis of Industrial Geographical Agglomeration

Krugman (1991) and other scholars used spatial Gini coefficient to measure the degree of industrial geographical agglomeration, and then Ellision & Glaeser (1997) put forward the E-G index to measure the degree of industrial co-agglomeration. Devereux etal. (2004) simplified the E-G co-agglomeration index and expressed it as, $C(r) = \frac{G_r - \sum_{i=1}^{r} w_i^2 G_i}{(1 - \sum_{i=1}^{r} w_i^2)}$, in which G_r represents the geographical concentration of the number of r industries, in which G_i can be expressed as $G_i = \sum_{n=1} s_n^2 - \left(\frac{1}{N}\right)$, N represents the number of regions, and S_n represents the proportion of the employment of industry i in the region n and the total employment of industry i in N regions. $w_i = T_i / \sum_{i=1}^{r} T_i$ as a weight is usually expressed by the number of employees of industry i, and T_i is the number of all employees of industry i in N regions. The value of $C_{(r)}$is larger, the spatial co-agglomeration degree of r industries in the region is higher. In this paper, according to the method of Devereux etal. (2004), we take Nanchang, Jingdezhen, Pingxiang, Jiujiang, Xinyu, Yingtan, Ganzhou, Ji'an, Yichun, Fuzhou and Shangrao as the basic spatial units, and investigate the spatial co-agglomeration of producer services and manufacturing industries of Jiangxi province.

The Analysis of the Industrial Association Effect between Jiangxi Producer Services and Manufacturing Industries

According to the index of measuring industrial association in this paper, based on Jiangxi Province Input-Output Table in 2012, the industrial association between five categories of producer services and 19 manufacturing sectors is considered, and the coefficient matrix between them is constructed. The calculation results are shown in Table 1. Among the 95 matched pairs of industries, there are 30 pairs whose standard value of industrial association degree is greater than 0, which are accounting for 31.58% of all combinations.

Table 1. Industrial Association Table of Jiangxi Province Producer Services and manufacturing industries in 2012 (Partial Data)

Productive service industry	Manufacture	Industrial correlation degree
Transportation, warehousing and postal services	Petroleum, coking products and nuclear fuel processed products	0.0841
Transportation, warehousing and postal services	Other manufactured goods	0.0621
Leasing and business services	Paper printing and cultural and educational sporting goods	0.0519
Information transmission, software and information technology services	Electrical machinery and equipment	0.0446
finance	Paper printing and cultural and educational sporting goods	0.0394

According to Table 1, among these 30 pairs of industry associations, transportation, warehousing and postal industries have relatively high industrial associations with petroleum, coking products, nuclear fuel processed products and other manufactured products. And leasing and business services industries have relatively high industrial associations with paper printing, cultural and educational sporting goods manufacturing. And information transmission, software and information technology services industries have relatively high industrial associations with electrical machinery and equipment manufacturing. And finance sector has relatively high industrial associations with paper printing, cultural and educational sporting goods manufacturing. It shows that these industries are closely related in economic production activities.

By further analysis, it finds that the producer services such as transportation, warehousing and postal service, finance, scientific research and technical service, leasing and business service, information transmission, software and information technology service,which have higher industrial association degree with manufacturing industries by the frequency from high to low.While the manufacturing industries such as paper making, printing, cultural and sports goods, chemical products, textile and clothing, shoes and hats, leather and down products, non-metallic mineral products, electrical machinery and equipment, metal products, petroleum, coking products and nuclear fuel processing products, food and tobacco, communication equipment, computer and other electronic equipment, special equipment and other industries, which have higher industrial association degree with producer services by the frequency from high to low.

Analysis on the Industrial Spatial Synergy Co-Agglomeration Effect of Producer Services and Manufacturing Industries in Jiangxi Province

According to the index of measuring industrial spatial co-agglomeration degree, based on Jiangxi economic census database in 2013,we can get the spatial co-agglomeration coefficient of 372 pairs of industrial clusters matched by 12 producer services and 31 manufacturing sectors.The calculation results show that the average industrial spatial co-agglomeration degree of 372 pairs of Jiangxi producer services and manufacturing industries is 0.0308. On the whole, the degree of industrial spatial synergy between producer services and manufacturing industries is not high. Table 2 lists the top five matching combinations of producer services and manufacturing industries in terms of industrial spatial synergy co-agglomeration.

