The Urban Spatial Structure, Regional Coordinated Development and New Urbanization of the Central Plains Urban Agglomeration

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Abstract

This paper investigates the urban spatial structure characteristics and evolution of 30 prefecture-level cities in Central Plains urban agglomeration, measures the regional coordinated development level and evolution characteristics of Central Plains urban agglomeration, and puts forward some policy suggestions to promote new urbanization. The research results show that the city scale distribution of the Central Plains urban agglomeration presents a flattening characteristic and has a trend of averaging. The regional coordinated development level of the Central Plains urban agglomeration changes from an uncoordinated development state to a coordinated development, but there are differences in the coordination degree of different cities. The policy implications of this paper are that actively promoting the balanced development of urban scale in Central Plains and realizing the scale distribution pattern of multi-center cities are the important directions to promote the coordinated development of Central Plains and the new urbanization.

Keywords

Urban spatial structure; Regional coordinated development; New urbanization.

1. Introduction

Urbanization is a basic problem in the process of China's modernization, and it is a big strategy and a big problem (Li Keqiang, 2012). Different from the traditional urbanization model. The new urbanization model is guided by the scientific outlook on development, adheres to the principle of "comprehensive, coordinated and sustainable promotion", takes population urbanization as the core content, takes informatization, agricultural industrialization and new industrialization as the driving force, takes "inclusive growth" as the development mode, and takes "government guidance and market operation" as the mechanism guarantee. Take the path of sustainable development and build a China city integrating urban and rural areas (Ni Pengfei, 2013). Throughout the process of urbanization in my country since the reform and opening up, the distribution status of the urban system is that small and medium-sized cities have developed too much and large-scale urban agglomerations are relatively insufficient. , 2000). There is a big gap between the conclusions (Chen Wenliang, Yang Kaizhong, 2007). The reason is that traditional urbanization places too much emphasis on speed, and emphasizes the administrative-led urbanization promotion model for population concentration (Li Qiang et al., 2012). But ignores In the process of urbanization, the impact of the urban spatial structure and the linkage mechanism of the regional income gap on the flow of factors and industrial transfer has led to the continuous widening of regional differences (Chen Wenliang, Yang Kaizhong, 2007). Therefore, it is necessary to study the relationship between urbanization and urban spatial structure in depth. So as to promote the optimization of resource allocation and the coordinated development of regional economy with a reasonable urban spatial structure, thus promoting new urbanization.

2. The Overall Characteristics and Evolution of Urban Spatial Structure of Central Plains Urban Agglomeration

2.1. The General Characteristics of the Urban Spatial Structure of Central Plains

The Central Plains urban agglomeration development plan (2016) points out that the Central Plains urban agglomeration takes 14 cities such as Zhengzhou City in Henan Province as the core development area. Linkage radiation to other cities in the Central Plains Economic Zone. Later, the opinions of the CPC Central Committee and the State Council on establishing a more effective new mechanism for regional coordinated development (2018) issued by the CPC Central Committee and the State Council clearly pointed out that we should take Zhengzhou as the center and lead the development of Central Plains urban agglomeration. On the whole, the urban spatial distribution of 30 prefecture level cities in the Central Plains urban agglomeration shows an obvious three-tier structure of center periphery. Among them, Zhengzhou is the core city level, which reflects the most concentrated characteristics of population, factors and resources. Anyang City, Hebi City, Puyang City, Xinxiang City, Jiaozuo City, Jiyuan City, Luohe City and Pingdingshan City in Henan Province, Handan City in Hebei Province, Liaocheng City in Shandong Province, Jincheng City in Shanxi Province and Huaibei City in Anhui Province are the middle level. The remaining cities of the Central Plains urban agglomeration are peripheral levels. As the capital city of Henan Province, Zhengzhou has a high degree of urban primacy, with obvious advantages in agglomeration, and serious differentiation among other cities.

