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THE UNEVEN DEVELOPMENT AND SPATIAL DIFFUSION OF CHINESE CENTRAL CITIES

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ABSTRACT: The central cities are the political, economic and cultural centers of a country or a region. To make the central cities to play a key role in the national economy is one of the most important tasks in Chinese urban economic reform. This paper firstly approaches the classification of the central cities, then, the features of the development and spatial diffusion of the central cities since the 1980s. The authors think that the central cities have experienced the uneven development, and the effects of economic spread of the central cities in a different hierarchical level are also different. Particularly, the spatial economic pattern of both Jiangsu and Zhejiang provinces is taking place a new division under the influence of Shanghai, the largest central city of China. In order to further make the central cities to play a role, the authors make 4 suggestions to different types of the central cities so as to strengthen the development of the central cities in the future.

KEY WORDS: central cities, centrality index, uneven development, spatial diffusion

The formation and development, scale hierarchy, centralization and diffusion of the central cities are the important themes in the research of the regional development and urban system. The suggestion to play the role of the central cities in the economic reform was put forward in the early 1980s [1], since then, the development of the central cities is opening up a new prospect. However, some problems still exist in the process of the development and spatial diffusion of the central cities. This paper mainly approaches the features of the development and the spatial diffusion of the central cities since the early 1980s. The authors think that the development of the central cities greatly changes the spatial pattern of the urban economic development of China.

I. THE STUDY ON THE CLASSIFICATION AND UNEVEN DEVELOPMENT OF THE CENTRAL CITIES

1. The Differentiation and Hierarchical Classification to the Central Cities

In the early 1980s, the idea to play an important role of the central cities in the urban economic reform was put forward. However, there exist different points of view how to determine the central cities in the academic circles [2-3]. We think that the standard to determine the central cities must base on the concept of the central cities, i.e., the central cities are the political, economic and cultural centres of a country or a large region, of which the function of the economic centres is the most important.

In order to differentiate which cities can be recognized as the central cities in the early 1980s, moreover, to analyse the dynamic of them during the 1980s, we used the data of "Statistical Yearbook of Chinese Cities, 1985". Considering that there were not the statistics of gross domestic product (GDP) in this yearbook and some statistical items had strong relevance with the population size of the city, we only selected 3 representative statistical indicators:

(1) The non-agricultural population in urban districts. This indicator must reach 50×10^4 persons or more. The population size is a comprehensive index which can reflect the strength and status of a city. If the population of a city is up to 50×10^4 or more, this kind of city is called large city in China. In 1984, China had 50 large cities.

(2) The gross output value of industry of an administrative city. This indicator must reach 30×10^8 yuan or more. We adopted an administrative city as the statistical scope because most central cities located a part of factories in their suburbs. Of 50 large cites, there were 14 large cities whose gross output value of industry was less than 30×10^8 yuan, and they were mining cities or the provincial capitals of the less developed regions. Although the gross output value of industry of Daqing City was above 30×10^8 yuan, it was a mining city, not a central city. At last, there were 35 large cities whose gross output value of industry reached 30×10^8 yuan or more.

(3) The volume of postal and telecommunications services of urban districts. This indicator can so as to reflect the status of a city as a information centre. The relevance between this indicator and the population size of a city was low, but this indicator had a close relationship with the political and cultural status and the economic strength of a city. For example, the numbers of population of Beijing and Guangzhou were less than those of Shanghai and Tianjin respectively, but the volume of postal and telecommunications serv-

ices of the former two cities surpassed the latter two cities respectively.

Above 3 indicators of 35 cities were standardized firstly, then the centrality index of each city was counted.①The higher the centrality index, the higher the status of the city. Table 1 lists the former 27 cities according to the rank of the centrality index. If these indices are plotted on an axis, they can be classified into 3 types according to the distance of the points.

