Comprehensive Evaluation on Urban Competitiveness—A Case of Xinjiang Province

WAN Qiu-cheng

College of Business, Shihezi University, Wujiaqu 831300, China

Abstract This paper constructs the index system and econometric model of comprehensive evaluation on urban competitiveness, then adopts the factor analysis method to measure the urban competitiveness of 22 prefecture-level cities in Xinjiang Province. The 22 prefecture-level cities are divided into four levels according to the measurement result. Comprehensive analysis of the advantages and disadvantages of the cities in each level is carried out. And related countermeasures and proposals on how to improve the urban competitiveness of the 22 cities are put forward.

Key words Urban competitiveness; Factor analysis; Xinjiang Province; China

With the emergence of a knowledge-based economy and the continuous advance of the wave of globalization, urban competitiveness research has aroused widespread concern in the world.

As a developing country, the central position and the ‘engine’ role of China become more prominent in the regional and national development. However, different urban agglomeration and allocation of production factors have different abilities to create wealth. Therefore, the correct understanding and evaluation of city competitiveness will contribute to a correct understanding of the city’s own situation, as well as the obtaining of the advantages and disadvantages of competitors and partners, and making the correct competition and regional cooperation strategy. Thus it will contribute to the reasonable and orderly competition among cities and will help promoting the rational development of regional economy.

1 Connotation of urban competitiveness

Urban competitiveness refers to a city’s ability to create wealth and to promote the region, country and even the world to create more social wealth, compared with other cities. It is a comprehensive reflection of the production capacity, life quality, social progress and external influence of a given city in a given period. This definition emphasizes the relationship between urban area and region, and the main body of urban competitiveness is city. To be specific, urban competitiveness should include 7 aspects including economic strength, industrial structure and efficiency, scientific and technological innovation level, government’s management ability, financial strength, cities’ ability to communicate with the outside world, urban infrastructure and service facilities. Among them, economic strength is the base of economic development and the city’s comprehensive competitiveness, which is manifested mainly in the economic output per capita level, economic structure and so on. Industrial structure and efficiency is the external performance of urban competitiveness, and is an important feature of urban development. The development of leading industries directly determines the level of economic growth in cities. Scientific and technological innovation level is the support element of urban development, and the driving force for urban development. Technology development and the improvement of the quality of population have a pushing effect on urban competitiveness. Government’s management ability reflects the government’s ability to allocate the resources, and has significant effect on urban competitiveness. Efficient government supervision can provide a good institutional environment for the upgrading of urban competitiveness. Financial strength reflects the potential for urban development, and it is an important component of urban competitiveness. Input and accumulation of funds can promote the economic growth in this region. Cities’ ability to communicate with the outside world determines the position in the country and even the world. Improvement of the communication ability of city can effectively speed up the process of urbanization, enhance the economic strength and international status, and affect the level of urban competitiveness. The urban infrastructure and service facilities are the material basis for the survival of a city, and are the prerequisite and guarantee of social development. A perfect infrastructure can enhance the attractiveness and gathering force of a city, and guide the flows of capital, technology, information and elements.

2 Research perspective and evaluation index system of urban competitiveness

2.1 Research perspective Accompanied by the expansion of inter-city competition in both breadth and depth, the majority of scholars, media, institutions and government have attached great importance to the research on urban competitiveness.

However, the current study are from the view of country or economic zone, few are from the perspective of provincial cities and towns. The former can be used to display a large area and a wide range of competition, which makes the inter-provincial and trans-basin inter-city comparison easier, and is conducive for cities to understand their own strength and position at a higher level. The disadvantage is the difficult reflection of the
restriction and impact of local development environment on urban competitiveness. Moreover, the research has reference value for only one city's development due to the spanning of a certain administration boundary, but has little reference for the correct understanding of the city's position in provincial cities and towns, for the labor division and collaboration among cities, or for the strategy making of provincial city development. Hence, this paper carries out preliminary discussion on the urban competitiveness from the perspective of provincial cities and towns system.

