

# The Analysis of the Spatial Distribution and Its Characteristics for China's Township Enterprises over the Past 10 years

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**ABSTRACT:** After the founding of the PRC, the rapid development of China's township enterprises promoted the national economy. But China's township enterprises were facing to problems, such as the space pattern dispersion, space organization inefficiency, and unsustainable environmental effects etc. This paper selected three indicators(the number of enterprises, the employees, and its gross output value)of 2000-2010 from "township enterprises and agricultural product processing industry Yearbook" to study spatial-temporal features of it on a national and regional scale, and finds that the development tendency of township enterprise becomes higher and higher, the number of enterprises, output efficiency and employees are not synchronized in the growth rate and fluctuation, but all began gathering, the agglomeration level of gross output is the most prominent. The three zones gap became more larger and intra-regional differences also large, regional economical conditions and natural foundation became the key points.

**KEYWORD:** township enterprise; evolvement of spatial pattern; regional characteristic

## 1 INTRODUCTION

In 1980s and 1990s, the township enterprises have sprung up everywhere, which has played an important role in promoting Chinese economy actively in the beginning of reform and opening-up policy (Che, J. & Qian, Y. Y. 1998). but the township enterprises whose small-scale and decentralized layout were not conducive to itself development has been being studied (Li C. Y. 2004, Cao G. Z. & Zhong Y. X. 1997) In the 1980s, to some extent, Weber's theory that the minimum cost of production raw materials and distance resulted in the concentrated and dispersed spatial layout of township enterprises (Li C. Y. 2004). The "growth pole theory", "circle structure theory", "point and axis system theory" as well as "the southeast coast and the Yangtze River development plan—"T" theory" have showed the present spatial pattern and characteristics of China's regional development not balanced(Wan J. P. 1992, Lu D. D. 2001). The research on dynamic mechanism of space recombinant clarified that the spatial structure change was determined by a set of factors, such as state intervention, globalization, industrial upgrading, spatial interaction and lateral regional collaboration Etc (Chen X. Y. 2003). In the 1980s and 1990s, the coastal provinces and special

economic zones located on the "T" belt growth pole accelerated national economy (Lu D. D. 2001, Yan P. F. & Shao Q. F. 2001). Township enterprises agglomeration brought greater scale of economy and stronger regional competitiveness and market adaptability (Luo Y. B. 2008), Optimizing the spatial layout of township enterprises to achieve agglomeration will help the small towns prosperous (Liu Y. & Y. C. Z 1995). Urbanization is consistent with the township enterprises development (Xu Z. C. 2008), and the agglomeration degree will evaluate the rural development and urbanization. Agglomeration development is inevitable (Li C. Y. 2004).

As social and economic development corresponds to regional spatial structure (Wan J. P. 1992), it was significant for the strategic decision of national regional development and key areas to know the space evolution characteristics of rural industry not only in China and its three zones but provinces in recent ten years. This study selected the related 2000-2010 data from "township enterprises and agricultural product processing industry Yearbook", used three indicators including township enterprises numbers (CTEN), employees (CTEE), and the total output value (CTTO) to conduct it. Thus, we not only calculates the whole country's township enterprises development tendency and agglomeration

degree but also each province and three zones rank changing, this can clearly distinguish the space change process of township enterprises and play a direct critical role on regional coordinated development.

## 2 GENERAL VIEW OF TOWNSHIP ENTERPRISES DEVELOPMENT FROM 2000 TO 2010

### 2.1 The nationwide growth characteristics of three indicators

To 2011, the total number of Chinese township enterprises (CTEN) reached  $2.8 \times 10^7$ , the township enterprises employees (CTEE) increased to  $1.6 \times 10^8$  (per) and the total output value (CTTO) is  $5.5 \times 10^9$  (RMB), the three indicators were increasing respectively by  $6.6 \times 10^5$ ,  $3.1 \times 10^6$ /per and  $3.5 \times 10^8$ /RMB on an annual average speed, no matter CTEN, CTEE or CTTO all showed a continuous expansion and rising tendency as shown in Fig. 1.