2.2. The Evolution of the Urban Spatial Structure of the Central Plains Urban Agglomeration

Since the reform and opening up, with the rapid development of China's economy and the gradual advancement of urbanization, the distribution of urban scale has been changing constantly. Through comparative analysis of the evolution process of urban spatial structure of Central Plains urban agglomeration since the reform and opening up, it is shown that:

2.2.1. The Urban Density Increased Significantly

In the early stage of reform and opening up, the single-city framework of the Central Plains urban agglomeration was small and relatively scattered, mainly concentrated in northern Henan and the north. With the economic development, especially the vigorous development of the transportation infrastructure marked by high-speed railways in recent years, a large number of people are rapidly gathering in cities and towns, and the siphon effect of big cities is obvious. On the one hand, the population of various prefecture-level cities poured into capital cities such as Zhengzhou, which promoted the continuous expansion of Zhengzhou's scale and continued development trend. On the other hand, the population at or below the county level is concentrated in prefecture-level cities, which increases the urban density of all prefecture-level cities in Central Plains. As the first city in the Central Plains urban agglomeration, Zhengzhou's position is becoming more and more obvious and consolidated.

2.2.2. Significant Differences in Urban Scale Expansion

Since the reform and opening up, the urban scale of all cities covered by the Central Plains urban agglomeration has expanded significantly, which is consistent with the law of urban scale change caused by population concentration, but there are obvious differences among cities. This is because, affected by many factors such as location, scale, infrastructure, government policies and so on, the urban scale of the Central Plains region presents differentiated changes. For example, under the policy of urban integration, Zhengzhou and surrounding cities such as Kaifeng, Xuchang and Xinxiang are gradually integrated into a whole, which promotes the rapid development of related cities, and at the same time leads to the faster expansion of city scale,

resulting in the unbalanced distribution of urban system scale.

2.2.3. The Flattening Degree of Urban Distribution Changes Obviously

The flat feature means that the scale distribution of the city system is more balanced than the Zipf distribution. The size distribution of the city system of the Central Plains urban agglomeration was quite different in the initial stage of reform and opening up, and then it showed a flattening trend, which does not comply with Zipf's law. The reason for this phenomenon is that the Central Plains urban agglomeration with Henan Province as the core area has a population of more than 100 million. Since the 1990s, cross city, cross provincial and cross regional flows have been more frequent and large-scale, and a large number of rural people have poured into cities. In particular, the natural population growth rate of Zhengzhou, the provincial capital, was as high as 19.0% in 1990, and the growth rate exceeded 10% between 1987 and 1991. The rapid concentration of population has led to a widening gap in the size of the city, increasing the city's primacy in Zhengzhou. Subsequently, due to the rising cost of living in big cities and the emergence of urban diseases, the population flow once showed the characteristics of backflow, and some of the population returned to their hometown counties and other prefecture-level cities, and the distribution of urban system showed the characteristics of flattening. However, according to the results of the seventh census of Henan Province, Zhengzhou is a city with a permanent resident population of more than 10 million in all cities of the Central Plains urban agglomeration, an increase of 3.97 million over 2010. This is due to the improvement of transportation infrastructure, the attraction of education, medical treatment and other conditions, and the obvious improvement of Zhengzhou's population agglomeration capacity. This reduced the flatness of the urban system distribution of the Central Plains urban agglomeration to a certain extent.

3. Measurement and Analysis of Regional Coordinated Development Level of Central Plains Urban Agglomeration

3.1. Measurement of Regional Coordinated Development Level of Central Plains Urban Agglomeration

Build an indicator system. Regional coordinated development involves the development and aggregation of subsystems such as economic development level, social harmony, ecological environment, science, technology and culture. Based on the compilation principles of scientificity, integrity, dynamic guidance and stability, this paper constructs the index system of regional coordinated development level of Central Plains urban agglomeration.

