CHINESE GEOGRAPHICAL SCIENCE
Volume 9, Number 4, pp. 322 - 329, 1999
Science Press, Beijing, China

TEMPORAL AND SPATIAL DIFFERENCES OF THE INDUSTRIAL RESTRUCTURING OF GUANGDONG PROVINCE IN THE 1990S

Yan Xiaopei(阎小培) Jia Li(贾 莉) Lin Xiyi(林锡艺)
Centre for Urban and Regional Studies, Zhongshan University, Guangzhou 510275, *P. R. China*
Huang Qian(黄 谦)
Economic and Trade Committee of Wuhua District of Kunming, Kunming 650007, *P. R. China*
(Received 8 June 1999)

ABSTRACT: This paper focuses on the temporal and spatial change of industrial structure in Guangdong Province since the 1990s. The attention is initially paid to the change of industrial structure through analyzing the structure change of the three sectors, and the change of internal structures of agriculture, industry and tertiary sector respectively. Then the spatial differences of industrial restructuring are analyzed based on the four economic regions which have been agreed in the academic field: the Zhujiang (Pearl) River Delta, northern mountain region, east and west wings. Thirdly, the reasons for the spatial differences of industrial restructuring are examined. Finally a short conclusion is drawn and some suggestions for the regional integration are put forward.

KEY WORDS: industrial restructuring, temporal and spatial differences, Guangdong Province

1 CHANGES OF INDUSTRIAL STRUCTURE

1.1 Changes of Structure of Three Economic Sectors

Since the reform of economic system and opening to the outside world in the late 1970s, the industrial structure of Guangdong Province has been experiencing an obvious process of non-agriculturalization with the industrialization. The agricultural sector grew slowly and its proportion in GDP (Gross Domestic Product) fell from 33.2 percent in 1980 to 24.7 percent in 1990, decreasing 8.5 percentage points during the decade of the 1980s. But in the 1990s, the non-agriculturalization has become more obvious. The proportion of primary sector fell further to 14.4 percent in 1996, decreasing 10.3 percentage points during the six years of 1990 - 1996, which exceeded that of the 1980s. The labor employed in the three economic sectors showed a similar change trend. From 1980 to 1990, the proportion of labors engaged in the primary sector in the total number fell from 70.7 percent to 50.3 percent, decreasing 20.4 percentage points. But from 1990 to 1996, the proportion decreased 12.3 percentage points (Table 1). The number of labor engaged in primary sector decreased every year in the period of the Eighth Five-Year Plan (1990 - 1995), declining from 16 517 100 in 1990 to 14 736 000 in 1995, with a decrease of 1 781 100. In the 1990s, with the overall socio-economic development in rural areas, the non-agricultural activities have taken a leading position, and the rural industries have contributed to the development of rural economy. The total output value created by rural industries in 1995 reached 440.712 billion yuan (RMB), with an average annual growth rate of 41 percent in 1990 - 1995, which has accelerated the non-agriculturalization process of rural economy in Guangdong.

In the three sectors, the GDP proportion created by the secondary sector kept a level of around 40 percent in the 1980s, but has risen rapidly since 1990, increasing from 39.5 percent in 1990 to 50.2 percent in 1996, which reached the highest level in history. On the contrary, the tertiary sector showed a relatively slow development rate in the 1990s and the proportion in GDP remained around 35 percent, although it experienced a rapid development in the 1980s. The labor composition of the three sectors revealed that the proportions of secondary and tertiary sectors increased steadily, the former had a slight bigger pace (Table 1).

Table 1 Composition of GDP and labor force of three economic sectors

Year	GDP (%)			Labor (%)		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
1980	33.2	41.1	25.7	70.7	17.1	12.2
1990	24.7	39.5	35.8	53.0	27.2	19.8
1995	15.1	50.2	34.7	41.5	33.8	24.7
1996	14.4	50.2	35.4	40.7	33.5	25.8
Change (1980 - 1990)	- 8.5	- 1.6	10.3	- 17.7	10.1	7.6
Change (1990 - 1996)	- 10.3	10.7	- 0.4	- 12.3	6.3	6.0

Source: Statistical Yearbook of Guangdong, 1997.

