Industrial agglomeration in China's agricultural product processing industry

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I. Introduction

Spatial clustering results in increased returns and growth, as a consequence of localized economies of scale. Industrial agglomeration plays an important impact on the regional and industrial layout. With the economic development, industrial agglomeration has appeared in the agricultural industry. The United States, Netherlands and other countries have good examples in the agricultural clusters. Therefore, the agricultural industry in the transition from traditional agriculture to modern agriculture in China is gathering more and more concern from scholars. The existing research concentrate on the theory of cluster and empirical studies are limited, especially on China's agricultural product processing industry. Whether has the agro-processing industry in China industrial agglomeration? What is the status of the distribution of industrial agglomeration? Whether has the change occurred? How to strengthen the agglomeration of the agro-processing industry? In order to solve these problems, we use panel data at the provincial level to describe industrial agglomeration of agricultural products processing industry in China in this paper by using Ellison-Glaeser index. The data include the employees of 12 sub-industries of the agricultural products processing industry in China at the provincial level from 2000 to 2009. The research results may provide the academic support in making some policies to accelerate the agglomeration of agricultural products processing industry in China.

II. Data

The agricultural products processing industry includes 12 sub-industries. In this paper, we combined 12 sub-industries into 5 sub-industries: food, beverages, tobacco processing; textile,

apparel and leather; timber and wood products (including furniture manufacturing); processing of paper and paper products, printing and publishing; and rubber products processing.

In this paper, we analyzed the agglomeration of 7 regions in China: Northeast (Liaoning, Jilin, Heilongjiang), North China (Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia), East China (Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong), South China (Guangdong, Guangxi, Hainan), Central China (Henan, Hunan, Hubei), Southwest (Chongqing, Sichuan, Guizhou, Yunnan, Tibet) and Northwest (Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang).

The data come from the RESSET/DB database from 2000 to 2009. They are the employees of all listed companies of food and beverage; textile, clothing, fur; wood, furniture; paper making and printing; and rubber products processing industry.

III. Results

1. HHI

From the HHI, the degree of concentration is higher for listed companies of the wood and furniture industry than that of the other sub-industries. This shows that industrial clustering for China's agricultural product processing industry is not high and there is no monopoly.

Table 1 HHI of 5 sub-industries in China in 2000-2009

Year	Food, tobacco	Textile, clothing, and leather	Wood and furniture	Paper making and printing	Rubber products processing
2000	0.0118	0.0218	0.2211	0.0153	0.0639
2001	0.0139	0.0185	0.2282	0.0189	0.0630
2002	0.0080	0.0181	0.2126	0.0201	0.0389
2003	0.0090	0.0138	0.1232	0.0176	0.0424
2004	0.0116	0.0136	0.1497	0.0195	0.0289
2005	0.0115	0.0116	0.0702	0.0211	0.0510
2006	0.0107	0.0088	0.0638	0.0158	0.0395
2007	0.0309	0.0293	0.1880	0.0381	0.0565
2008	0.0419	0.0576	0.1540	0.0603	0.2142
2009	0.0365	0.0559	0.1355	0.0514	0.0939

Data Source: Calculated according to the data from RESSET/DB database

2. Spatial Gini coefficient

From the spatial Gini coefficient, industrial agglomeration for wood and furniture industry is relatively high from 2000 to 2004, but from 2005 the agglomeration level began declining Spatial Gini coefficient of the other4 sub-industries over the years have maintained between 0 and 0.1, which shows the degree of industrial agglomeration of listed companies in China's agricultural product processing industry is not high.

Table 2 Gini coefficient of 5 sub-industries in China in 2000-2009

Year	Food, tobacco	Textile, clothing, and leather	Wood and furniture	Paper making and printing	Rubber products processing
2000	0.0898	0.0560	0.2687	0.0436	0.0374
2001	0.0216	0.0289	0.8506	0.0487	0.0792
2002	0.0354	0.0301	0.8455	0.0332	0.0355
2003	0.0705	0.0370	0.3211	0.0532	0.0305
2004	0.0329	0.0269	0.4524	0.0252	0.0431
2005	0.0429	0.0241	0.1718	0.0304	0.0320
2006	0.1042	0.0258	0.1091	0.0245	0.0098
2007	0.0976	0.0590	0.0765	0.0236	0.0287
2008	0.0700	0.0541	0.0467	0.0203	0.0192
2009	0.0530	0.0342	0.0559	0.0290	0.0292

Data Source: Calculated according to the data from RESSET/DB database

3. EG Index

Table 9 lists the EG index of each sub-industry of agricultural product processing industry in China from 2000 to 2009. The EG index of food, tobacco industry shows that the food, the tobacco industry has no industrial agglomeration. In 2001, 2002, 2004, 2005 and 2009, the distribution is relatively even and in 2000, 2003, 2006, 2007 and 2008, its agglomeration is higher. EG index of China's textile, clothing and leather industry shows that the textile, clothing and leather industry has no industrial agglomeration in 2009. In 2001-2006 and 2008 the regional distribution is relatively uniform and its agglomeration is higher in 2000 and 2007. EG index for China's timber and furniture industry shows that it had no industrial agglomeration from 2007 to 2009. From 2003 to 2006, industrial agglomeration became higher. EG index of China's paper-making, printing industry shows that China's paper-making,

printing industry had no industrial agglomeration from 2004 to 2009. In 2000-2003, the distribution is relatively uniform. EG index of rubber products processing industry in China shows that rubber products processing industry in China had no industrial agglomeration in 2000, 2002, 2003, 2005 and 2009 and the distribution was more uniform in 2001 and 2004.

Table 3 EG index of 5 sub-industries in China in 2000-2009

Year	Food, tobacco	Textile, clothing, and leather	Wood and furniture	Paper making and printing	Rubber products processing
2000	0.1045	0.0511	--	0.0381	-0.0179
2001	0.0151	0.0203	--	0.0427	0.0434
2002	0.0381	0.0210	--	0.0210	0.0069
2003	0.0820	0.0326	0.2359	0.0486	-0.0039
2004	0.0320	0.0215	0.3670	0.0122	0.0283
2005	0.0485	0.0215	0.1653	0.0194	-0.0073
2006	0.1366	0.0275	0.0863	0.0178	-0.0269
2007	0.1049	0.0524	-0.1105	-0.0076	-0.0205
2008	0.0621	0.0220	-0.1058	-0.0339	-0.2385
2009	0.0387	-0.0088	-0.0721	-0.0137	-0.0614

Data Source: Calculated according to the data from RESSET/DB database

IV．Conclusion

In 5 sub-industries of China's agricultural product processing industry, food, tobacco industry and wood, furniture industry had higher industrial agglomeration, the distribution of textiles, clothing and leather industry is relatively even, and paper-making, printing and rubber products processing industry had no industrial agglomeration. From 2007 to 2009, food, tobacco; textile, clothing, leather; wood, furniture; paper, printing; and rubber products processing industry tended to be lower industrial agglomeration and even no industrial agglomeration. Although the situation of industrial agglomeration is still not optimistic, the effort in improving the healthy development is necessary.