Table 1 The centrality indices of 27 cities in 1984

City	Centrality index	City	Centrality index	City	Centrality index
Shanghai	11.81	Xi'an	−0.22	Wuxi	−1.03
Beijing	8.79	Chengdu	−0.27	Suzhou	−1.14
Tianjin	3.76	Dalian	−0.46	Anshan	−1.14
Shenyang	1.76	Hangzhou	−0.53	Zhengzhou	−1.25
Guangzhou	1.51	Changchun	−0.71	Kunming	−1.27
Wuhan	1.43	Qingdao	−0.81	Shijiazhuang	−1.27
Harbin	0.40	Taiyuan	−0.87	Fushun	−1.31
Chongqing	0.30	Lanzhou	−0.99	Changsha	−1.37
Nanjing	0.23	Jinan	−1.01	Fuzhou	−1.50

Type 1: Shanghai, Beijing and Tianjin. They are the most important central cities in China until the middle 1980s, and the centrality indices of them much surpassed the centrality indices of the other central cities.

Type 2: Shenyang, Guangzhou, Wuhan, Harbin, Chongqing, Nanjing. Their centrality indices are positive, so they are the central cities of large regions.

Type 3: 18 cities from Xi'an to Fuzhou. Their centrality indices are negative, showing that their centrality indices are lower than the mean of 35 cities. Considering the small difference among the centrality indices of 18 cities, we selected the former 11 cities as the central cities according to the rank of the centrality index. They are the sub-central cities of

① Centrality index $C_i = P_i + V_i + t_i$, P_i—the number of the non-agricultural population of the urban district of i city, V_i— the gross output value of industry or the sum of the secondary and tertiary sectors of GDP of i city, t_i—the volume of postal and telecommunications services of the urban district of i city.

large regions.

Thus we determined 20 central cities of China in the early 1980s, and they can be classified 3 levels: i.e. national central cities (type 1), regional central cities (type 2), regional sub-central cities (the former 11 cities in type 3). This classification will help to study the development of different types of the central cities.

2. The Uneven Development of the Central Cities since the 1980s

China has implemented the policies of the reform and opening to the outside world since 1978. Because these policies have different effects on different cities and the developmental bases and conditions of the central cities are different, the uneven development has been appearing among the central cities, which has caused the change of the status of the central cities. We used the statistics of 1990 and calculated two kinds of centrality indices of the central cities in 1990. The centrality index 1 consisted of 3 indicators which were GDP of a city (excluding the primary sector), non-agricultural population of the urban districts and the volume of postal and telecommunications services of the urban districts. The centrality index 2 was the same as the centrality index in Table 1 so as to make a comparison (Table 2).

Table 2 Two kinds of centrality indices for the central cities in 1990

City	Index 1	City	Index 2	City	Index 1	City	Index 2
Shanghai	11.39	Shanghai	11.89	Chengdu	−0.33	Hangzhou	−0.32
Beijing	8.79	Beijing	7.84	Hangzhou	−0.42	Chengdu	−0.45
Guangzhou	3.90	Tianjin	3.53	Xi'an	−0.48	Qingdao	−0.49
Tianjin	3.40	Guangzhou	3.31	Qingdao	−0.57	Xi'an	−0.51
Shenyang	1.65	Shenyang	1.47	Changchun	−0.83	Suzhou	−0.60
Wuhan	0.87	Wuhan	1.02	Jinan	−0.84	Changchun	−0.78
Nanjing	0.25	Nanjing	0.31	Suzhou	−1.03	Wuxi	−0.84
Dalian	0.12	Chongqing	0.12	Wuxi	−1.08	Jinan	−0.90
Chongqing	0.08	Harbin	0.01	Taiyuan	−1.11	Taiyuan	−1.14
Harbin	0.02	Dalian	−0.04	Zhengzhou	−1.13	Fuzhou	−1.22

Source: Statistics Yearbook of Chinese Cities, 1991.

Table 2 shows the following two characteristics:

(1) Because GDP is a comprehensive indicator which reflects the economic strength of a city, Index 1 more exactly reflects the centrality status of a city compared with Index 2.

