Research of Manufacturing Industry with Anhui Characteristic Based on Location Quotient Theory

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***Abstract*—By calculating and analyzing Anhui manufacturing industry based on location quotient theory and the ratio of trade theory, we can divide Manufacturing Industry with Anhui characteristic into five industries: resources recycling industry mainly includes discarded resources and waste materials salvaging; equipment manufacturing industry mainly includes electric machines and equipment manufacturing industry, general equipment manufacturing industry and transportation equipment manufacturing industry; raw material industry mainly includes metallurgical, chemical industry and building materials; food industry mainly includes agricultural food processing industry and beverage manufacturing industry; metal manufacturing industry mainly includes metal products industry, metal smelting and pressing industry.**

Keywords-location quotient; the ratio of trade; Anhui; manufacturing industry with characteristic

Industry with characteristic is an important phenomenon during regional economy development which means small and medium-size businesses and institutions with a certain characteristic gather together in a certain area to become a stable aggregation with a consistent advantage. Industry with characteristic has relatively competitive industries with real resource endowment and comparative superiority and potential industries with competitive advantage. Developing regional characteristic industry to increase the competition of regional industry has become a significant part in economic development, which is an efficient way to promote the upgrading of industrial structure and to achieve leapfrog development. During the historic opportunity tt is a question worth to discuss that following the real situation of Anhui how to adjust economic structure and develop the advantage of characteristic industry to join quickly into Changjiang river delta.

Location quotient theory is used to analyze the middle range. Guo Zhiyi and Yao Min apply it in measuring the specification of our country's industrial areas. Thus, this article will calculate and analyze Anhui manufacturing industry by applying location quotient theory and the ratio of trade theory to find out the industry with Anhui characteristic and cultivate it to be the pillar and leading industry to drive related industries' development.

I. LOCATION QUOTIENT AND THE RATIO OF TRADE THEORY

A.Location quotient theory and measure

Location quotient (abb. LQ) was first raised by Hagget P which analyzes the spatial distribution of a certain level and reflects the position and function of this level in a higher level. Location quotient means the ratio of the proportion in a certain area of the certain department's output value in the overall output and the proportion of the whole country of the certain department's output value in the overall output. It expresses the relatively concentration of all sectors of national economy in space and its basic meaning is the export guide of one certain area. The bigger it gets, the more professional of the industry in this location, the more obvious of this relative advantage and the market become more concentrated. Through location quotient we can measure the relatively concentration of some aspect of a certain industry to find out the nationally advantageous industry in this certain area.

Its expression is:

$$LQ_{ij} = \frac{L_{ij} \Big/ \sum_{j=1}^{m} L_{ij}}{\sum_{j=i}^{n} \Big/ \sum_{i=1}^{n}\sum_{j=1}^{m} L_{ij}} \quad (1)$$

i — the order of the area (i-1,2,3…n);
j — the order of the industry (j=1,2,3…n)
L_{ij} — the output of industry j in area i
LQ_{ij} — the location quotient of industry j in area i
Another expression of location quotient is:

$$LQ_{ij} = \frac{L_{ij} \Big/ \sum_{i=1}^{n} L_{ij}}{\sum_{i=i}^{m} \Big/ \sum_{i=1}^{n}\sum_{j=1}^{m} L_{ij}} \quad (2)$$

The first expression shows the territorial division and the products trade while the second one indicates the industry advantage. In the first expression, $LQ_{ij} > 1$ means there has surplus product to export; $LQ_{ij} < 1$ means product can not fulfill the demand and need import; $LQ_{ij} = 1$ means there is self-sufficiency in product. In the second expression, $LQ_{ij} > 1$ indicates the ability of supply is bigger than the ability of demand in local space, this industry or its product has an advantage, its market concentration is high and can be exported; $LQ_{ij} < 1$ indicates the ability of supply is less than the ability of demand in local area, this industry or its product needs to be imported from outside which means this industry (or pruduct) in this area is relatively

disadvantage and its market concentration is low; $LQ_{ij} = 1$ indicates industry (or product) is average and its market concentration is not obvious.

B.The ratio of trade theory and measure

Location quotient equals 1 is the critical point decides if external trade or not, export or import. In order to highlight and realize the meaning of location quotient and to reveal territorial division and trade relationship, Cheng Xuan raised that named LQ-1 (location quotient minus 1) as the ratio of trade, which means the value of export of a certain industry in a certain area or the demand of this industry's product. The ratio of trade has both positive and negative sides. The positive value indicates the ratio of export and the negative value reflects the ratio of import. The ratio of trade directly shows the external trade pattern of the certain area.