Although the three economic sectors showed different proportion change, they all developed rapidly. In 1990 - 1996, the average annual growth rate of GDP in the province was 16.8 percent and the rates of the three economic sectors were 4.9 percent, 22.9 percent and 15.2 percent respectively, while in the 1980s, the four rates were 12.8 percent, 7.5 percent, 14.8 percent and 14.5 percent respectively, which showed a rapid development in the 1990s except the lower growth rate in primary sector than that of the 1980s. Thus, the trend of non-agriculturalization has been more obvious in the 1990s.

1.2 Changes of Internal Structure of Agriculture

In the 1980s, the location advantages in Guangdong Province were given a full play, the so-called "three-high agriculture" and "export agriculture" were developed, and the simple internal structure of agriculture in long run was changed. In recent years, the agricultural development lagged behind that of secondary and tertiary sectors because of insufficient input and slowly improved technology. But the changes of meeting the requirement of improving people's living standard has been obvious. It behaved that the proportion of farming in the total output value by agriculture dropped from 52.1 percent in 1990 to 45.6 percent in 1996, while the fishery and husbandry increased rapidly. The proportion of fishery rose by 6.4 percentage points during these six years and reached 20.0 percent in 1996. During the same period, the proportion of husbandry rose by 2.6 percentage points, and forestry and sideline decreased slightly. The development of agricultural industrialization is another prominent characteristic in the province's agriculture in the 1990s. The marketing agriculture, intensive farming, agricultural enterprises, agricultural bases and integration of agriculture, industry and trading are becoming obvious. The "three-high agriculture" has been an important pillar for rural economic growth, whose products have accounted for a half of the total agricultural products. The socialization degree of agricultural production has been further improved, and the commodity ratio of farming and sideline products rose from 67.0 percent in 1990 to 73.4 percent in 1996.

1.3 Changes of Internal Structure of Industry

In the 1990s, the economy of Guangdong is at the stage of accelerated industrialization, the average annual growth rate of total industrial output reached 28.0 percent. Since 1990, the pace of developing heavy industry has fastened after having experienced the dominance of light industry in the ten years of the 1980s. With the developed light industry and rising urbanization level, the income of residents were improved and the income gap was enlarged, which resulted in the diversified consumption. Furthermore, the cars, commodity houses and communication utilities partly consumed by families. Thus the light industry including textile and durable goods for families which ever impelled the rapid economic growth of the province has developed slowly. The market demand has inclined to heavy and chemical industries. But because of habitual effect of the previous input, the characteristic of dominance of light industry is still obvious. During the period of 1990 - 1996, the average annual growth rate of total output value of light industry remained 27.6 percent. In the same period, the annual growth rate of heavy industry exceeded that of light one, reaching 28.6 percent and being larger than that of the 1980s (16.7 percent). So the ratio of output value of light industry to heavy industry fell from 2.23 ∶1 in 1990 to 1.86 ∶1 in 1996.