Researches on provincial urban competitiveness are different from those on nationwide urban competitiveness. Investigation on nationwide urban competitiveness shows that there are great differences in the type and strength of a city as well as its status in the entire national economy due to the relatively large geographical span and the significantly different urban development conditions. Therefore, the emphasis and index system of urban competitiveness evaluation are different from those of urban competitiveness in provincial area. The former mainly examines the city's ability to compete, focuses on the core competitiveness of a single city, and reflects the city's ability of self-development; its macro-environment is the national or international background; the degree of openness, financial conditions and other factors have important impact on the urban competitiveness. While the latter is to discuss the cities' position in the geographical division of the province and the possibility and ways for carrying out the division of labor. It pays more attention to the city's comprehensive competitiveness, and reflects the leading role of city in regional development. Its macro-environment is a given province; the effects of administration status, traffic condition and increase efficiency on urban competitiveness are more significant. Besides, researches on urban competitiveness in the scope of province should also consider the role of provincial government in urban development. Because the government is certain to give the cities, which have made outstanding contributions to the regional development, more opportunities and preferential terms in order to promote the development of the whole region. Therefore, we must start from a specific provincial situation in the research on provincial urban competitiveness, with the guidance of comparative advantage theory and competitive advantage theory. This not only reflects the socio-economic development level of city and its future development potential, but also embodies the ability of city to participate in competition and the driven and promotion role of city in the development of the whole region.

When studying on provincial urban competitiveness, we should compare the urban competitiveness among cities, and moreover analyze the status of overall competitiveness taking all the cities in a province as a whole. Here, we only select the 22 cities in Xinjiang Province as the research objects to carry out comprehensive evaluation on urban competitiveness.

2.2 Establishment of the evaluation index system of urban competitiveness Urban competitiveness is to carry out measurement by a certain index system, that is to quantitatively reflect all the aspects of urban competitiveness by selecting representative index system, and further compare and analyze the variation status of the competitiveness in different cities. Urban competitiveness evaluation model is a theoretical platform designed for the test index system of urban competitiveness. How to construct the urban competitiveness evaluation model and its index system is a core problem of the research on urban competitiveness.

According to the principles of purposefulness, scientificness, unity, systematization and comparability, we combine the evaluation index system of IDU urban competitiveness with the bowstring arrow model advanced by Ni Peng-fei together in order to screen the evaluation index system of urban competitiveness, which is constructed by 6 aspects and 21 concrete indices covering urban economic strength, industry, scientific and technological innovation ability, government management, communication ability, and financial strength and infrastructure. Table 1 reports the concrete indices and their interpretations.

3 Empirical analysis of urban competitiveness

This paper adopts the factor analysis method commonly used in urban competitiveness to carry out the comprehensive evaluation on the urban competitiveness of 22 cities in Xinjiang Province.

Factor analysis is a multivariate statistical analysis method, which tries to find out several common factors controlling all the changes in order to simplify the research system through the internal dependencies of sample correlation matrix, and finally carries out quantitative analysis and evaluation on samples. The basic idea is grouping variables based on the relevance size in order to make the correlation higher among the variables in the same group and lower among the variables in different groups. Each variable represents a basic structure, which is named as common factor in factor analysis. Factor analysis can be accomplished by SPSS13.0 statistical package.

3.1 Data source Data in this paper are from the 2007 Xinjiang Statistical Yearbook and the Xinjiang Investigation Yearbook.

3.2 Treatment of index data Indices do not have additivity and comparability due to the different dimensions of index data in urban competitiveness. Thus it is necessary to conduct non-dimensional treatment on all the indices, so that these indices can be integrated. This paper uses standardization method (Z-scores method) to conduct non-dimensional treatment. Positive index is \( Z_i = \frac{X_i - \bar{X}}{S_i} \); and negative index is \( Z_i = \frac{X_i - \bar{X}}{S_i} \) \( (i = 1,2,3,\cdots, m; j = 1,2,3,\cdots, n) \), where \( X_i \) is the index value of city \( i \), \( \bar{X}_i \) is the average index value of city \( i \), \( S_j \) is the standard error \( S_j = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \mu_i)^2}{n-1}} \) of index \( j \). \( Z_i \) is the standardized values of index \( j \) in city \( i \). Finally the correlation matrix \( R \) of standardized index \( Z \) is obtained.

3.3 Correlation analysis According to the SPSS13.0 calculation result and the correlation matrix, many of the 21 varia-
bles have significant correlations (up to 0.979). Thus it is difficult to make the right judgments on urban competitiveness. Therefore, factor analysis is needed.

### 3.4 Determination of the principal factor

I use the SPSS13.0 software to obtain the eigenvalue and contribution rate of factors.