For example, Guangzhou and Dalian which possess relative developed tertiary industry rank the 3rd and 8th on Index 1, while they rank the 4th and 10th on Index 2. So Guangzhou has become a national central city, and Dalian has become the 2nd level central city according to Index 1.

(2) Comparing Index 2 in Table 2 with the index in Table 1, the regional development difference of the central cities is obvious during the 1980s. Because the uneven development, the ranks of the inland central cities have declined to a different extent from 1984 to 1990. Especially, Lanzhou in the northwest was replaced by Fuzhou in the southeast, and the latter had become a new central city. Meanwhile the ranks of Suzhou, Wuxi, Qingdao, Hangzhou and Guangzhou in the coastal areas have risen to a different extent. The south–north division in the development of the central cities is also obvious. As inland cities, Chongqing and Chengdu ranked after Harbin and Xi'an respectively in 1984. However, the former two cities ranked before the latter two cities respectively in 1990. As the rapid development of the Changjiang (Yangtze) River Valley and the Zhujiang (Pearl) River Delta , the south–north division in the economic development of the central cities will be further enlarged in future.

II. THE ANALYSIS TO THE EFFECTS OF SPATIAL DIFFUSION OF THE CENTRAL CITIES

To play the role of the central cities aims at forming the economic networks in which the central cities are cores so as to promote the economic development of various regions.

The central cities in China implement the "city leads county" system, the counties administered by a central city are most deeply influenced by the effect of spatial diffusion from the central city. Table 3 makes the comparisons of per capita national income between the urban districts and counties of the central cities. If the ratio (I/ II) is larger, the regional development within a central city is much uneven. If the ratio approximates to 1 and the per capita national income of both the urban districts and the counties are higher, the economic development in both core areas and peripheral areas within a central city is relative even, and the central city strong spreads its hinterland.

Both the per capita national income of the counties (II) and the ratio (I/ II) are used to form a coordinate of axes. According to the distribution of the points, the central cities can be classified into 4 types:

Type 1: Shanghai, Wuxi, and Suzhou. They were classified into 2 sub–types: Sub–type 1 is Shanghai, its index II is the highest, the ratio I/ II is only 1.38, the lowest in all central

cities, which mean that Shanghai has a strong spatial diffusion and the very small difference between the urban districts and counties. Sub-type 2 is Wuxi and Suzhou. Their index II are only less than that of Shanghai, th ratios are also lower, which mea: that they have smaller development difference between the urban districts and counties, but their levels of development are still lower than that of Shanghai. Moreover, the economic development of their counties is affected by the spatial diffusion from Shanghai to a great extent besides themselves.

Table 3 The comparisons of per capita national income between the urban districts and counties in the central cities

City	I*	II**	I/ II	City	I	II	I/ II
Shanghai	5197	3779	1.38	Chengdu	2316	941	2.46
Beijing	3878	2164	1.79	Changchun	2222	753	2.95
Shenyang	3296	1166	2.83	Taiyuan	2554	1550	1.65
Wuhan	3030	1228	2.46	Jinan	2842	1222	2.32
Guangzhou	4535	1989	2.28	Qingdao	3340	1436	2.32
Harbin	2426	959	2.53	Lanzhou	3083	699	4.41
Chongqing	2291	869	2.63	Hangzhou	4440	1895	3.34
Nanjing	3515	1183	2.97	Wuxi	5094	2633	1.93
Xi'an	2190	640	3.42	Suzhou	4285	2671	1.60
Dalian	4456	1291	3.45				

Note: * per capita national income of the urban districts (RMB yuan). * * per capita national income of the counties (RMB yuan).

Source: Statistics Yearbook of Chinese Cities, 1990. No data of Tianjin.

Type 2: Beijing, Guangzhou, Hangzhou, also including Tianjin. Their two indices are over averages, index II around 2,000 yuan, the ratio I / II between 1.8 to 2.34. However, the economic development of the counties of Guangzhou and Hangzhou are also affected by the spatial diffusion from Hong Kong and Shanghai respectively besides themselves.

