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Assessing the comprehensive competitiveness of Shandong Peninsula Megaregion

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Abstract

The Shandong Peninsula Megaregion (SPM) is located in China's eastern coastal area between the Yangtze River Delta and Beijing-Tianjin-Hebei Megaregions. To understand its status of development in the national context, this paper assesses its competitive ability through a comparison with 20 megaregions nationwide. Using a principal components analysis of time and space dimensions, the authors proposed an evaluation system which included 28 indices. Findings from this research show that the overall competitiveness of SPM ranked 4th, whilst its per capita competitiveness ranked only 10th in 2013. In addition, the overall competitiveness ranking of SPM had not changed from 2005 50 2013, but its pace of economic development and investment had slowed down. Not only was this pace slower than megaregions in middle and western China, it was significantly slower that the top three megaregions nationally. The authors concluded by suggesting transformation, innovation and cooperation strategies for the future development.

1. Introduction

With the development of the urbanization in China, the relationships between different cities have become closer, and the structures of regional urban systems have been constantly improved. Megaregion as a regional spatial form has been developing very quickly in recent years and as such, has become one of the most important forms in Chinese urbanization. Megaregions in China are also widely recognised as the key strategy to promote regional development and enhance national competitiveness. Megaregion's competitive power reflects development potential and competitiveness of a certain region; it is also regarded as an important method to evaluate the status of each urban agglomeration within certain areas. Much research about megaregions have been done by Chinese scholars in terms of its conceptual connotations (Feng & Zhang, 2006; Li, 2009; D. Liu, 2009; Ni, 2008; Tong, Wang, & Zhou, 2010; H. Zhang, 2006), assessment models (S. Liu & Liu, 2014; Ni, 2008; Tong et al., 2010) and test cases. These have great significance for both promoting further development and improving comprehensive competitiveness of megaregions.

The Shandong Peninsula Megaregion (SPM), one of the major megaregions in eastern China, is also an important part of the Bohai Economic Rim. The regional development of SPM started early and grew rapidly. Although research into the competitiveness of SPM is increasing (Li, 2009; Wang, Li, Wang, & Yao, 2012), studies comparing its national competitiveness to those of the other megaregions in China remain limited (Ni, 2008; X.

Zhang & Li, 2014). To clarify SPM's competitiveness against the ranking of the nation's megaregions, it is necessary to assess its comprehensive competiveness on a national scale. This assessment would further result in a promotion of transformation and an improvement of its competitive power in the future development of SPM.

2. Study area and sources

The following 20 megaregions in China were analysed (Figure1): Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei, Shandong Peninsula, the Middle Yangtze River,, Chengdu-Chongqing, Central Plains, Western Taiwan Straits, Jiang-Huai, mid-southern Liaoning, Jinzhong, Guanzhong, Hohhot-Baotou-Erdos-Yulin, Central Guizhou, the Tianshan Mountains, region along the Yellow River in Ningxia, Haerbin-Changchun, North Bay, Central Yunnan, Lanzhou-Xining. Sources were collected from yearbooks of 2006 and 2014, including China City Statistical Yearbook, China Statistical Yearbook (County-level), China Urban Construction Statistical Yearbook, and statistical yearbooks at the provincial level.

3. Index selection and research methods

3a. Index selection

Our evaluation system for megaregions offers a systematic and comprehensive multi-index approach to evaluate the competitiveness of megaregions. To assess the ability of megaregions' competiveness in a subjective and accurate manner, our analysis approach applied the principles of scientific soundness, objectivity, comprehensiveness, comparability, consistency and provision of pragmatic solution. Based on existing literature, features were analysed and evaluated in terms of economic development, innovativeness, infrastructure status, resource and environment, and regional structure. These five features were used to create28 indices to establish an evaluation system for overall competitiveness (Table 1).

3b. Research methods

Principal Components Analysis (a technique of dimension reduction which can convert a number of original related multi-indexes into few independent comprehensive indices) was used to compare and evaluate competitiveness among megaregions. This statistical technique ensures subjective and accurate assessment results more by reducing the impact of human factors. Hierarchical clustering of megaregions was performed using the Ward method.

4. Analysis and findings

4a. Horizontal comparison of regional competiveness

Competitiveness assessment of the SPM in 2013

Using SPSS17.0 software, the first six main components explained 89.75% of the variation. Among the main components, F1denotes the total amount of economic development and service delivery. F2 denotes per capita level of economic and social development. F3 denotes the density distribution of urban areas. F4, F5 and F6 (collectively defined as environmental characteristics) primarily denote industrial pollutant emissions and environmental management; F4 denote the amount of industrial smoke dust (powder) emissions; F5 for the rate of domestic garbage disposal harmlessness; F6 for the amount of industrial sulphur dioxide emissions.