The changes of the internal structure of industry also behaves the structural change of specific industrial sectors. In the 1990s, the proportion of new industrial sectors in total output value has had a big rise, in which the electronics industry was most prominent, increasing 6.2 percentage points between 1990 and 1996. Some traditional industrial sectors have declined obviously. So the characteristic of the dominance of light industry continues in the 1990s. The changes of industrial sectors occupying more than 5 percent in total industrial output value respectively were presented in Table 2. From Table 2, one can see that labor-intensive processing industry with low technological level took a main position in the industrial structure in Guangdong, and the energy, raw and processed materials and other base industries lagged behind, which might form a bottleneck to further economic development. At the same time, the development of pillar industries were stagnant and their scales were small, only the proportion of output value by electronic industry exceeding 15 percent. As a whole, the transformation of industrial structure in the 1990s has proceeded slowly. After the late 1980s, with the overall opening to the outside world all over the country and the shrinking difference of economic system, the rise of the costs of raw and processed materials and labor, and the aggravation of market competition, the former superiority of dominance of light industry in the province has been weakened. After the economic reorganization in 1989, Guangdong Province should grasped the opportunities to drive its industrial structure upgrade in the new economic circle which started in 1990. But in fact, the traditional development model is still followed and the former development scale is expanded. Although industry develops still rapidly with the pull of investment, the regulation of structure retards and questions brought by unreasonable structure is more and more protruding.

Table 2 The changes of major industrial sectors in Guangdong Province, 1990 - 1996

Industrial sectors	Total industrial output value (%)		Rank	
	1990	1996	1990	1996
Electronics	11.50	17.70	1	1
Food/ drink/ tobacco	11.02	8.48	2	4
Electric machinery and equipment	10.06	10.51	3	2
Textile	8.85	5.56	4	5
Clothing/ leather	7.16	9.13	5	3
Plastics/ rubber	5.36	5.02	6	6
Chemical	4.99	5.00	7	7

Source: Statistical Yearbook of Guangdong, 1991, 1997.

1.4 Changes of Internal Structure of Tertiary Sector

The tertiary industry in Guangdong Province has been developing rapidly since the late 1970s and showed a characteristic of diversification and new sectors emergence. Although the development of tertiary sector is slower than the whole process of industrialization and its proportion in GDP is stagnant since the 1990s, its position has not dropped with its ability of absorbing the surplus rural labor. The number of labors engaged in the tertiary sector in 1996 added 3240 thousand and the proportion in the total increased 6 percentage points compared with those of 1990. During the same period, the workers in tertiary sector showed a tendency towards concentrating in several new sectors while some traditional ones grew relatively slowly. These trends are actually the continuity of the change in the internal structure of tertiary sector in the 1980s. The main reason is that, to great extend, new sectors serve directly market mechanism and make the basic conditions for the mechanism taking effect. In the 1990s, under the overall background of accelerating marketablization, the roles of tertiary sector in economic development have become more important.

2 REGIONAL DIFFERENCES OF INDUSTRIAL RESTRUCTURING

It is agreed in academic field that Guangdong Province could be divided into four economic regions in terms of geographical conditions and development levels: the Zhujiang River Delta, Northern Mountain Region, East and West Wings.

2.1 The Zhujiang River Delta

The economic region of the Zhujiang River Delta ranks the highest level of economic development and urbanization in Guangdong Province. Through the regulation of the 1980s, the industrial structure of most areas passed the primary development stage of "small scale, scattered distribution and low level" and has started to drive into a high level. After 1990, the industrial restructuring has some new trends and many contradictions of industrial structure become more acute.

At first, industrialization has advanced all around the region. In 1990, the ratio of primary, secondary and tertiary sectors was 14.8 :46.3 :8.8, while in 1996 the ratio changed to 8.0 :49.4 :42.1. The proportion of primary sector dropped 6.8 percentage points. Considering the regions where the proportion of primary sector was formerly high such as Zhaoqing, Huizhou, Zhongshan and Jiangmen, and the secondary and tertiary sectors have overtaken the primary one through the development of the 1990s, the proportions of the primary sector were all under 20 percent.

Second, although the industrial structure has been regulated, its process of upgrade is slow. Heavy industry in the Zhujiang River Delta has developed rapidly since 1990 and its proportion in the gross value of industrial output increased from 26.9 percent in 1990 to 34.2 percent in 1996. On the other hand, the economic growth is still restricted seriously by retarded basic industry. With the rapid development of export-oriented processing industry, plenty of the raw and processed materials needed by it depend heavily on import. Labor-intensive industry is a major part of the industrial structure, capital-intensive and technology-intensive industries have not hold a superiority position. What is more, new sectors springing up recently come apart with traditional sectors. Because of lack of capital, the technology innovation processes slowly.