(1) CTEN overall increased year by year in decade, the growth rate of last five years advanced obviously. In 2000-2005, the amount grew at an annual average rate of  $3.30 \times 10^5$ , in 2005-2010 in a high-speed stable stage, the growth rate was  $9.86 \times 10^5$  per year.

(2) Compared with the CTEN, the CTEE growth tendency remained stable relatively in ten years at a nearly equal speed. the employees of 2000-2005 were growing at an average rate of  $2.91 \times 10^6$  per/year, in 2005-2010, the average growth rate was  $3.24 \times 10^6$  per/year.

(3) The stage growth characteristics of CTTO was distinct, after 2004 the rate increased significantly. The average annual growth rate from 2000 to 2004 was  $1.43 \times 10^8$  RMB, after 2004 the inflection point, in 2005-2010 it is  $4.87 \times 10^8$  RMB. The CTTO has a quick development tendency.

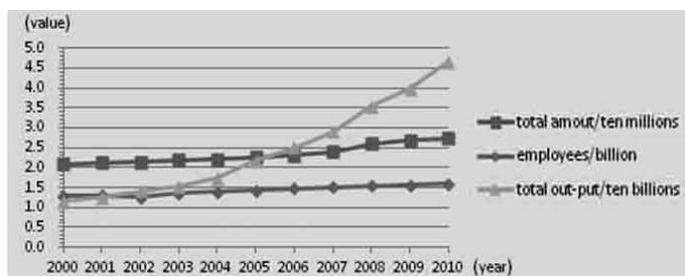


Figure.1 The overall tendency of the amount, employees and the total output of township enterprises from 200 to 2010

### 2.2 The nationwide characteristics of hierarchical distribution

Based on the CTEN, CTEE, CTTO of 31 provinces, municipalities, autonomous regions in 2000, 2005, 2010. The provinces which had the best and worst

development over the years have been divided into five grades to be analyzed.

(1) In ten years, CTEN overall was growing, the gap between the superiority provinces in the first and second grade with the low grade provinces was gradually expanding. in 2000, 2005, 2010, the number of provinces in the first and second grade respectively was 2, 5; 4, 11; 4, 7. Proportion of amount of these two grades enterprises in 2000 was 20.5%, 26.8%, 31.5%, 49.7% in 2005, 47.4%, 32.1% in 2010. The provinces in the last two low grades almost remained 15 in 10 years, and their amount of enterprises accounted for about 10%. By the end of 2010, nearly half the provinces have been in the first tow grades, a significant large-scale. (shown in Fig.2)