Measurement method. The measurement methods of regional coordination level in the central plains are as follows: firstly, the original data such as per capita GDP and energy consumption per unit GDP are adjusted accordingly.Secondly, the benefit index and cost index are treated in the same direction.Thirdly, referring to the existing practice (an Lin et al., 2007), the weight of each index is determined by entropy method to calculate the quality development index of each urban subsystem.Finally, the coordination degree of each urban subsystem is calculated and corrected.Finally, the calculated coordinated development degree of local cities is between 0 and 1. The larger the value, the more coordinated the regional development is. Less than 0.4 means uncoordinated, between 0.4 and 0.6 means uncoordinated, between 0.6 and 0.8 means relatively coordinated, and more than 0.8 means coordinated. The data involved in this paper are all from China Statistical Yearbook, China Urban Statistical Yearbook, statistical yearbooks of relevant provinces and prefecture-level cities, etc. The data processing software is stata15.1.

3.2. Analysis on Regional Coordinated Development Level of Central Plains Urban Agglomeration

According to the above measurement method, this paper selects the panel data of 30 cities in

Central Plains urban agglomeration from 2009 to 2019 to measure the coordinated development level of Central Plains.

Table 1. 2009-2019 coordinated development level of cities in Zhongyuan Urban Agglomeration

City	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Handan	0.2811	0.3683	0.3220	0.3251	0.3832	0.5263	0.4560	0.5488	0.5893	0.6839	0.7946
Xingtai city	0.3379	0.4914	0.3785	0.3684	0.5180	0.5472	0.5498	0.5605	0.5232	0.6527	0.7612
Changzhi City	0.2911	0.3091	0.2639	0.3390	0.5944	0.5532	0.4552	0.4281	0.5627	0.6151	0.5142
Jincheng	0.3587	0.3227	0.2709	0.4157	0.4544	0.3623	0.4485	0.2196	0.5448	0.5881	0.6526
Yuncheng	0.3912	0.3992	0.3352	0.4917	0.4181	0.5585	0.4431	0.2205	0.3152	0.3475	0.4115
Bengbu	0.4014	0.3698	0.3551	0.3805	0.3925	0.4913	0.3691	0.4015	0.5976	0.7163	0.7438
Huaibei City	0.4739	0.3771	0.2861	0.3946	0.4009	0.5009	0.4936	0.4823	0.6099	0.5848	0.6462
Fuyang City	0.2925	0.3082	0.4068	0.5397	0.4794	0.4446	0.3869	0.4051	0.5485	0.6272	0.5401
Suzhou City	0.2916	0.3033	0.3757	0.4217	0.4814	0.4790	0.4014	0.3636	0.5508	0.5231	0.4694
Bozhou City	0.3690	0.2977	0.3036	0.3473	0.3783	0.4339	0.3148	0.4088	0.5450	0.5962	0.6177
Liaocheng	0.3550	0.4015	0.3020	0.2807	0.3841	0.3680	0.4159	0.4027	0.5405	0.5326	0.5950
Heze City	0.3048	0.2519	0.2407	0.2919	0.3783	0.4420	0.4847	0.3843	0.5304	0.6548	0.6155
Zhengzhou City	0.2643	0.2849	0.3084	0.4069	0.5205	0.5468	0.5054	0.4580	0.6771	0.5392	0.7555
Kaifeng	0.2928	0.2913	0.2428	0.4256	0.3581	0.4467	0.4186	0.4544	0.6367	0.6770	0.7715
Luoyang City	0.2320	0.2498	0.2229	0.2695	0.4811	0.5099	0.4742	0.4754	0.6174	0.5894	0.7838
Pingdingshan	0.3551	0.3104	0.2787	0.3591	0.4716	0.5042	0.4561	0.4592	0.6638	0.6649	0.7214
Anyang	0.3805	0.3621	0.3117	0.4058	0.4972	0.4845	0.4379	0.5538	0.6904	0.5891	0.7301
Hebi City	0.3183	0.3064	0.2261	0.3449	0.3057	0.4438	0.3610	0.4189	0.5817	0.5873	0.8814
Xinxiang City	0.4313	0.3566	0.3532	0.4273	0.5089	0.5204	0.4888	0.5097	0.7369	0.7046	0.8957
Jiaozuo	0.2826	0.2166	0.2473	0.2727	0.3869	0.4009	0.4148	0.4192	0.6501	0.5775	0.7644
Puyang City	0.3096	0.2981	0.3324	0.4827	0.4688	0.5178	0.4990	0.4766	0.5504	0.6344	0.7786
Xuchang City	0.2343	0.3059	0.2569	0.4506	0.3992	0.4288	0.4740	0.3972	0.5309	0.5590	0.6918
Luohe City	0.3786	0.3571	0.3615	0.4708	0.5751	0.5922	0.4880	0.4770	0.3689	0.5401	0.5875
Sanmenxia	0.3183	0.3736	0.2923	0.3956	0.4415	0.3993	0.4286	0.4244	0.6827	0.7364	0.7537
Nanyang City	0.3765	0.3786	0.3445	0.4357	0.5047	0.5159	0.4861	0.5527	0.7329	0.7214	0.7088
Shangqiu	0.3788	0.3528	0.4126	0.4094	0.5070	0.5423	0.4289	0.4493	0.5617	0.6502	0.6189
Xinyang City	0.2849	0.2626	0.2502	0.4255	0.4293	0.4388	0.4343	0.4569	0.6142	0.5459	0.6732
Zhoukou City	0.3741	0.3408	0.3366	0.3390	0.4399	0.4002	0.3448	0.4499	0.5706	0.6048	0.7502
Zhumadian	0.2150	0.2469	0.2682	0.3757	0.3606	0.4085	0.3642	0.4820	0.5565	0.6485	0.7758
Average value	0.3302	0.3274	0.3064	0.3894	0.4455	0.4761	0.4387	0.4393	0.5821	0.6101	0.6898