Thirdly, the regional differences of industrial structure tend to narrow. The phenomenon of similar industrial structures between cities or counties is serious. Every city or county in the Zhujiang River Delta has taken electronics, electric machinery, clothing, leather, food industries as the main sectors in development. Electronic industry in Shenzhen, Dongguan, Zhongshan and Huizhou and electric machinery in Zhuhai and Foshan hold big proportions in their own industries. But not all of those industries have advantages to developing in those cities. The similar industrial structure has made each city's superiority in its resources and productive powers not give a full play. So this type of industry in many regions is at a low level, which depends heavily on import, the scale of production is too small and the capacity of innovation is poor. Once the consumptive requirement it meets reaches saturation, the staying power of industrial development will be inadequate.

Fourthly, the changes of internal structure of the tertiary sector show the regional differences. The whole level of tertiary sector in the Zhujiang River Delta is high. In some regions as Guangzhou and Shenzhen, the GDP proportions of the tertiary sector were 47.0 percent in 1996 and 48.0 percent in 1996 respectively, which has shown a tendency of shifting towards the service economy. But in some other regions, the level of the tertiary sector is still low. The development tendency of the two different types of region can be identified. In Guangzhou, Shenzhen, Zhuhai and Jiangmen, after having experienced the flourishing of the services for circulation (distributive services), those services for production and life (consumer and producer services) are developing rapidly, while in other regions, the former grows faster than the latter.

2.2 East and West Wings

"East and West Wings" refers to seven coastal cities except for the Zhujiang River Delta, taking Shantou and Zhanjiang as the centers respectively. In the 1980s, the sustainable and overall economic development in the province made the industrial structure of the two regions change greatly. As a whole, the level of industrial structure is lower than that of the Zhujiang River Delta. In 1990, the proportions of the GDP by primary sector in East and West Wings were 38.0 percent and 43.9 percent respectively, obviously higher than that of the secondary and tertiary sectors. After the development in recent years, the proportions of the primary sector in the two wings decreased to 20.3 percent and 30.2 percent respectively in 1996, being lower than the those of secondary and tertiary sectors. Viewed from the proportion rise of the secondary and tertiary sectors, the East Wing's was faster than the West's, the secondary sector's was faster than the tertiary sector's. The change of the internal structure in the two regions was different. The phenomenon that the internal structure of industry in the areas of the East Wing tended to same has not changed, instead, more obvious. The dominant industrial sectors of each city in East Wing were clothing, leather, food, electronic industry, plastic industries. Taking the three cities in West Wing as a whole, the heavy industry has had a relatively prominent position, although the light industry has grown rapidly in the 1990s. Maoming is an example. In 1996, the gross industrial output values of the three sectors, petroleum, building materials and chemical industries, accounted for 50.1 percent in the total in 1996. The machinery, transport equipment manufacturing in Zhanjiang, the metal manufacturing, metallurgy in Yangjiang also took a prominent position in 1996. At the same time, the industrial difference between cities in West Wing was bigger than that in East Wing, each of the cities having its own special structure and few being same. Considering the changes of the tertiary sector, except for Shanwei, the proportion of the services for circulation rose, and the services for production and people's life decreased, which showed a relatively small regional difference.