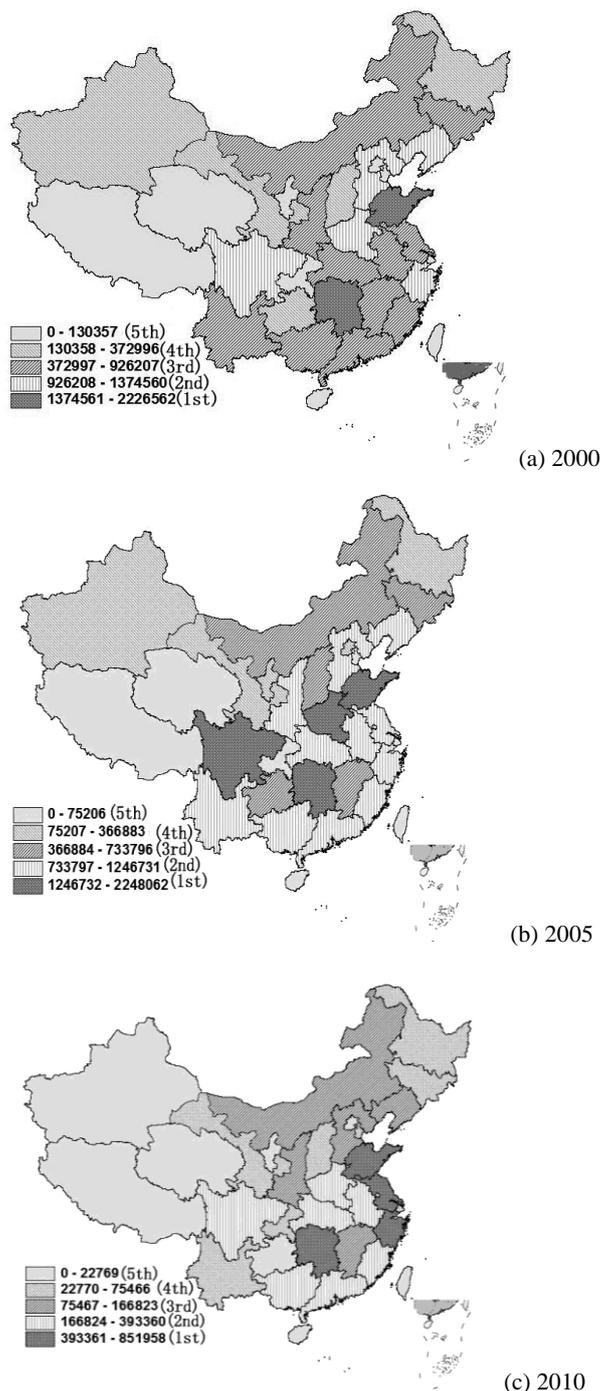


Figure.2 The spatial distribution of the enterprises' amount and its grades in 2000, 2005, 2010

(2) In ten years, the CTTO of provinces in the first and second grade accounted for as more than half as that of the nationwide township enterprises, the high-grade provinces had an obvious gap with the low-grade ones. The number of the first two grades provinces was 9, 7, 6 in 2000, 2005, 2010 and their CTTO proportions respectively were 70%, 67%, 73%. The number of low-grade (the fourth and fifth) provinces in 2000, 2005, 2010 remained about 18, their CTTO proportions were about 14%. The amount of the first two provinces was less than other grades, in contrast, their CTTO proportions were larger and they had a higher efficiency level. (seen in Fig. 3)

(3) In ten years, the labors that first three grades provinces could hold were as more than 85% as the total number, far more than the other grades, The number of the first three grades provinces in 2000, 2005, 2010 respectively was 19, 17, 18. During this period, the proportion of employees in the first three grades was 91%, 87.5%, 92%, a relatively fixed. (seen in Fig. 5)

### 2.3 The nationwide characteristics of agglomeration

In ten years, the development of township enterprises had an upward tendency, regional agglomeration characteristics were becoming significant. In 2010, the nationwide coefficients of variation of the CTEN, CTEE, CTTO respectively were 1.12, 1.01, 1.41. The township enterprises began gathering.

From 2000 to 2010, the spatial pattern of township enterprises tended to be a further agglomeration, in the same period, the agglomeration degree measured by CTTO was the highest and the CTEN was the lowest. For example, in 2000, 2005, 2010, the coefficients of variation calculated by CTEN were 0.79, 0.80, 1.12, the values by CTEE were 0.81, 0.89, 1.01, and by CTTO the values were 1.00, 1.25, 1.41. The centralization indexes also showed a similar judgement. In 2000, 2005, 2010 the centralization indexes of CTEN were 0.43, 0.46, 0.57; by CTEE were 0.45, 0.49, 0.53, and the values by CTTO were 0.54, 0.60, 0.64.

Therefore, in these ten years when the spatial agglomeration started, the CTTO had a significant point role in the agglomeration.