Measurement results show that: Before 2017, all cities in the Central Plains were in an uncoordinated or uncoordinated development state (less than 0.6), and after that, the coordinated development level of most cities continued to improve. From a horizontal perspective, the overall development level of dispatching in all cities increased, but fluctuated in some years. Compared with 2019 and 2009. It is found that Zhumadian City increased the fastest and Yuncheng City the slowest, which shows that the effect of urban coordinated development strategy is remarkable, but uneven. The average value is used to express the level of coordinated development of the Central Plains region during the entire inspection period. It is found that the degree of coordinated development of more cities fluctuates in certain years during the inspection period. Longitudinally, in 2009, the minimum degree of development coordination in Central Plains was 0.215 in Zhumadian City and 0.4739 in Huaibei City, and there was a big difference in the level of coordinated development among cities. This difference has changed greatly by 2019, with a minimum of 0.4115 in Yuncheng City and a maximum of

0.8957 in Xinxiang City.

4. Policy Recommendations for Promoting New Urbanization

4.1. Enhance the City's Innovation Ability and Accelerate the Industrial Agglomeration of Urban Agglomerations

Zhengzhou is the central city of the Central Plains urban agglomeration, which has strong innovation ability. It can continue to cooperate with universities and research institutes, increase investment in scientific research and development, and actively introduce innovative enterprises. For some prefecture level cities with lagging innovation ability, we should pay more attention to the introduction of talents at home and abroad, improve the hard environment and soft environment as much as possible, and introduce innovative talents, powerful scientific research teams and research centers at home and abroad. Actively promote the construction of high-tech industrial parks, high-tech business incubators, engineering technology centers, characteristic industrial bases, etc., and gradually realize industrial clusters with innovative capabilities.

4.2. Optimize the Urban Spatial Structure and Accelerate the Process of New Urbanization

New-type urbanization is the backbone of my country's economic and social stability, and it is also an important support for my country's comprehensive construction of a well-off society, and it is of great significance. As the main form of urbanization, urban agglomeration has always played a strong driving force in economic and social development with its unique economic characteristics. Therefore, to speed up the new urbanization process in the Central Plains urban agglomeration, it is necessary to promote regional coordinated development and highlight the concept of fairness in urban development. Previous studies have shown that the development path focusing on small and medium-sized cities is more conducive to the improvement of economic efficiency (Glaeser et al., 2015). Specifically, the "invisible hand" of the market and the "visible hand" of the government should work together to form an integrated development pattern of "government guidance + market leadership". The rapid development of small and medium-sized cities promoted by policy support will continue to Optimize the urban spatial structure, gradually form a pattern of promoting regional economic integration with market thinking, and accelerate the process of new urbanization of the Central Plains urban agglomeration.