Our results show that the overall competitiveness of SPM ranked 4th in 2013 (Table 2 and Figure 2), after the three major megaregions in China; Yangtze River Delta, Pearl River Delta and Beijing-Tianjin-Hebei megaregions. The overall competitiveness score of SPM was much lower i.e., 1/6, 1/4 and 1/2 of the score of Yangtze River Delta, Pearl River Delta and Beijing-Tianjin-Hebei megaregions respectively. Based on economic development and service delivery (F1), SPM ranked 5th, behind the Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei and the Middle Yangtze River. SPM's score was significantly below those of the three major megaregions, at only 1/6 of the Yangtze River Delta, and less 1/2 of the score of Pearl River Delta or Beijing-Tianjin-Hebei. This indicates that economy and service delivery of SPM was not strong in 2013. Additionally compared to the three major megaregions, there was still a wide gap in terms of economic scale, economic structure, foreign investment, and science and technology expenditures as indicated by F2 - F6. Based on the per capita competitiveness score (F2), SPM only ranked 10th nationally, placing it behind Pearl River Delta, Hohhot-Baotou-Erdos-Yulin, Jinzhong, Mid-southern Liaoning, Beijing-Tianjin-Hebei, Central Guizhou, region along the Yellow River in Ningxia, and Central Yunnan. These significant gaps can be seen from scores of average wage, educational expenditure, and public revenue. Based on the density distribution score (F3), SPM rank second. Based on other characteristics, SPM ranked 5th as assessed by industrial dust emission (F4); 9th as assessed by domestic harmless disposal (F5), and 15th as assessed by industrial sulphur dioxide emission (F6). Among these results, the large amount of sulphur dioxide emission was considered as the biggest problem.

Hierarchical clustering analysis for regional competiveness

In addition to the principle components analysis, hierarchical clustering analysis was performed to visualise hierarchy of clusters (megaregions) based on the national competitiveness. As shown in the dendrogram (Figure 3), the 20 megaregions are arranged into three clusters. The Yangtze River Delta and Pearl River Delta comprise the first cluster to represent megaregions with the highest level of competitiveness and economic development. Megaregions in the second cluster represent those with medium level of competitiveness and development; these are Beijing-Tianjin-Hebei, Chengdu-Chongqing, the middle Yangtze River, Shandong Peninsula, Central Plains, Jiang-Huai, and Western Taiwan Straits. The remaining megaregions comprising the third cluster represent those with the lowest competitiveness and development.

4b. Evolution analysis of regional competiveness between 2005 and 2013

Firstly, changes in regional competitiveness were analysed through a comparison between data from 2005 and 2013. Secondly, main indices for 2005 were compared with those of 2013. Lastly SPM was compared with the three major megaregions in China based on global accessibility and agglomeration ability of core cities.

Changes in regional competitiveness

In 4th position, the overall competitiveness ranking of SPM had not changed when comparing scores from 2013 with those from 2005 (Figure 4). Moreover, the score difference between

that of SPM and Yangtze River Delta tended to decline during this period. However, because the developmental pace of the middle Yangtze River (ranked 5th) and Chengdu-Chongqing (ranked 6th) was faster than that of the SPM, the score gaps between SPM and these two megaregions became even smaller (Table 3 and Figure 4). Through the changes of each main component between 2005 and 2013 (Figure 5), we see that the score of total amount of economic development and service delivery (F1) reduced but the ranking remained unchanged (both above 2). Furthermore, the score for per capita development (F2) increased with its rank rising from -0.54 to -0.11 during this period. This means the competitiveness of both total amount and per capita of development was relatively stable, whilst the overall competitiveness (based on the sum of all components; F1-F6) was still weak. The scores and ranks of F4 and F5 had dropped between 2005 and 2013. In contrast, that of F6 had risen for SPM, but the score of overall environmental competitiveness had decreased slightly.

Changes in main indices

From the growth rankings of main indices of SPM between 2005 and 2013 (Table 4), the growth rate of full-time teachers in tertiary education was placed in last position. The penultimate indices include GDP, the actual use of foreign capital, fixed asset investment, per capita educational expenditure. The growth rates of these indices during this period were also relatively low. Indices with ranks from 13 to 17 include per capita GDP, science and technology spending, the amount of urban private firms and people, total freight volume, urban population proportion of the core city, regional population, and population density. These figures were below the middle level. The increasing rate of the proportion of service industry in GDP and the amount of broadband users was the highest, so both of them were tied in 1st position. The growth rate of total passengers was placed in the 5th position; the growth rate of total retail sales of social consumer goods per capita and the amount of civil aviation passengers were ranked 7th and 8th respectively.