Type 3: Shenyang, Wuhan, Jinan, Qingdao, Nanjing, Dalian, Taiyuan and so on. Their index I approximates to the mean, index II are lower than the mean, and the ratio I / II are between 2.3 to 3.5, which show that they have a characteristics of stronger concentration trend but weak spatial diffusion.

Type 4: Harbin, Changchun, Xi'an, Lanzhou, Chengdu, Chongqing. They are located in the northeast or the west. Both index I and index II are the lowest, index II are under 1,000 yuan, and the ratio I/ II are the highest, between 2.5 to 4.4. The concentration trend still dominates over the economic development of this kind of the central cities.

As indicated above, at present, there are only a few central cities which can cause a great pushing effect on the regional development. All of them are located in the coastal areas, of which the spatial diffusion of Shanghai is the strongest, Under the influence of Shanghai, the economic spatial pattern of Jiangsu and Zhejiang provinces is showing a new division. Table 4 shows the per capita national income of the cities of Jiangsu and Zhejiang provinces and Shanghai (whole city), and there are 3 features as follows:

Table 4 The spatial distribution of per capita national income of the cities of Jiangsu, Zhejiang provinces and Shanghai

City	Per capita NI(yuan)	City	Per capita NI(yuan)	City	Per capita NI(yuan)
Shanghai	4822	Nantong	1456	Jiaxing	2335
Suzhou	3200	Yangzhou	1532	Hangzhou	2599
Wuxi	3246	Yancheng	1195	Huzhou	1951
Changzhou	2550	Huaiyin	961	Shaoxing	1770
Zhenjiang	2613	Xuzhou	1152	Ningbo	2442
Nanjing	2474	Lianyungang	1293	Jinhua	1396
Quzhou	1274	Wenzhou	1001		

Source: Statistics Yearbook of Chinese Cities 1991.

(1) The per capita national income of the various cities along Shanghai–Nanjing railway, Shanghai–Hangzhou railway and Zhejiang–Jiangxi railway gradually decline as the distance between them and Shanghai increase, which shows that the rule of distance decrease dominates over the spatial diffusion of Shanghai.

(2) The per capita national income of Yancheng, Huaiyin and Xuzhou which lie to the north of the Changjiang River, and Jinhua, Quzhou and Wenzhou which lie to the mountain areas of southern Zhejiang Province rapidly decline,which shows that the natural barriers change the rule of distance decrease.

(3) The existence of the other central cities in the region can change the outcome of the spatial diffusion from the main central cities to certain extent. For example, the decline speed of the per capita national income of the cities located along Shanghai–Nanjing railway is lower than that of the cities located along Shanghai–Hangzhou railway, because the former include the central cities such as Suzhou and Wuxi. Moreover, Nanjing and Ningbo

make the decline trend of per capita national income to restore rise.

At present, 3 rings have been formed in Jiangsu and Zhejiang provinces according to the close degree of the economic connection between them and Shanghai.

The first ring consists of Suzhou, Wuxi, Changzhou, Hangzhou, Jiaxing, Huzhou and Ningbo which are near Shanghai, and they get benefits from the economic spread of Shanghai much more than the other cities.

The second ring consists of Nanjing, Yangzhou, Nantong, Shaoxing and Jinhua. They get little economic benefits from Shanghai. Furthermore, the affected areas are mainly the urban districts and suburbs.

The third ring consists of Xuzhou, Huaiyin, Yancheng, Lianyungang, Quzhou, Taizhou and Wenzhou. These cities and regions get less benefits from Shanghai. The economic connections between them and Shanghai are mainly on the aspect of circulation of goods, not on the aspect of the production connections.