II. LOCATION QUOTIENT ANALYSIS OF MANUFACTURING INDUSTRY IN WANJIANG URBAN BELT

In order to analyze each industry inside Anhui industry, we calculated their location quotient. Statistics in this article are from China statistical yearbook (2012) and Anhui statistical yearbook (2012). There are 15 industries include processing industry of agricultural products, soft drink industry, tobacco industry, industry of wood-processing and its products of which location quotients are bigger than 1. There are 15 industries include food manufacturing industry, textile industry, industry of leather, fur and its product, furniture manufacturing industry and etc., of which location quotient are below 1. The biggest location quotient is discarded resources and waste materials salvaging industry which LQ=3.249 and the lowest is communication equipment, computer and other electric equipment manufacturing industry which LQ=0.302.

III. ANALYSIS OF THE RATIO OF TRADE OF ANHUI INDUSTRY

The ratio of trade shows directly the patter of external trade in one area. We can see the industrial distribution of regional advantages represented by local market occupancy in Table2. Marks on radius means the ratio of trade as LQ-1.

From figure 1, the ratios of trade of discarded resources and waste materials salvaging industry, electric machines and equipment manufacturing industry, industry of wood-processing and its products, metal smelting and pressing industry are respectively 2.249, 0.974, 0.506, 0.442 which have strong advantages. Additionally, the ratios of printing industry and recording media reproducing industry, agricultural food processing industry, plastic industry and tobacco industry respectively are 0.408, 0.39, 0.286, 0.245 which also have advantages. Besides, the ratios of trade are higher than 0 are soft drink industry (0.134), industry of textile, shoe and hat (0.062), rubber products industry (0.058), non-metal mineral product industry (0.174), metal product industry (0.009), general equipment manufacturing industry (0.016), transportation equipment manufacturing industry (0.112), those industries have less advantages. The ratios of trade of other industries are below 0 and four of them such as textile industry are lower than -0.4. The ratio of petrol processing, coking and nuclear fuel processing industry is -0.664, the ratio of chemical fiber manufacturing industry is -0.603, the ratio of communication equipment, computer and other electric equipment manufacturing industry is -0.698, the ratio of instrument and office machinery industry is -0.484.

IV. ANALYSIS AND CONFIRMATION OF INDUSTRY WITH ANHUI CHARACTERISTIC

Anhui is located in the central and less-developed region of our country, some industries' advantages haven't shown yet and their potential are great. According to the reality of Anhui economy development, we suppose those industries' ratio of trade higher than 0 (LQ-1>0.2) are industries with advantages and of which the ratios between 0.2 and 0 ($0 \le LQ-1 \le 0.2$) are average industries.

A.Industries with advantages

According to the evaluation standard, there are discarded resources and waste materials salvaging industry, electric machines and equipment manufacturing industry, industry of wood-processing and its products, metal smelting and pressing industry, printing and recording media reproducing industry, agricultural food processing industry, plastic industry and tobacco industry.

B.Average industries

According to the evaluation standard, it can be defined as the beverage manufacturing industry, textile and garment (shoes and hats) manufacturing industry, rubber production industry, non-metallic mineral production industry, metallic production industry, general equipment manufacturing industry and transportation equipment manufacturing industry.

C.The confirmation of special manufacturing industry

Apply the theory of comparative advantage, through computing and analyzing the ratio of each manufactory to trade in Anhui, based on the actual economic and social development situation, we can summarize the Anhui special manufacturing industry as First, renewable resources industry like waste resource and material recycling industry, Second, equipment manufacturing industry like electrical machinery, general and transportation equipment manufacturing industry, Third, the raw materials industry like metallurgy, chemical and building materials industry, Fourth, the food industry like farm and sideline food processing industry, beverage manufacturing industry, Last, the metal-processing industry like metal production, non-ferrous metal metallurgy and delay processing industry.