Findings in this section suggest that SPM's transformation of industrial structure had accelerated, and industry structure had been improved. However, its overall economic growth rate was still relatively slow. Within the three main driving forces, influence of investment and foreign investment presented were weak, whereas the consumption force tended to be enhanced. On the other hand, construction of infrastructure such as broadband and highways, as well as development in the air transport sector had rapidly developed. However, the growth in education, science and technology spending remained relatively slow; this will likely restrict the innovation-driven development of SPM. Furthermore, the population growth of SPM had slowed down; agglomeration of core city was less strong. The treatment levels of sewage, domestic garbage and industrial solid waste were relatively high, but the amount of industrial emissions remained high.

Commonalities between SPM and the three major megaregions

Compared to megaregions in the middle and western China, SPM and the three major megaregions show some commonalities. A cross-analysis of economic volume with economic growth rate shows that megaregions in China can be grouped into 4 categories (Figure 6). Category 1 represents a large economic volume with high growth rate; Category 2 reflects a

large economic volume but low growth rate; Category 3 defines areas where there is a small economic volume but high growth rate; Category 4 reflects a small economic volume with low growth rate. Figure 6 shows that both SPM and the three major megaregions were grouped under Category 2, as having a large economic volume but relatively low growth rate. The reason is largely because that these four megaregions are all located in the eastern coastal areas. As a result of this geographic advantage, they had developed earlier and accumulated sufficient economic volume. Moreover, they also had higher levels of economic and social development, and infrastructure construction. However, the growth pace of the four megaregions had become slower than those in the middle and western China. The growth rates of some other indices were also at or below mediocre level; include GDP, public revenue, fixed assets investment, the actual utilisation of foreign investment, total retail sales of social consumer goods, and education, science and technology expenditures. Our findings suggest that under the new normal circumstance, the future development of SPM should be based on acceleration of economic shift, upgrade of growth pattern by innovation, and improvement of quality and core competency.

Differences between SPM and the three major megaregions

Compared to the three major megaregions, SPM performed weaker in areas of both overall economic volume and innovative development. In terms of economic development, foreign investment and educational expenditures, both volume and growth rate of SPM were lower than those of the three major megaregions. Moreover, innovative development capacity of SPM remained a large gap after the three major megaregions. For instance, in 2013, GDP of SPM was 4.48 trillion Yuan, while that of Yangtze River Delta, Pearl River Delta and Beijing -Tianjin - Hebei was 13, 5.31 and 6.22 trillion Yuan respectively. From 2005 to 2013, the growth rate of GDP for SPM was 188%, while that of the three major megaregions was 202%, 191% and 198% respectively. Moreover, science and technology expenditures of SPM were 11.10 billion Yuan in 2013, while that of the three major megaregions was 76.73, 25.75 and 36.46 billion Yuan respectively. Educational expenditure for SPM was much lower at 93.70 billion Yuan, compared with that of the three megaregions each at 302.53, 104.68 and 186.83 billion Yuan respectively. Between 2005 and 2013, the growth rate of science and technology expenditure for SPM was 2358% compared with that of the three megaregions each at 2854%, 3188% and 1677%. The growth rate of educational expenditure in the SPM was far below that of the three megaregions; SPM: 336%, Yangtze River Delta: 386%, Pearl River Delta: 466% and Beijing-Tianjin-Hebei: 405%. In addition, the actual utilisation of foreign investment for SPM in 2013 was 12.58 billion US dollars, which was much lower compared to the three major megaregions with Yangtze River Delta, Pearl River Delta and Beijing-Tianjin-Hebei at 71.23, 23.06 and 32.00 billion US dollars respectively. Between 2005 and 2013, growth rate of the actual utilisation of foreign investment for SPM was 25.8%, while that of Yangtze River Delta, Pearl River Delta and Beijing-Tianjin-Hebei was 146%, 103% and 250% respectively.

Another significant difference between SPM and the three major megaregions includes a lack of global accessibility from the core city, and the poorer agglomeration ability of production factors. The primate city of a megaregion plays the role of “knowledge portal” in both

external connection to global economic network and internal radiation to its hinterland. The spatial hierarchy of urban associated networks reflects the status and role of the megaregion and its clustered cities (Tang & Li, 2014). According to the Globalization and World Cities Research Network (GaWC), a correlation study between 25 Chinese cities and the global city network found that Beijing, Shanghai and Guangzhou (primate cities of the major three megaregions) had the highest correlative degree in mainland China (Derudder et al., 2013). The study also showed that Qingdao, as the primate city of SPM, had a lower correlative degree, ranking it in 12th position at the national level. The global rank of Qingdao was even farther behind the primate cities of the three major megaregions (Table 5). Research findings from the GaWC suggest that the agglomeration ability of advanced sectors in SPM is still insufficiently strong to drive itself to deeper division in the global industrial chain.