Principle for selecting common factor is using the first few factors with cumulative contribution rate more than 85% or eigenvalue more than 1. And this paper follows the principle of eigenvalue more than 1. Table 2 shows that eigenvalues of the first five factors in variable correlation coefficient matrix are 10.615, 4.414, 1.515, 1.007 and 1.005, respectively; and their cumulative contribution rates have reached 88.362%. Thus the first five factors offer the sufficient information from original data, and can fully reflect the evaluation information of competitiveness of 22 cities in Xinjiang Province. In other words, the five main factors extracted in this paper are $F_1$, $F_2$, $F_3$, $F_4$ and $F_5$.

| Table 1 Comprehensive evaluation index system of urban competitiveness |
|-------------------------------------------------|-------------------------------------------------|
| Primary index | Secondary index | Tertiary index | Interpretation |
| Urban competitiveness | Economic strength | GDP // yuan | Economic aggregate $X_{i1}$ |
| | | Per capita GDP // yuan | Economic development level $X_{i2}$ |
| | | Proportion of local financial revenue in GDP //% | Government strength $X_{i3}$ |
| | | Total society retail sales // × 10^4 yuan | Urban consumption level $X_{i4}$ |
| | | Average wage per worker // yuan | Labor cost $X_{i5}$ |
| | | Proportion of urban GDP in overall regional GDP //% | Regional economic strength $X_{i6}$ |
| | | Proportion of added industrial value in GDP //% | Urban industrialization level $X_{i7}$ |
| | | Proportion of the added value of tertiary industry in GDP //% | Advanced degree of urban industry $X_{i8}$ |
| Industry | Scientific and technological innovation | Local fiscal expenditure for science research // × 10^4 yuan | Scientific research level $X_{i9}$ |
| | | Proportion of technical personnel in total population //% | Scientific and technological team $X_{i10}$ |
| | | Total enrollment in primary and middle schools | Potential innovation ability $X_{i11}$ |
| Government management | Gross profit of industrial enterprise // × 10^4 yuan | Enterprise obtained ability $X_{i12}$ |
| | Number of beds occupied by every ten thousand people | Degree of medical and health protection $X_{i13}$ |
| Financial strength | Deposit balance per capita in financial institution at the end of year // yuan | Capital financing and control capability $X_{i14}$ |
| | Deposit balance per capita of urban and rural residents // yuan | Urban capital stock $X_{i15}$ |
| Communication ability | Highway passenger transportation // × 10^4 yuan | Population flow $X_{i16}$ |
| | Highway freight transportation // × 10^4 ton | Material flow $X_{i17}$ |
| | Per capita posts and telecommunications business // yuan | Frequency of communication $X_{i18}$ |
| Infrastructure | Per capita fixed asset investment // yuan | Level of infrastructure construction $X_{i19}$ |
| | Per capita area of road pavement // m² | Level of urban facilities $X_{i20}$ |
| | Per capita green area // m² | Environmental protection $X_{i21}$ |

**Table 2 Decomposition of total variance**

<table>
<thead>
<tr>
<th>Main factors</th>
<th>Common factor variance of each variable before factor extraction</th>
<th>Common factor variance of non-revolving variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eigenvalue</td>
<td>Variance contribution rate //%</td>
</tr>
<tr>
<td>1</td>
<td>10.615</td>
<td>50.547</td>
</tr>
<tr>
<td>3</td>
<td>1.515</td>
<td>7.216</td>
</tr>
<tr>
<td>4</td>
<td>1.007</td>
<td>4.793</td>
</tr>
<tr>
<td>5</td>
<td>1.005</td>
<td>4.786</td>
</tr>
<tr>
<td>6</td>
<td>0.751</td>
<td>3.574</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

### 3.5 Analysis of loading matrix

Factor load matrix is established for the extracted five main factors $F_1$, $F_2$, $F_3$, $F_4$ and $F_5$. 
I find from the initial factor loading matrix that the structure of the loading matrix is complex, and the typical variable of each factor is not prominent enough. So it is difficult to determine the actual meaning of each factor according to the initial factor loading matrix. For the convenience of reasonable explanation, the factor loading, orthogonal rotation of initial loading matrix is often applied in practice in order to achieve the goal of structure simplification. The square of the load factor can acquire polarization to 0 or 1 in column, and the typical representative variables of factors become more significant. Finally the objective of easy to explain the loading matrix of main factors can be realized.

Using the Varimax Rotation Method, rotation transformation of factor eigenvalue and factor loading matrix are obtained after 8 times of iteration convergence. The phenomenon of the similar distribution of variable load as well as the ambiguity of factor significance is greatly eliminated after rotation transformation. Load distribution of the variable shows polarization in the factor loading matrix after rotation, which makes the meanings of five factors more clear.