## 3 ANALYSIS OF EVOLUTION CHARACTERISTICS AND STRUCTURE OF TOWNSHIP ENTERPRISES BETWEEN THE THREE ZONES IN 2000-2010

Regional differences of spatial structure for township enterprises studied in 1999 had shown that the eastern agglomeration calculated by the CTTO was the most obvious (Wang Y. H. 2003). Since 2000, Township enterprises had developed rapidly, the three zones have a new feature of space distribution.

(1) In these ten years, the amount proportion of eastern township enterprises continued to rise, the middle area's declined, and the west fell sharply in 2005-2010. In 2000, 2005, 2010, the eastern proportions were 42%, 45%, 69%; the middle were 38%, 34%, 22%, and the west were 20%, 21%, 9%. (Fig. 2). The eastern provinces except Beijing, Tianjin, Shanghai, and Hainan were all located in the first three grades. The middle provinces were almost

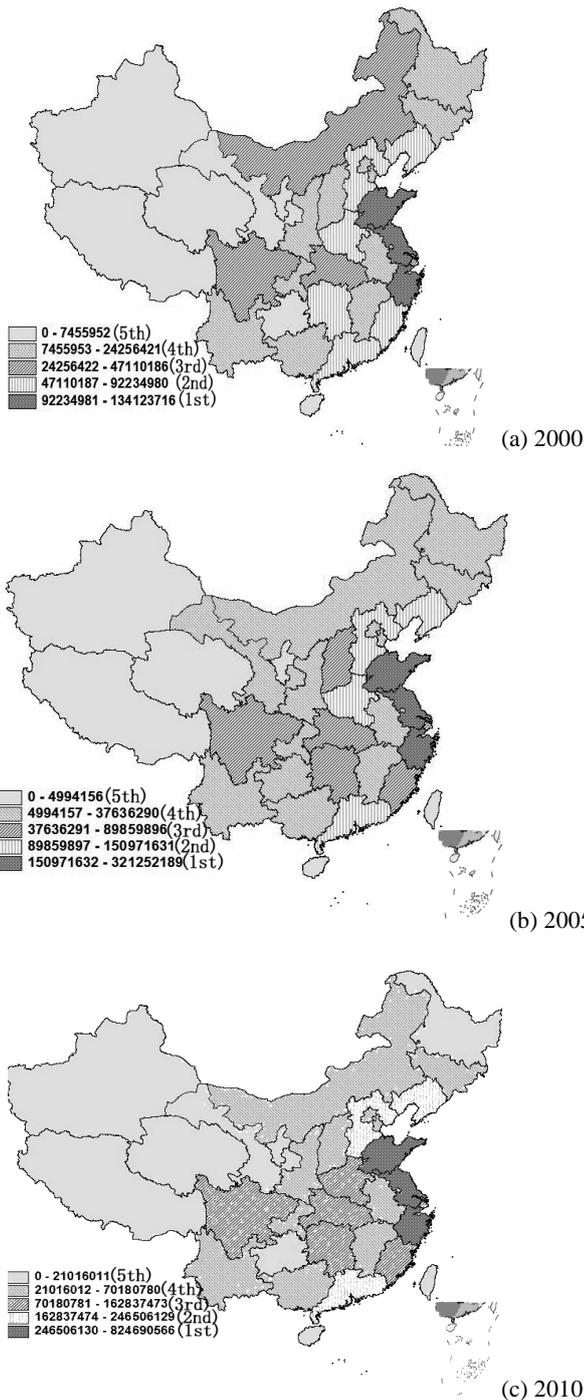


Figure.3 The spatial distribution of the enterprises' employees and its grades in 2000, 2005, 2010

located in the top three grades, too. The West except Sichuan, Shaanxi and Yunnan were in the fourth or fifth grade, according to these, we could explain the big gap among the east, the middle and the west, and could also see the core of the township enterprises distribution be moving to the east.