5. Conclusion

Horizontally, the overall competiveness of SPM within the national megaregions ranked stably in 4th and was categorised as having a large economic volume but low growth rate in 2013. The overall competitiveness score of SPM remained much lower compared to that of the Yangtze River Delta, Pearl River Delta and Beijing-Tianjin-Hebei megaregions. At the national level, SPM sows a relatively weak (mid-level) ranking for average competitiveness. Construction of infrastructure in SPM was already of higher standard, but its innovative development is still inefficient. From 2005 to 2013, the quality of economic operation had improved at a constant rate annually, but the overall growth pace became slower, in particular when compared to that of megaregions in the middle and western China. In regards to actual utilisation of foreign investment, SPM lacked of motivation. Furthermore, growth of science and innovative development for SPM was also slow. Due to a lack of global accessibility from the core city, and the poorer agglomeration ability of advanced sectors, SPM had limited influence nationally and globally. This would further restrict its overall development.

To adapt to the global trend of new scientific and technological revolution, we suggest that the growth model and development path of SPM needs to be changed from one that is traditional to an innovation-driven, technology-supported, production factor-agglomerated, ecological and sustainable development model. Firstly, the function of the core city in SPM needs to be improved significantly. This would broaden its radiation ability and increase its international competitiveness. Secondly, people-oriented development should be emphasised in a move to improve public services, social security and living environment, and enhance competitiveness of soft environment. Thirdly, a mechanism for developing internal cooperation needs to be established in order to ensure an integrated development of the entire megaregion.

6. Acknowledgement

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Figure 1 Location of 20 megaregions in China