2.3 The Northern Mountain Region

The Northern Mountain Region's economy grows rapidly after 1990. But compared with the coastal area, the enlarged gap of development can be identified. The industrial structure is still at a low level, and the proportion of the primary sector only shows a slow decline. In 1996, the GDP ratio of the primary, secondary and tertiary sectors of the 51 counties in mountain region was 36.8 ∶35.8 ∶27.4. It shows that agriculture has still held the leading position. The proportion of agriculture of Heyuan, Qingyuan even reached 51.0 percent and 45.8 percent respectively. The gap resulted from the differences of developing conditions and policies, fitting the objective rule of regional unbalance development. Meanwhile, the regional industrial gradient makes it possible that the mountain region in the north of the province accepts the industries decentralized from the Zhujiang River Delta, accelerating the industrial upgrade in this region. Because of introducing new industries to the Zhujiang River Delta, the industries with big input and small output must diffuse outward, such as textile, daily necessities, common machinery and electronic industries. And the Northern Mountain Region accepted these industries due to its cheap labor and land value. Thus, the industrial decentralization is one of the important motive forces for the industrial restructuring of the Northern Mountain Region. By the influences, the proportion of the light industry in most of the cities in the mountain region has been improved, such as the proportions of textile, food, clothing, so the ratio of light to heavy industries has changed. Moreover, the electronic industry in Shaoguan, Heyuan, Meizhou has increased fast. On the other hand, although the phenomenon of similar industrial structure in Northern Mountain Region in the 1990s is not so obvious as the Zhujiang River Delta and east region of the province, the differences between regions tends to narrow. For example, the building material, textile and food industries in each city had relatively big shares.

3 REASONS FOR INDUSTRIAL RESTRUCTURING

3.1 Structure Change of Consumptive Requirement of Residents

Since the late 1970s, the resident's income in Guangdong Province has shown two trends of constant rise of average income and continuous enlargement of income gap. Both of the trends has inevitably led to the diversification of the resident's consumptive requirement, thus the industrial structure changes to meet the requirement. Industrialization in the developed countries shows that the average income had a close corresponding relation with the requirement structure and the industrial structure. With the increasing income, the requirement structure experienced a change of four stages —farming product took dominant position, the core of consumption inclined to common industrial consumer goods, the requirement for durable goods increased, and the proportion of resident's un-necessaries gradually rose. For Guangdong Province, the middle two stages happened in the decade of the 1980s and were characterized the dominance of light industry. Since 1990, the consumptive structure of the province has been at the fourth stage, having impetus of driving the development of un-necessaries industry, which more and more depends on the raw and processed materials and technology provided by heavy and chemical industries, resulting in the growth of heavy and chemical industries. It could explain the fast growth of the heavy industry in the 1990s. But it should be emphasized that the industrial structure meeting the diversifying requirement in Guangdong owed to the deviation of investment structure.

3.2 Investment Structure

Theoretically, the direction of residents' consumptive requirements would form the profits-driven power for inputting to this sector. But in the 1990s, the investment structure of Guangdong has shown some deviations. First, there was some wrong understandings of industrial development, i.e. the light industry was still overemphasized in the industrialization process and right choices of pillar industries as well as industrial upgrading were not done well. Secondly, the investment in real estate was too large. Hundreds of billion fund were input in the sector only in several years, causing funds overstock to some extend and therefore investment in manufacturing and technological transformation were ignored. According to statistics, during the period of the Seventh Five-Year Plan, the proportions of the technological transformation and real estate in gross investment were 18.2 percent and 8.3 percent respectively. The proportions during the Eighth Five-Year Plan period were 11.7 percent and 19.5 percent. In 1995, the proportions were 11.0 percent, 24.2 percent respectively. Moreover, during the period of the Eighth Five-Year Plan, the investment in manufacturing was only 15.6 percent in the total, and the proportion was merely 12.0 percent in 1995. The unreasonable investment structure not only retarded the industrial upgrading but also led to the declining of competition of products and insufficiency of potential development dynamic.

As far as the spatial distribution, during the period of 1990 - 1996, the investment for capital construction was emphasized to tend to the Zhujiang River Delta, and the investment in industry and tertiary sector shifted from highly concentrating in the Zhujiang River Delta towards scattering in other regions in the province, which actually had a cause and effect relationship with the accelerating process of non-agriculturalization in each region.