(2) In these ten years, the CTTO of the three zones in China were all increasing constantly, but there was still a widening gap between the east and the other parts. The CTTO of the eastern part was 7.48 billion RMB, 15.91 billion RMB, 32.09 billion RMB in 2000, 2005, 2010. That of the middle provinces were 3.06 billion RMB, 4.49 billion RMB, 6.54 billion RMB. and the values of west were just 1.07 billion RMB, 1.81 billion RMB, 3.00 billion RMB.(Fig.3) The east was 3.35 billion RMB, 9.61 billion RMB and 22.55 billion RMB higher than the middle and the west in 2000, 2005 and 2010. The polarization space feature of the township enterprises was becoming prominent.

(3) In this decade, the east was the major region absorbing the labors, its per capita CTTO was leading the whole country. The amount proportions of eastern employees in 2000, 2005 and 2010 were 51.4%, 55.6%, 63.0%; the middle's were 33.9%, 29.5%, 25.8%; the west was the least, which were 14.7%, 14.9%, 11.2% (Fig. 5). So the east has been the main labor market. Meanwhile, the per capita CTTO of ten provinces on the eastern coast of China were the top ten, showing a gradient pattern from the east to the west. (Fig. 4)

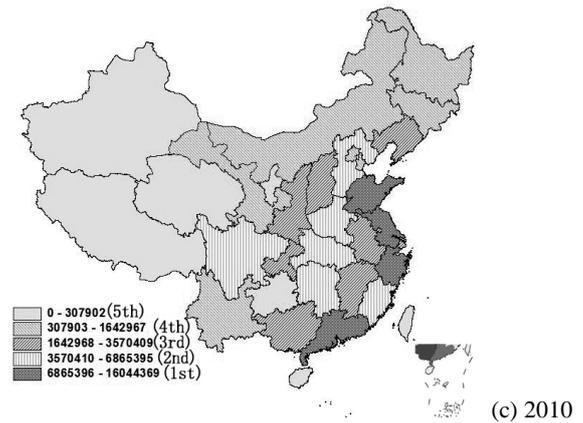
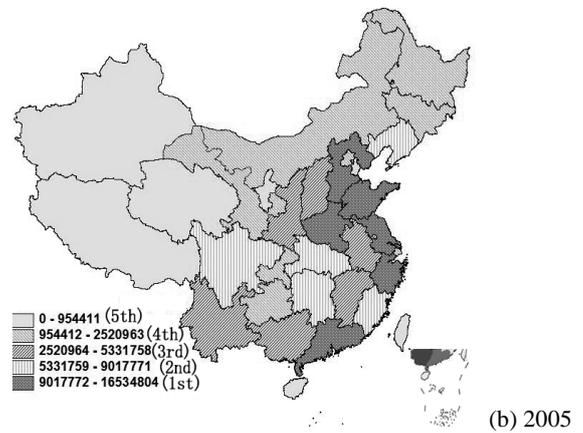
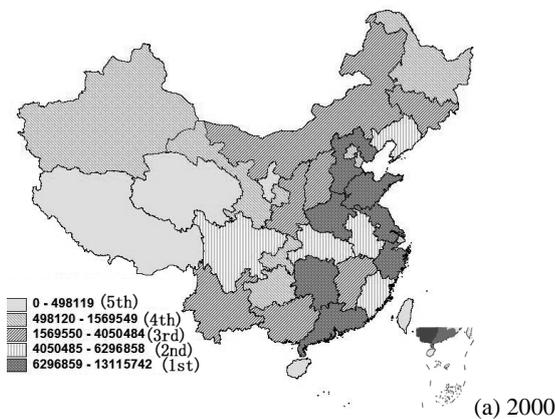


Figure.5 The spatial distribution of the enterprises' total output and its grades in 2000, 2005, 2010