Figure 2 Scores of overall competitiveness of megaregions in China

Higher score denotes more competitiveness

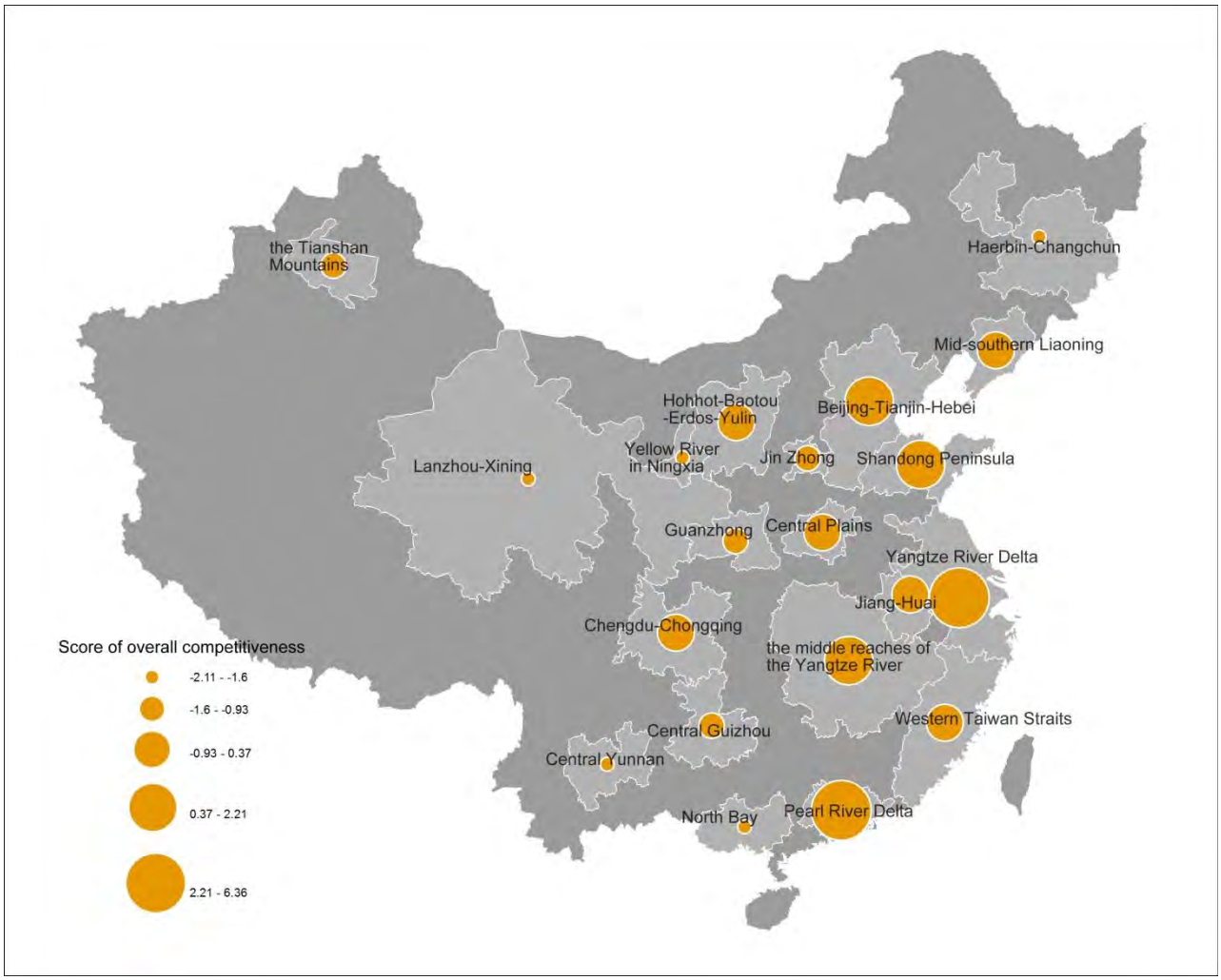


Figure 3 Hierarchical clustering o of megaregions

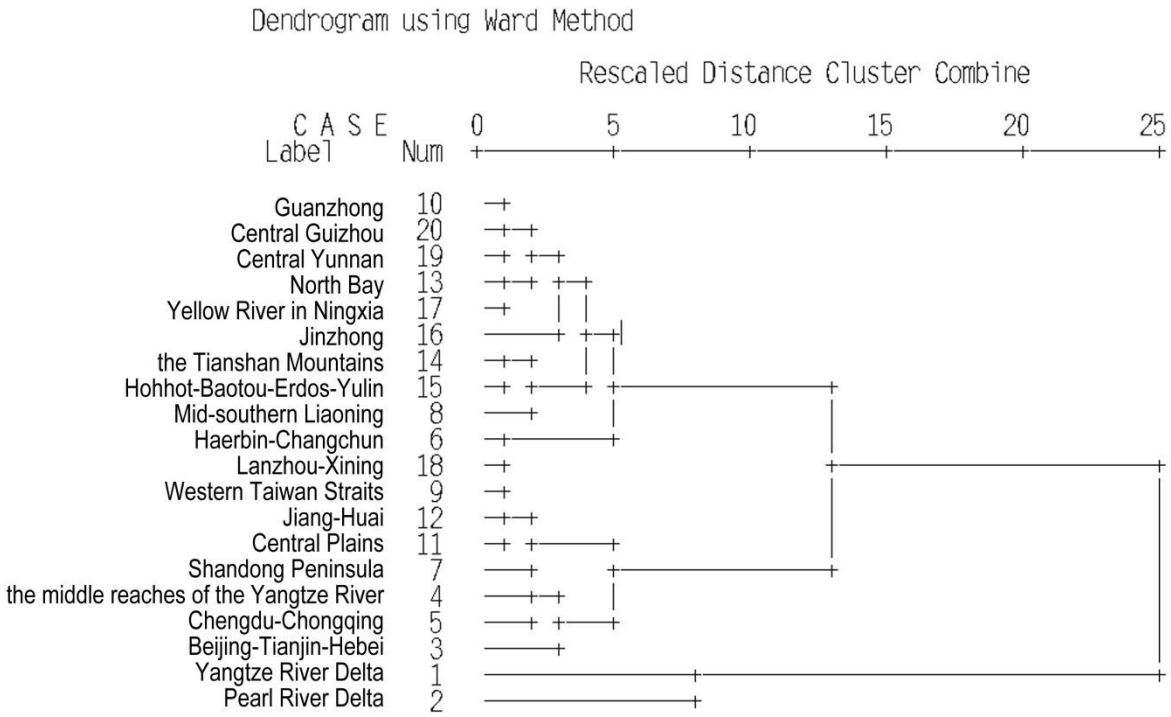


Figure 4 Scores of overall competitiveness in 2005 and 2013

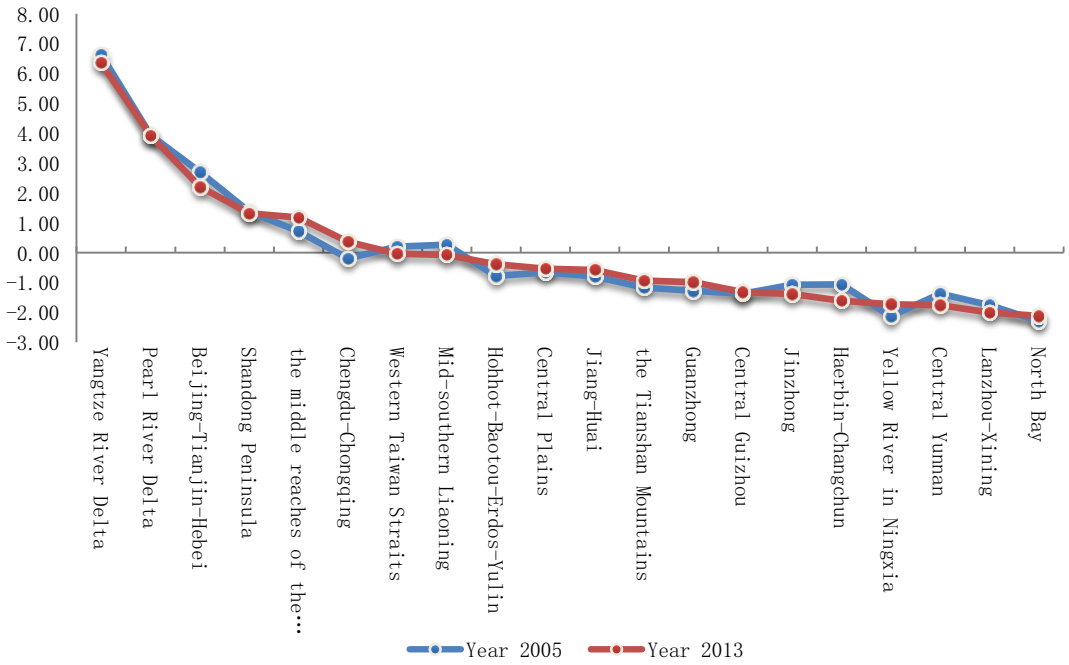
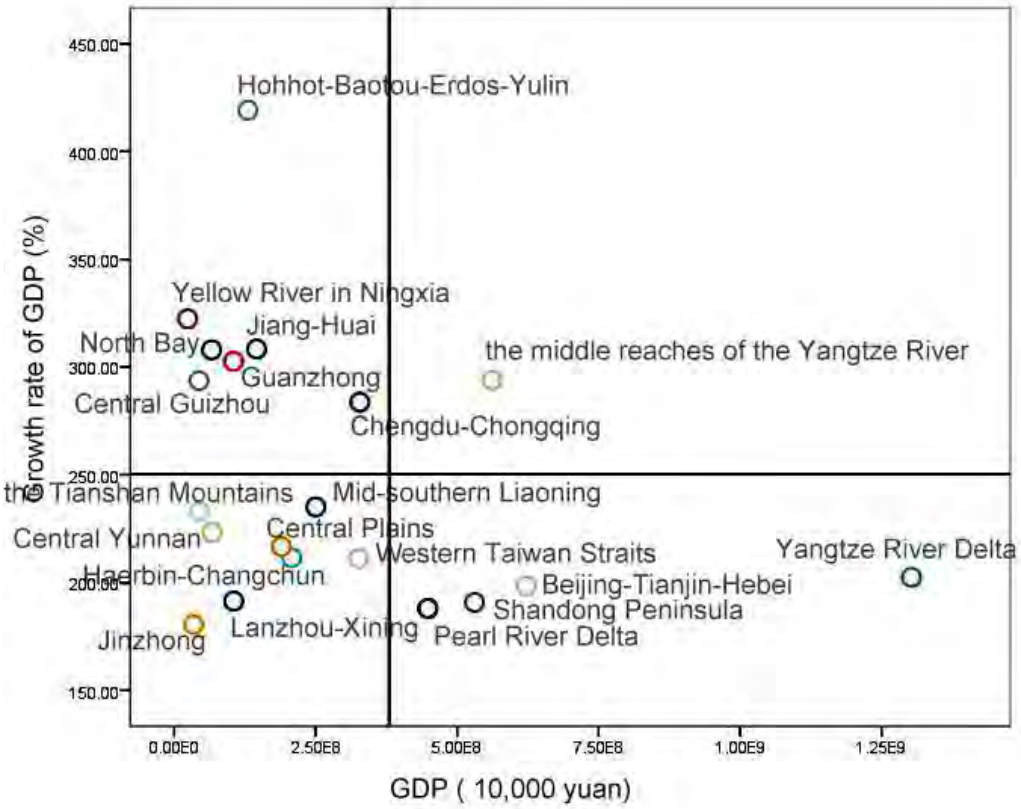


Figure 5 Scores of main components of SPM in 2005 and 2013

Figure 6 Scatterplot based on the total GDP and its growth in megaregions



X-axis: GDP represents economic volume
Y-axis: economic growth rate
Megaregions are divided into 4 categories denotes by the 4 quadrants in the scatterplot.
Category 1: large economic volume with high growth rate (top right)
Category 2: large economic volume but low growth rate (bottom right)
Category 3: small economic volume but high growth rate (top left)
Category 4: small economic volume with low growth rate (bottom left)