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Table1 Anhui manufacturing industry location quotient

industry	index	Whole country	Anhui	industry	index	Whole country	Anhui
Agro-food processing industry	Proportion（%）	6.01%	8.36%	Chemical fiber manufacturing industry	Proportion（%）	0.91%	0.36%
	location quotient		1.39		location quotient		0.4
Food manufacturing	Proportion（%）	1.91%	1.56%	Rubber products industry	Proportion（%）	1.00%	1.06%
	location quotient		0.81		location quotient		1.06
Beverage manufacturing	Proportion（%）	1.61%	1.83%	Plastic products industry	Proportion（%）	2.12%	2.73%
	location quotient		1.13		location quotient		1.29
Tobacco industry	Proportion（%）	0.93%	1.15%	Non metallic minerals products industry	Proportion（%）	5.47%	6.43%
	location quotient		1.25		location quotient		1.17
Textile industry	Proportion（%）	4.45%	3.13%	Ferrous metal smelting and rolling processing industry	Proportion（%）	8.73%	7.92%
	location quotient		0.7		location quotient		0.91
Clothing, shoes, hats manufacturing	Proportion（%）	1.84%	1.96%	Non-ferrous metal smelting and rolling processing industry	Proportion（%）	4.89%	7.05%
	location quotient		1.06		location quotient		1.44
Leather fur and feather products	Proportion（%）	1.22%	1.03%	Metal products industry	Proportion（%）	3.18%	3.21%
	location quotient		0.85		location quotient		1.01
Timber processing , wood, taketo brown grass products	Proportion（%）	1.23%	1.85%	General equipment manufacturing industry	Proportion（%）	5.58%	5.67%
	location quotient		1.51		location quotient		1.02

industry								
Furniture manufacturing industry	Proportion (%)	0.0069	0.54%	Special equipment manufacturing industry	Proportion (%)	0.0356	3.25%
	location quotient	0.79			location quotient	0.91	
Paper and paper products industry	Proportion (%)	1.65%	1.17%	Transportation equipment manufacturing industry	Proportion (%)	8.62%	9.58%
	location quotient	0.71			location quotient	1.11	
Printing and record medium	Proportion (%)	0.53%	0.74%	Electrical machinery and equipment manufacturing industry	Proportion (%)	7.01%	13.83%
	location quotient	1.41			location quotient	1.97	
Cultural and sports goods manufacturing industry	Proportion (%)	0.44%	0.34%	Communications equipment, computers and other electronic equipment manufacturing	Proportion (%)	8.69%	2.62%
	location quotient	0.78			location quotient	0.3	
Petroleum processing, coking and nuclear fuel processing	Proportion (%)	5.03%	1.79%	Instrumentation and cultural office common machinery	Proportion (%)	1.04%	0.54%
	location quotient	0.36			location quotient	0.52	
Chemical materials and products manufacturing industry	Proportion (%)	8.29%	6.92%	Arts and crafts and other manufacturing industry	Proportion (%)	0.98%	0.64%
	location quotient	0.83			location quotient	0.65	
Pharmaceutical manufacturing industry	Proportion (%)	2.04%	1.57%	Waste resources and materials and recycling industry	Proportion (%)	0.36%	1.16%
	location quotient	0.77			location quotient	3.25	

Table2 The ratio of trade of each industry of Anhui manufacturing industry

Manufacturing industry category	Trade ratio	Manufacturing industry category	Trade ratio
Agro-food processing industry	0.39	Chemical fiber manufacturing industry	-0.6
Food manufacturing	-0.19	Rubber products industry	0.06

Beverage manufacturing	0.13	Plastic products industry	0.29
Tobacco industry	0.25	Non metallic minerals products industry	0.17
Textile industry	-0.3	Ferrous metal smelting and rolling processing industry	-0.09
Clothing, shoes, hats manufacturing	0.06	Non-ferrous metal smelting and rolling processing industry	0.44
Leather fur and feather products	-0.15	Metal products industry	0.01
Timber processing , bamboo, rattan, brown grass products industry	0.51	General equipment manufacturing industry	0.02
Furniture manufacturing industry	-0.21	Special equipment manufacturing industry	-0.09
Paper and paper products industry	-0.29	Transportation equipment manufacturing industry	0.11
Printing and record medium	0.41	Electrical machinery and equipment manufacturing industry	0.97
Cultural and sports goods manufacturing industry	-0.22	Communications equipment, computers and other electronic equipment manufacturing	-0.7
Petroleum processing, coking and nuclear fuel processing	-0.64	Instrumentation and cultural office common machinery	-0.48
Chemical materials and products manufacturing industry	-0.17	Arts and crafts and other manufacturing industry	-0.35
Pharmaceutical manufacturing industry	-0.23	Waste resources and materials and recycling industry	2.25