#### 4 ANALYSIS OF EVOLUTION CHARACTERISTICS AND STRUCTURE OF TOWNSHIP ENTERPRISES IN EACH ZONE FROM 2000 TO 2010

In 2000-2010, the special differences of township enterprises existed not only among the three zones, but in each zone caused by different natural regional economical conditions. The strongest provinces were selected by the order index to analyze the spatial pattern and the growth rate, to grasp the ranking of each province, and to reveal the characteristics and its reason

Table.1 The top ten growth rate provinces and the order index\* of each provinces' enterprises amount and total output in 2000, 2005, 2010

| Area   | Province     | The number of township enterprise(CTEN) |                     |                     |                             |                     | The total value of out-put(CTTO) |                     |                     |                           |                     |
|--------|--------------|---|---------------------|---------------------|-----------------------------|---------------------|----------------------------------|---------------------|---------------------|---------------------------|---------------------|
|        |              | Order index Of 2000                     | Order index of 2005 | Order index of 2010 | Comprehensive order index** | Top ten growth rate | Order index of 2000              | Order index of 2005 | Order index of 2010 | Comprehensive order index | Top ten growth rate |
| East   | Jiangsu      | 8                                       | 8                   | 3                   | 6                           | 2(17%)              | 2                                | 1                   | 1                   | 1                         | 3(25%)              |
|        | Zhejiang     | 4                                       | 6                   | 2                   | 3                           | 3(15%)              | 1                                | 2                   | 3                   | 2                         | 8(19%)              |
|        | Shandong     | 2                                       | 2                   | 4                   | 2                           | 9(9%)               | 3                                | 3                   | 2                   | 3                         | 4(23%)              |
|        | Guangdong    | 3                                       | 7                   | 5                   | 4                           | -***                | 4                                | 4                   | 4                   | 4                         | -                   |
|        | Hebei        | 16                                      | 13                  | 15                  | 14                          | -                   | 8                                | 9                   | 5                   | 5                         | 7(20%)              |
|        | Fujian       | 11                                      | 16                  | 14                  | 12                          | -                   | 7                                | 8                   | 9                   | 8                         | -                   |
|        | Shanghai     | 19                                      | 25                  | 22                  | 22                          | -                   | 10                               | 6                   | 8                   | 9                         | 10(19%)             |
|        | Liaoning     | 10                                      | 12                  | 10                  | 11                          | 6(11%)              | 12                               | 10                  | 6                   | 11                        | 2(25%)              |
|        | Tianjin      | 21                                      | 24                  | 20                  | 21                          | -                   | 15                               | 16                  | 15                  | 15                        | -                   |
|        | Beijing      | 25                                      | 22                  | 24                  | 25                          | -                   | 19                               | 17                  | 19                  | 18                        | -                   |
|        | Guangxi      | 18                                      | 15                  | 11                  | 13                          | 1(20%)              | 22                               | 22                  | 22                  | 22                        | -                   |
| Hainan | 27           | 27                                      | 26                  | 27                  | -                           | 26                  | 27                               | 27                  | 27                  | -                         |                     |
| Middle | Henan        | 6                                       | 11                  | 8                   | 9                           | -                   | 6                                | 7                   | 10                  | 6                         | -                   |
|        | Hunan        | 1                                       | 1                   | 1                   | 1                           | -                   | 5                                | 11                  | 12                  | 10                        | -                   |
|        | Hubei        | 5                                       | 9                   | 7                   | 8                           | -                   | 9                                | 12                  | 11                  | 12                        | -                   |
|        | Shanxi       | 12                                      | 14                  | 18                  | 15                          | -                   | 14                               | 13                  | 13                  | 13                        | -                   |
|        | Anhui        | 9                                       | 3                   | 9                   | 7                           | -                   | 13                               | 14                  | 16                  | 14                        | -                   |
|        | Jiangxi      | 13                                      | 5                   | 13                  | 10                          | 10(8%)              | 20                               | 15                  | 14                  | 16                        | 1(25%)              |
|        | Neimenggu    | 15                                      | 20                  | 12                  | 17                          | 5(13%)              | 17                               | 18                  | 20                  | 19                        | -                   |
|        | Heilongjiang | 17                                      | 10                  | 19                  | 16                          | -                   | 18                               | 19                  | 23                  | 21                        | -                   |
| Jilin  | 20           | 21                                      | 17                  | 19                  | 4(14%)                      | 23                  | 24                               | 21                  | 23                  | -                         |                     |
| West   | Sichuan      | 7                                       | 4                   | 6                   | 5                           | 7(11%)              | 11                               | 5                   | 7                   | 7                         | 6(22%)              |
|        | Shaanxi      | 14                                      | 18                  | 16                  | 18                          | -                   | 16                               | 21                  | 17                  | 17                        | -                   |
|        | Yunnan       | 22                                      | 23                  | 23                  | 23                          | -                   | 21                               | 20                  | 18                  | 20                        | 9(19%)              |
|        | Gansu        | 24                                      | 17                  | 21                  | 20                          | -                   | 24                               | 23                  | 24                  | 24                        | -                   |
|        | Xinjiang     | 23                                      | 19                  | 27                  | 24                          | -                   | 25                               | 25                  | 25                  | 25                        | -                   |
|        | Ningxia      | 26                                      | 28                  | 25                  | 26                          | -                   | 27                               | 26                  | 26                  | 26                        | 5(22%)              |
|        | Qinghai      | 28                                      | 26                  | 28                  | 28                          | 8(9%)               | 28                               | 28                  | 28                  | 28                        | -                   |

