Clustering Analysis on the Urbanization Development with Jilin Characteristics

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Abstract. This paper explored the clustering characteristics of the urbanization of county-level areas in Jilin province, which located in the central of Northeast China. In general, the urbanization development of Jilin province still lies in preliminary stage, which means there lacks of sufficient industrial supporting capacity. To promote the urbanization development with Jilin characteristics, improving the quality of urbanization powered by system and mechanism innovation around the 'innovation, coordinating, green, open, safe' five big idea should be the focus. The local authority should take the space extension strategy of 'strengthening the central, building the pivot, interconnecting different regions' as well as pay more attention to the accumulative and leading role of the urban agglomeration of central Jilin, to build the pattern of 'one cluster and three groups, two axes and one cycle'.

Introduction

Urbanization is the inevitable demand of industrialization. Meanwhile, it is also the inevitable trend of economic and social development. Accelerating the development of urbanization is not only an important way to balance the 'three modernizations' and change the pattern of economic development, but also an important engine for expanding domestic demand and promoting a new round of economic development. It is the only way to break the dual structure of urban and rural areas, solve the dilemma of agriculture, rural areas and farmers' and promote the integrated development of urban and rural areas.

Status of the Development of Jilin Urbanization

Jilin province, located in the hinterland of northeast China, lies in the geometric center of northeast Asia composed of Russia, Korea, Korea, Mongolia, Japan and northeast China. It borders Russia in the east, Inner Mongolia autonomous region in the west, liaoning province in the south, heilongjiang province in the north, facing North Korea across tumen river and yalu river in the southeast. The administrative division of Jilin province includes nine prefecture-level cities, namely, changchun, jilin, siping, songyuan, baicheng, liaojuan, tonghua, baishan and yanbian Korean autonomous prefecture and two directly administrative county-level cities, namely, meihokou and gongzhiling. The urbanization development of jilin province mainly experienced four different stages: rapid development after the founding of the People's Republic of China, the fluctuated decline during great leap forward, three years of natural disasters and the cultural revolution, rapid development after the reform and opening up, and slow development since the 21st century.

In recent years, promoting urbanization has been viewed as an important measure to 'stabilize growth and optimize structure' and improve people's livelihood, and thus the development of urbanization has made remarkable achievements. In 2013, the province had 14.912 million permanent urban residents, with an urbanization rate of 54.2 percent. The number of cities reached 29, including 2 large cities with a population of more than one million, 2 medium-sized cities with a
population of more than 500,000, 8 small cities with a population of more than 200,000, 17 small towns with a population of less than 200,000 and 434 incorporated towns.

With the continuous improvement of urbanization rate, the urban industrial agglomeration effect has been preliminarily manifested: the total economic output of the province's 113 development zones (industrial concentration areas) accounts for 65.3% of the province, the fiscal revenue accounts for 50.7%, and the industrial added value above the scale accounts for 82%. At the same time, the comprehensive carrying capacity of urban areas has been improved comprehensively: the rate of public water supply in urban areas has reached 93.5%, the penetration rate of gas in urban areas has reached 89.5%, the rate of harmless treatment of urban household garbage has reached 72%, and the rate of centralized treatment of sewage has reached 83%. The number of primary school teachers, medical beds and health technicians per 10,000 people is among the highest in the country, and the coverage of basic medical insurance for the permanent urban population is 93.8 percent.

**Clustering Analysis on the Development of Jilin Urbanization**

In 2017, the population urbanization rate of Jilin provincereached 49.60 percent, with the urbanization rate of songyuan, baicheng, siping and changchun lower than the provincial average, while the urbanization rate of baishan, yanbian, jilin and tonghua higher than the provincial average.

![Figure 1. The Average Value of Population Urbanization Rate for 60 County-level Cities.](image)

From the point of county urbanization rate change, 60 county (district) population urbanization rate rose from 52.81% in 2012 to 54.17% in 2017, the average annual growth of 0.91%. To better identify the province county urbanization development characteristics, we take the population urbanization rate as the research object of 60 county (municipal districts) clustering analysis.
From the point of clustering results, the urbanization development of 29 counties, namely, Huadian, Huinan, Meihhekou, Zhenlai, Daan, Shuangliao, Jiaohe, Ji’an, Banshi, Tonghua, Taonan, Gongzhuling, Dongfeng, Liuhe, Tongyu, Qian’an, Jiutai, Shulan, Fuyu, Yushu, Nong’an, Dehui, Dongliao, Changling, Shuangyang, Yongji, Lishu, Yitong, Qiango, are at the relatively low level. On the contrary, 31 counties, namely, Nanguan, Kuancheng, Chaoyang, Erdao, Luyuan, Changyi, Longtan, Chuanying, Fengman, Tiexi, Tiedong, Longshan, Xi’an, Dongchang, Erdaojiang, Hunjiang, Jiangyuan, Susong, Jingyu, Changbai, Linjiang, Ningjiang, Changling, Taobei, Yenji, Tumen, Dunhua, Hunchun, Longjing, Helong, Wangqing, Antu are in a relatively high development level of urbanization.

In order to better understand the relationship between urbanization and economic development stage, we also took two important indicators of per capita GDP and population urbanization rate at the county level as attributes, and conducted k-mean clustering analysis on 48 prefecture-level (county-level) cities in the province. For comparison purposes, we grouped the 48 prefecture-level cities into four categories.
Figure 4. The Clustering Result of 48 County-level Districts.

Figure 4 shows the clustering results. Clearly, 12 districts, namely, Yanji, Baishan, Fusong, Longjing, Linjiang, Jingyu, Changbai, Huadian, Jilin, Liaoyuan, Meihekou and Changchun are located in the first quadrant, and all of them are in the stage of mutual support with higher economic growth rate and higher urbanization rate. Seven regions, namely, Tumen, Hunchun, Helong, Wangqing, Antu, Dunhua and Yanbian are in the second quadrant. Other 13 regions, namely, Tonghua, Huinan, Baicheng, Shuangliao, Siping, Da'an, Taonan, Tongyu, Shulan, Yitong, Liuhe, Lishu, Yongji are located in the third quadrant, and all of them stay in the primary stage of sluggish economic growth and low level of urbanization. Besides, 16 areas, namely, Tonghua county, Qian'an, Dehui, Qianguo, Songyuan, Panshi, Dongliao, Changling, Nong'an, Fuyu, Yushu, Zhenlai, Taobei, Jiangyuan, Jiaohe are located in the fourth quadrant and they all lie in the initial stage of rapid economic growth while not high urbanization rate.

Summary

There is unique objective law in urbanization development. To promote the urbanization with Jilin characteristics, the local government should reasonably grasp the policy orientation, seize the favorable opportunity of constructing Harbin-Changchun city cluster, and cooperate with the effective implementation of Changjitu development and opening up pilot zone strategy. The core of the new urbanization is the urbanization of people. To promote the urbanization development with Jilin characteristics, improving the quality of urbanization powered by system and mechanism innovation around the 'innovation, coordinating, green, open, safe' five big idea should be the focus. The local authority should take the space extension strategy of 'strengthening the central, building the pivot, interconnecting different regions' as well as pay more attention to the accumulative and leading role of the urban agglomeration of central Jilin, to build the pattern of' one cluster and three groups, two axes and one cycle'.
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