Table 1 Evaluation index system for megaregional competitiveness

Goal	System layer	Control layer	Index layer	Unit	Index property
Overall competitiveness	Economic competitiveness	Economic scale	GDP	10,000 yuan	Positive
		Economic structure	The proportion of service industry in GDP	%	Positive
			The proportion of employed people in non-agriculture sectors	%	Positive
		Economic efficiency	Per capita GDP	10,000 yuan	Positive
			Per capita public revenue	%	Positive
		Economic vitality	The actual use of foreign investment	10,000 US dollars	Positive
			Fixed asset investment	10,000 yuan	Positive
			Number of registered urban unemployed people	people	Negative
			Private owners and self-employed people	people	Positive
			Per capita retail sales of social consumer goods	10,000 yuan	Positive
			Average wage	yuan	Positive
	Innovative competitiveness	Educational Development	Number of full-time teachers in tertiary education	people	Positive
			Per capita education spending	yuan/person	Positive
		Technological development	Science and technology spending	10,000 yuan	Positive
	Infrastructural competitiveness	Transport infrastructure	Total passengers	10,000 people	Positive
			Civil aviation passengers	10,000 people	Positive
			Total freight	10,000 tons	Positive
			Urban roads area at year-end	m^2/person	Positive
		Information Infrastructure	Internet broadband access users	10,000 users	Positive
	Environmental competitiveness	Polluting emission	Industrial sulfur dioxide emissions	kg/10,000 yuan	Negative
			Industrial smoke (powder) dust emissions	kg/10,000 yuan	Negative
		Environmental management	Utilization of general industrial solid waste	%	Positive

			Centralized treatment rate of sewage treatment plant	%	Positive
			Harmless treatment rate of domestic garbage	%	Positive
	Structural competitiveness	Urban compactness	Urban distribution density	number/10,000km^2	Positive
			Population density	person/km^2	Positive
		Regional structure	Proportion of population in the primate city	%	Positive
			Regional population	10,000 people	Positive

Table 2 Competitiveness scores of megaregions in 2013 by principal components analysis

Megaregions	Component F1	Component F2	Component F3	Component F4	Component F5	Component F6	Total score	Order of overall competitiveness
Yangtze River Delta	11.66	-0.92	-0.93	-0.43	1.02	2.03	6.36	1
Pearl River Delta	4.91	5.69	0.88	1.44	-1.85	0.09	3.92	2
Beijing-Tianjin-Hebei	4.39	0.29	-0.49	-2.58	-0.09	-1.5	2.21	3
Shandong Peninsula	2.02	-0.11	1.83	1	0.29	-0.85	1.32	4
the middle reaches of the Yangtze River	3.23	-3.31	0.13	0.41	1.03	-2.21	1.18	5
Chengdu-Chongqing	1.33	-1.81	-0.19	-0.19	-0.37	0.42	0.37	6
Central Plains	0.16	-0.98	0.05	0.61	-0.5	0.83	-0.03	7
Western Taiwan Straits	-0.32	0.81	-1.13	1.21	0.27	-1.04	-0.07	8
Jiang-Huai	-1.57	3.61	-2.49	0.7	0.72	-0.95	-0.38	9
Mid-southern Liaoning	-0.78	-1.66	3.29	0.19	-0.94	-0.97	-0.53	10
Jinzhong	-0.91	-1.4	1.46	1.07	-0.39	0.31	-0.57	11
Guanzhong	-2.74	2.57	-0.14	1.05	1.01	0.06	-0.93	12
Hohhot-Baotou-Erdos-Yulin	-1.97	-0.19	1.16	-0.04	0.78	0.39	-0.98	13
Central Guizhou	-2.69	0.28	1.36	-0.62	0.47	1.06	-1.31	14
the Tianshan Mountains	-2.8	2.37	0.89	-4.34	-0.45	0.18	-1.38	15
along the Yellow River in Ningxia	-1.61	-1.78	-2.36	-0.35	-2.48	-0.28	-1.6	16
Haerbin-Changchun	-3.37	0.21	0	0.99	0.49	0.74	-1.72	17
North Bay	-3.3	0.12	-0.2	-0.57	2.34	0.36	-1.75	18
Central Yunnan	-2.48	-1.9	-2.65	-0.09	-0.28	-0.05	-2	19
Lanzhou-Xining	-3.15	-1.88	-0.46	0.53	-1.07	1.36	-2.11	20

Legend

F1: total amount of economic development and service delivery

F2: per capita level of economic and social development

F3: density distribution of urban areas

F4: amount of industrial smoke dust (powder) emissions

F5: rate of domestic garbage disposal harmlessness

F6: amount of industrial Sulphur Dioxide emissions.