Note: The data of Guizhou and Xizang of "township enterprises and agricultural product processing industry Yearbook" are incomplete and ignored; In order to be unified, no individuals and private enterprises; "-" means "not be listed"; Order index is the rank of indicator, the "comprehensive order index" is the ranking order of the sum of order index of 2000, 2005, 2010. More smaller index, more higher ranking

(1) In these ten years, the eastern township enterprises developed well, high-order provinces had a high growth rate. The order index indicated that Jiangsu, Zhejiang in the Yangtze River Delta, Guangdong in the Pearl River Delta and Shandong lead other provinces, a obvious gradient pattern (tab.1). Jiangsu, Zhejiang and Shandong which were high-order provinces had a CTEN annual average growth rate of 17%, 15%, 9% and ranked the 2nd, 3rd, 10th; their CTTO's were 25%, 19%, 23% which ranked the 3rd, 9th, and 4th. Shandong has a good agriculture basis and its township enterprises played an important role in the industry, to a certain extent, industrial structure adjustment and benign development made by the alliance between the township enterprises and agriculture determined Shandong a high ranking (Zheng J. et al. 2006). the more proper industrial structure, advanced service industry and technology-intensive industry, huge human resources, reform and opening-up policy, and the successful institution innovation etc. promoted the rapid development of Jiangsu and Zhejiang (Xu Z. C. 2008, Fan G. & Zhang H. J. 2005), in the recent years, through the further economic reform, these two provinces ensured their CTTO advantage in the marketization. In 2010, the CTEN and CTTO rankings of Liaoning had risen to the 10th, 11th and the growth rate respectively came to the 6th, 2nd, this benefited from the common development of industrial agglomeration and industrial parks construction, and policies of support for small and medium enterprises and stimulating domestic demands (Wang H. 2009).

(2) In the middle region, no matter the CTEN or CTTO, southern provinces were better than the north, and Hunan, Henan in 2000-2010 stayed in the front. However, Jiangxi is closing. (Tab.1) Hunan as an agriculture product base and the processing and manufacturing base have promoted township enterprises development through the agriculture industrialization and the investment to the industry energetically (Li L. L. et al. 2004). Township enterprise development of Henan has been in the front of the middle area (Li L. L. et al. 2004, Xiong L. M. 2003), since 2001, Henan has established the institutional reforms and has been encouraging the development of township enterprises to ensure its life (Jiao Z. Y. 2011-1-1). Before 2000, Jiangxi developed primary agricultural processing industry and had a low industry level to result in a backward economy (Luo L. Z. & Xu K. Y. 2003). After joining the WTO, Jiangxi achieved a second rise, annual growth rate of 25%, which relied on its outstanding agricultural resources, smaller resistance to access to the market, international technical communication and cooperation and the rise of central China.