The redivision of economic space brings about a new core–periphery relation. The core region plays a leading and pushing role to the development of regional economy. Before Shanghai reached the stage of economic spread, the urban districts of Shanghai was the sole core region in the Changjiang River Delta. As the economic development of Suzhou, Wuxi, Hangzhou etc., these original peripheral regions of the Changjiang River Delta are becoming a part of new core region: economically, the economic integration between them and Shanghai is developing; on the spatial organization of urban system, a megalopolis is appearing. Moreover, some central cities in the southern Jiangsu Province have started their economic spread and lead the economic development of the northern Jiangsu Province.

The trend taking place in the Changjiang River Delta is also appearing in the Zhujiang River Delta, Beijing–Tianjin Zhujiang River region and the middle of Liaoning Province. The core region is spreading to larger scope from the urban districtsof the primary cities. of which, the development of the core region of the Zhujiang River Delta is much obvious, because Hong Kong, the primary city of the Zhujiang River Delta, also plays a role similar to the central cities to the development of inland. At present, 3 rings have been formed because of the economic spread from Hong Kong: the first ring is the Zhujiang River Delta, the per capita national incomes of various cities were between 2,227 yuan to 14,123 yuan in 1990; the second ring consists of the other areas of Guangdong Province, and the per capita national incomes of these areas were much less than that of the Zhujiang River Delta, gen-

erally around 1,500 yuan; the third ring consists of some areas in the coastal areas. Under the influence of Hong Kong, the Zhujiang River Delta is becoming a new core region of China.

III. SOME SUGGESTIONS TO THE DEVELOPMENT OF THE CENTRAL CITIES IN FUTURE

Since the idea to play a role of the central cities was put forward in the early 1980s, the economic development of the central cities has made a great progress. However, because of the uneven development and other causes, there still exist some problems in the economic development of the central cities[4]. In order to play a key role of the central cities in national economy in future better, muchour opinions are to further deep the economic reform, meanwhile, the following 4 suggestions may be important.

1. Transferring the Higher Level Cities to International Cities

Since the 1950s, an international urban networks with world cities as the core is appearing[5-6]. If some Chinese central cities can become international cities, the status of China in international labour division will rise. According to our classification to the central cities, only the higher level central cities can become the international cities. Firstly, they are Shanghai and Beijing. Especially, if we further open Beijing's door to the outside world, it will become one of two most important international cities of China. Besides, Guangzhou, Tianjin and Dalian should undertake some functions of the international cities, too.

2. Giving Priority to the Development of Productive Services of the Central Cities

The tertiary industry in the central cities are less developed, and the productive services are much less developed. As the economic system is transferring to market economy, it necessary to develop the productive services of the central cities, especially, finance, insurance, law, accountant.

3. Strengthening the Activity of Enterprises, Speeding up the Development of Enterprise Groups

The economic spread of the central cities has two outlets, i.e. the economic activities organized by some departments of the government and the business connections directly undertaken by the enterprises. As market economy is being established, the economic spread will be undertaken mainly by the enterprises. So, the enterprises should be given

more power of decision-making. Meanwhile, the state should promote the progress of industrial organization, and actively develop the enterprise groups or group corporations. Through the development of the enterprise groups, some general production sectors can be transferred to the regions which have a low labour cost, while their headquarters, sales departments and R & D institution etc. are still located in the central cities. Then, a new labour division between the central cities and the other cities will be formed.

4. Accelerating the Development of the Inland Central Cities

The level of development of the inland central cities has lagged behind the coastal central cities as the whole, and the gap between them is being enlarged. In order to solve the problem, the state should give more flexible policies to the inland regions so as to help them introduce capital and talents at home and abroad, and strengthen much close connections between the inland and the coastal areas. Meanwhile, the state should invest in the exploration of resources and the construction of infrastructures of the inland; locate some industrial sectors which can bring about a large amount of horizontal connections such as automobile, petrochemical, electronic, and iron and steel etc. so as to push the economic development of the inland; further open up the inland central cities to the outside world, including some provincial central cities, such as Kunming, Urumqi Changsha, Hefei etc.; and develop the frontier trade, tourism, science and technology, and education etc.

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