Table 3 Competitiveness scores of megaregions in 2005 by principal components analysis

Megaregions	Component F1	Component F2	Component F3	Component F4	Component F5	Component F6	Total score	Order of overall competitiveness
Yangtze River Delta	12.22	-0.58	-0.45	-0.88	0.69	-0.32	6.64	1
Pearl River Delta	5.09	5.28	0.10	2.05	-2.10	0.97	3.94	2
Beijing-Tianjin-Hebei	4.85	0.79	-0.70	-1.42	0.46	-0.38	2.70	3
Shandong Peninsula	2.21	-0.54	1.69	1.61	0.42	-1.10	1.38	4
Middle Yangtze River	2.57	-2.93	-0.46	-1.18	-0.01	-0.89	0.72	5
Chengdu-Chongqing	0.17	1.13	-0.29	0.55	-0.63	-0.40	0.28	6
Central Plains	0.33	-0.44	0.11	0.82	0.05	0.79	0.21	7
Western Taiwan Straits	0.61	-2.04	0.15	-1.76	-0.24	-0.35	-0.19	8
Jiang-Huai	-1.13	-1.45	2.76	0.65	-0.32	-0.67	-0.65	9
Mid-southern Liaoning	-2.05	2.88	-1.59	-0.53	1.10	-0.98	-0.77	10
Jinzhong	-1.40	-1.21	1.23	1.15	-0.21	0.86	-0.79	11
Guanzhong	-1.33	-0.99	-1.52	0.33	-0.41	-0.02	-1.06	12
Hohhot-Baotou-Erdos-Yulin	-2.65	2.19	1.06	-1.50	0.56	-0.01	-1.06	13
Central Guizhou	-2.73	1.33	0.85	0.85	0.00	-0.72	-1.17	14
The Tianshan Mountains	-2.31	-0.43	0.42	-0.44	1.55	0.42	-1.27	15
Region along the Yellow River in Ningxia	-2.88	0.79	0.39	-0.24	1.38	0.26	-1.37	16
Haerbin-Changchun	-2.84	-0.09	0.79	0.69	1.70	0.81	-1.37	17
North Bay	-2.32	-1.13	-2.19	-0.46	-0.22	-0.05	-1.75	18
Central Yunnan	-3.38	-0.55	-1.40	0.41	-1.29	0.81	-2.12	19
Lanzhou-Xining	-3.04	-1.99	-0.94	-0.68	-2.47	0.95	-2.29	20

Refer to table 2 for table legend

Table 4 Growth rankings of main indices for SPM between 2005 and 2013

Category	Growth ranking of indices
Economy and society	GDP(19), Per capita GDP(17), The proportion of service industry in GDP(1), Per capita public revenue (15), The actual use of foreign investment (19), Fixed asset investment (19), Total retail sales of social consumer goods (11), Per capita retail sales of social consumer goods (7), Average wage(13), Private owners and self-employed people (13)
Infrastructure	Total passengers (5), Civil aviation passengers (8), Total freight (15), Per capita urban roads area at year-end (11), Internet broadband access users (1)
Innovative development	Educational expenditure (19), Per capita educational expenditure (19), Science and technology expenditure (14), Number of full-time teachers in tertiary education (20)
Resources and environment	Industrial sulphur dioxide emission (13), Industrial smoke (powder) dust emission (10), Utilization of general industrial solid waste (15), Centralized treatment rate of sewage treatment plant (15), Harmless treatment rate of domestic garbage (14)
Megaregional structure	Population density (17), Proportion of population in the primate city (16), Regional population (13), Regional population at year-end(17)

Table 5 Correlation between Chinese major cities and global city network (Derudder et al., 2013)

City	Global rank	National rank	Correlation degree (%)
Hong Kong	3	1	73.0
Shanghai	7	2	62.7
Beijing	12	3	58.4
Taipei (Taiwan)	43	4	41.7
Guangzhou	67	5	34.1
Shenzhen	106	6	25.8
Tianjin	188	7	16.8
Gaoxiong (Taiwan)	223	8	143
Nanjing	245	9	13.5
Chengdu	252	10	13.1
Hangzhou	262	11	12.5
Qingdao	267	12	12.3
Dalian	275	13	12.0
Macao	291	14	10.9
Chongqing	319	15	8.9
Xi’an	323	16	8.7
Suzhou	325	17	8.6
Wuhan	337	18	8.0
Xiamen	346	19	7.5
Ningbo	348	20	7.5
Shenyang	356	21	7.2
Fuzhou	359	22	7.1
Xinzhu(Taiwan)	361	23	7.1
Taiyuan	367	24	6.7
Kunming	401	25	5.1

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