(3) Development of western enterprises was uncoordinated, a special pattern of one province strong and others weak. In ten years, Sichuan with

the CTEN and CTTO annual average growth rates of 11%, 22% kept ahead of Shaanxi in the second place of west, no narrowing trend.. Qinghai and Ningxia ranked at the bottom. (Tab.1). The reasons are: First, the entire western region has a low economic level; development of township enterprises is late; departments structure is unbalanced, economic spatial structure is decentralized; leading role of the center is not strong; a slow process of market leads a weak competition and a serious lack of funds and investment (Li X. L & Sun K. Y. 2013, Nie Y. 2008). Second, Sichuan as a big agricultural province has a large township enterprises scale and professional enterprise management talents which widen the gap between Sichuan and other western provinces. The rapid development is a good experience for others.

## 5 CONCLUSIONS

Through the three indicators analysis for the spatial evolution pattern of the township enterprises, the main characteristics and tendencies of evolution among and in the three zones were fully recognized. It will play an important role in township enterprises spatial layout, region development and direction of strategy. By studying evolution characteristics of the township enterprises in the nationwide scale in a recent decade, and after the analysis of inter-regional and intra-regional pattern by the three indicators, the spatial development, evolution law as well as the future tendency of the township enterprises were given by this paper:

(1) In the ten years, the amount, total output value and employees of township enterprises continued to increase, the overall development tended to be stable. However, the growths speed and amplitude of the CTEN, CTEE and CTTO were not synchronized. The employees grew slowly, meanwhile, the quantity of enterprises increased a lot after 5 years, growth amplitude of the CTTO was the most significant.

(2) Spatial pattern of the township enterprises tended to be a further agglomeration, the agglomeration degree of CTTO was the higher than CTEE's and CTEN's. To 2010, the coefficients of variation based on three indicators were all greater than 1.0, which meant the nationwide spatial layout of the township enterprises tended to be agglomerative, especially in the recent 5 years.

(3) The differences in the three zones in the last 10 years indicated that the gap of CTEE and CTTO between the east and other two parts was increasing continually. The opening-door economy and regional preferential policies made eastern area more competitive. In contrast, the inherent shortage and low industrial structure of Midwest areas constrain the future development too much.

(4) Spatial evolution pattern of township enterprises in the three zones had also shown a non-

equilibrium characteristic. The number of developed provinces in eastern area is more than others. Intra-regional differences are also significant, and the agricultural resources began to play a dominant role. The eastern areas had more competitive provinces, Yangtze River Delta, Pearl River Delta and Liaoning province are the most competitive units; As for the middle, Hunan and Henan provinces played a leadership role, but Jiangxi province enhanced further by taking advantage of resources and geography. In western areas, Sichuan continued to lead other provinces by relying on the better conditions and the developed foundation.

The spatial evolution pattern law of china's township enterprises was not only portrayed by the local environmental conditions, resources and historic background and many other long-term factors, but also the extension of a variety of local factors in future development of township enterprises. In this process, the role of local environmental factors becomes profound. Based on the existing spatial pattern and law of evolution, in the process to the future industrial layout strategic arrangement and policy-making of China's township enterprises, appropriate rules and conditions for local development, local conditions should be considered, forming a differentiated development path; Eastern, central and western zones should be combined with its own characteristics, highlight the elements and advantages on each region, and strengthen regional competitiveness. some areas especially the strongest, more important and general regions should take different paths and strategies to improve the efficiency of the spatial organization and competitiveness of township enterprises.

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