Table 2. Spatial Co-agglomeration Degree of Producer Services and manufacturing industries in Jiangxi Province in 2013 (Partial Data)

Productive service industry	Manufacture	Industrial spatial co-agglomeration degree
Software and information technology services	Tobacco products industry	0.4836
Software and information technology services	Automobile manufacturing industries	0.3081
Internet and related services	Tobacco products industry	0.2738

Telecommunications, radio, television and satellite transmission services	Tobacco products industry	0.2729
Research and experimental development	Tobacco products industry	0.2427

Among the 372 pairs of industries matched by 12 producer services and 31 manufacturing industries,the standard value of industrial spatial co-agglomeration degree of 124 pairs are greater than 0, which are accounting for 33.33% of the total combinations. At the same time, the software and information technology service sector and tobacco products manufacturing sector have the highest degree of industrial spatial synergy co-agglomeration. And in the higher industrial spatial co-agglomeration combinations, software and information technology services appear most frequently in producer services, while tobacco products industry appears most frequently in manufacturing sectors.

In order to further clarify the industrial spatial co-agglomeration of producer services and manufacturing industries in Jiangxi Province, this paper makes statistics on the frequency of each industry in the industry combinations, in which the industrial spatial co-agglomeration degree (standard value) of producer services and manufacturing industries are greater than 0. Among the manufacturing industries, computer, communication and other electronic equipment manufacturing industries, automobile manufacturing industries, tobacco product industry, textile and clothing industry, clothing industry, metal products industry, agricultural and sideline food processing industry, food manufacturing industries, pharmaceutical manufacturing industries, printing and recording media replication industry, special equipment manufacturing industries, which appear frequently in the combinations of producer services sector. In producer services, software and information technology services, warehousing, telecommunications, radio, television and satellite transmission services, business services, research and experimental development, professional technical services, postal services, Internet and related services, finance, which appear frequently in the combinations of manufacturing sectors. These industries have high degree of industrial spatial synergy co-agglomeration with manufacturing industries.

Conclusion and Suggestion

Through the quantitative analysis of the industrial association effect and industrial spatial co-agglomeration effect between Jiangxi producer services and manufacturing industries, this paper finds that the industrial association degree and spatial co-agglomeration degree between Jiangxi producer services and manufacturing industries are not high as a whole. Transportation services have relatively close industrial association with manufacturing industries, especially petrochemical capital-intensive manufacturing industries, while software and information technology services have relatively high industrial spatial co-agglomeration degree with tobacco products and automobile manufacturing industries. From the perspective of manufacturing industries, Jiangxi technology-intensive manufacturing industries have relatively high spatial co-agglomeration and low industrial association with producer services, while capital-intensive and labor-intensive manufacturing industries have relatively high spatial co-agglomeration and high industrial association with producer services. From the perspective of producer services, knowledge-intensive producer services such as software and information technology services have relatively high industrial spatial agglomeration degree and low industrial

correlation degree with manufacturing industries , while transportation producer services and manufacturing industries have relatively high industrial association degree and low spatial co-agglomeration degree.

It can be seen that in order to promote the coordinated development of Jiangxi producer services and manufacturing industries, we can consider the following aspects:

Firstly, on the basis of industrial association, we should strengthen the integration of producer services and manufacturing industries in the level of industry and space. Combining the geographical advantages and factor advantages of various regions in Jiangxi, we should give full play to the technical support of knowledge-intensive productive services such as software and information technology, in order to promote technological upgrading of labor-intensive and capital-intensive manufacturing industries, and improve the spatial proximity between transportation producer services and manufacturing industries so as to achieve a good synergy and interaction between producer services and manufacturing industries.

Secondly, under the impetus of the government, we should constantly optimize the spatial layout of regional producer services and manufacturing industries, and we should orderly adjust the spatial positions of industries with high spatial co-agglomeration but low industrial correlation. And we should rationally lay out industrial zones and industrial areas, give full play to and continuously optimize the service functions of producer services to manufacturing industries, enhance the value chain of producer services and manufacturing industries, form industrial chains with regional characteristics, and improve the competitiveness of regional economic development.

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