3.3 Rural-urban Economic Integration and Coordination of Regional Economy

In the 1990s, the further improved level of urbanization of Guangdong Province and the trend of non-agriculturalization in rural areas have impelled the rural industry to expand in size, which is an important factor of promoting the integration between urban and rural economies, moreover the formation of a rational division of labor between urban and rural areas. On the other hand, with the strengthened regional connection, the coordination of regional economy requires the rational division of labor between regions in order to improve the efficiency of resources disposition and usage. As a result, new industrial sectors tend to concentrate in the Zhujiang River Delta and coastal areas, while common industrial ones diffuse to small cities and towns, and Northern Mountain Region, which leads spatially to an industrial restructuring. At present, the pattern of regional differences of industrial structure comes into being, that is, electronics, electric machinery and other new sectors are the main industrial sectors in the Zhujiang River Delta. In East Wing, the prominent sectors are clothing, leather, food and other light industries. In West Wing, it takes heavy industries such petrochemical, machinery industries as its main sectors. And in the Northern Mountain Region, the proportion of heavy industry is slightly higher than that of light industry.

3.4 External Economic Relations

Guangdong Province has many favorable location advantages such as being the coastal areas, numerous overseas Chinese and compatriots in Hong Kong and Macao, and therefore convenient external relations. So the economy of Guangdong is always characterized export-oriented. Since the late 1970s, the economy of the province has taken off rapidly due to accepting the decentralized industries from Hong Kong and Macao together with the development of joint ventures. The imported foreign capital and technology and their input in the chosen sectors and regions have a great impact on the industrial restructuring of the province. In the 1990s, the developed countries are in the period of the third industrial restructuring and of the transformation from industrial society to postindustrial society, paying attention to developing high and new technological industries and decentralizing some traditional sectors to developing countries. These changes have two impacts on industrial restructuring of Guangdong. First, it accepts some traditional sectors decentralized by the developed countries and regions and occupies a part of international market. Next, it comes to give attention to open up high and new technological sectors for development. External economic relations, to some extend, determine the trend of industrial restructuring of Guangdong Province.

4 CONCLUSION

Through summarizing the temporal and spatial characteristics of industrial restructuring in Guangdong Province since the 1990s, one can find that the industrial structure of the province as a whole tends to non-agriculturalization and new pattern, but industrial structure's regulation and upgrade proceed slowly, the technological component in industry is low, and the contradictions of unreasonable structure are more and more protruding. On the spatial differences, the question of industrial structure inclining to the same between regions is serious. However, the regional differences are enlarged and a rough regional division of labor forms. With regarding to the trend of industrial restructuring and coordination in regional development in the future, it is believed that starting with the base to improve the investment structure of capital construction and guide the direction of importing foreign capital, quickening development of pillar sectors in order to form a new economic growth point, appropriately inclining to energy, raw material industries, accelerating the development of tertiary sector, improving the technological component, enhancing the status and role of technology-intensive industries, giving a full play for the advantages of regional coordination according to the principle of regional comparative advantages, as a result, forming a specific regional industrial system and avoiding the similar regional industrial structure, strengthening the government's macro-control power are all effective measures.

REFERENCES

Li Lixun, Qiu Jianhua, Xu Xueqiang, 1994. Economic growth and restructuring in Guangdong Province in recent ten years, *Scientia Geographica Sinica*, 14(2): 118 - 125. (in Chinese)

Li Cao, Li Hongchang, 1997. *The Economy Blue Book in Guangdong Province — the Economic Situations and Predictions*. Guangzhou: The People's Publishing House of Guangdong Province, 3 - 17, 136 - 146. (in Chinese)

Zhong Hong, 1995. The difficulty and countermeasure of restructuring in the Pearl River Delta Economic Zone. *Southern Economy*, (4): 18 - 20. (in Chinese)