4.3. Promote Coordinated Regional Development and Improve the Quality of New Urbanization

To effectively improve the quality level of new urbanization, besides optimizing the urban spatial structure of Central Plains urban agglomeration, it is also necessary to continuously promote the regional coordinated development of Central Plains urban agglomeration. On the one hand, it is necessary to earnestly formulate and implement relevant economic policies, and encourage the traditional industries of core-level cities such as Zhengzhou and Luoyang to spread to second-and third-level cities in an orderly manner, so as to form a spatial distribution pattern of cities focusing on small and medium-sized cities. On the other hand, small and medium-sized cities should make use of the situation to adjust and improve the industrial structure, make full use of the spillover effect of industrial agglomeration, promote the coordinated development of regional economy while improving economic efficiency, and improve the new urbanization quality of Central Plains urban agglomeration. In addition, in order to realize the coordinated development of large cities, small towns and new rural communities, the focus of urbanization tends to vigorously promote the development of small and medium-sized cities, and strive to form a four-tier new urbanization system with central

cities, county coordination, characteristic towns and beautiful villages.

4.4. Give Full Play to the Guiding Role of the Government and Make Overall Arrangements for New Urbanization

The Central Plains urban agglomeration is a national-level urban agglomeration, including 30 prefecture-level cities, involving 5 provincial-level administrative regions. It is particularly important to break through the administrative division between regions and effectively avoid the misallocation of resources caused by excessive competition among local governments in urban agglomerations and the waste of social resources caused by repeated construction. This requires giving full play to the government's guidance and coordination function, and planning and implementing the new urbanization pattern from the overall perspective. Firstly, in the new urbanization layout of urban agglomeration, we should guide the effective and reasonable distribution of urban scale and urban positioning, pay attention to the docking and sharing of infrastructure between central cities and surrounding cities, and actively promote industrial division and cooperation among cities. Secondly, under the guidance and coordination of the government, formulate and improve relevant policies to promote the rational flow and optimal allocation of resources and elements in the new urbanization process of the Central Plains urban agglomeration, and encourage the formation of cross-regional markets and the construction of public markets. Finally, we should give full play to the government's macro-control role, effectively combine the macro-control policies with the micro regulation of the market, guide the benign operation of the market through the formulation of relevant economic laws and regulations, and constantly improve the bottom-up guarantee mechanism of relevant systems. On this basis, continuously optimize the layout of urban spatial structure in Central Plains cities, promote the coordinated development of regional economy, and accelerate the process of new urbanization.

Acknowledgments

References

[1] Wang Fazeng New urbanization road of Central Plains Economic Zone [J] Economic geography, 2010, 30 (012): 1972-1977.

[2] Fan Jianyong, Xie Qiangqiang Local market effect of inter regional industrial distribution and Its Enlightenment to regional coordinated development [J] Economic research, 2010 (04): 108-120 + 134.

[3] Liu Xiuyan, Qin Meng, Li Songlin Urban spatial structure and workers' wage income [J] World economy, 2019, 42 (04): 125-150.

[4] Fan Shide, Jiang Debo Labor mobility, industrial transfer and regional coordinated development -- from the perspective of literature research [J] Industrial economic research, 2014 (04): 103-110.

[5] Chen Lu, Liu Xiuyan, ye Xinyue, et al Industrial agglomeration and industrial spatial governance from the perspective of Urban Agglomeration: measurement of machine learning algorithm [J] China industrial economy, 2020, No. 386 (05): 101-119.

[6] Zhou Chunshan, ye Changdong Review on the research of urban spatial structure in China [J] Progress in geographical science, 2013,32 (07): 1030-1038.

[7] Hu Jiquan Research on the development of new urbanization in China [D] Southwest Agricultural University, 2005.

[8] Pang Yuping Optimization of regional spatial structure and regional coordinated development in China [D] Wuhan University, 2018.