3.6 Construction of the evaluation model of urban competitiveness

Though the main factors $F_1$, $F_2$, $F_3$, $F_4$ and $F_5$ have strong ability to integrate the original information, single main factor cannot overall evaluate the urban competitiveness of each city. Therefore, I integrate the main factors $F_1$, $F_2$, $F_3$, $F_4$ and $F_5$ into weighted synthetic variable; the weight of each main factor is obtained according to its variance contribution rate, $w_i = \lambda_i / \sum \lambda_i$, where $\lambda_i$ is the related eigenvalue of main factor $i (i=1,2,3,4,5)$. Hence, the comprehensive evaluation model of urban competitiveness is constructed:

$$
F = w_1 F_1 + w_2 F_2 + w_3 F_3 + w_4 F_4 + w_5 F_5 / \sum w_i
$$

$$
= (50.547 F_1 + 21.020 F_2 + 7.216 F_3 + 4.793 F_4 + 4.786 F_5) / 88.362
$$

= 0.572 045 F_1 + 0.237 885 F_2 + 0.081 664 F_3 + 0.054 243 F_4 + 0.054 164 F_5,
$$

where $F_i$ is the factor score matrix, the values of them are reported in Table 3.

<table>
<thead>
<tr>
<th>City</th>
<th>Main factor score</th>
<th>Synthesis score</th>
<th>Rank</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>F3</td>
<td>F4</td>
<td>F5</td>
</tr>
<tr>
<td>Karamay</td>
<td>100.00</td>
<td>21.93</td>
<td>74.93</td>
<td>56.52</td>
</tr>
<tr>
<td>Urumqi</td>
<td>31.82</td>
<td>100.00</td>
<td>68.18</td>
<td>54.88</td>
</tr>
<tr>
<td>Korla</td>
<td>63.82</td>
<td>32.52</td>
<td>34.10</td>
<td>17.16</td>
</tr>
<tr>
<td>Hami</td>
<td>29.01</td>
<td>31.48</td>
<td>77.07</td>
<td>45.75</td>
</tr>
<tr>
<td>Shihzei</td>
<td>29.38</td>
<td>26.14</td>
<td>100.00</td>
<td>33.58</td>
</tr>
<tr>
<td>Changji</td>
<td>31.15</td>
<td>19.96</td>
<td>56.44</td>
<td>100.00</td>
</tr>
<tr>
<td>Kultun</td>
<td>29.39</td>
<td>24.79</td>
<td>84.36</td>
<td>37.65</td>
</tr>
<tr>
<td>Altai</td>
<td>23.84</td>
<td>27.20</td>
<td>55.97</td>
<td>43.59</td>
</tr>
<tr>
<td>Turpan</td>
<td>24.48</td>
<td>22.34</td>
<td>86.53</td>
<td>50.20</td>
</tr>
<tr>
<td>Yining</td>
<td>23.05</td>
<td>31.76</td>
<td>80.92</td>
<td>42.66</td>
</tr>
<tr>
<td>Bole</td>
<td>24.24</td>
<td>29.22</td>
<td>55.00</td>
<td>38.61</td>
</tr>
<tr>
<td>Hetian</td>
<td>21.42</td>
<td>20.56</td>
<td>92.41</td>
<td>71.53</td>
</tr>
<tr>
<td>Wusu</td>
<td>28.97</td>
<td>19.94</td>
<td>87.57</td>
<td>22.60</td>
</tr>
<tr>
<td>Tacheng</td>
<td>27.47</td>
<td>23.70</td>
<td>41.64</td>
<td>35.13</td>
</tr>
<tr>
<td>Fukang</td>
<td>30.95</td>
<td>16.61</td>
<td>68.92</td>
<td>39.96</td>
</tr>
<tr>
<td>Akesu</td>
<td>22.36</td>
<td>31.95</td>
<td>60.16</td>
<td>37.34</td>
</tr>
<tr>
<td>Kashi</td>
<td>20.53</td>
<td>30.91</td>
<td>85.27</td>
<td>25.18</td>
</tr>
<tr>
<td>Miquan</td>
<td>28.09</td>
<td>19.83</td>
<td>56.19</td>
<td>52.61</td>
</tr>
<tr>
<td>Wujaqu</td>
<td>24.61</td>
<td>23.93</td>
<td>53.62</td>
<td>41.09</td>
</tr>
<tr>
<td>Atushi</td>
<td>22.10</td>
<td>23.27</td>
<td>73.44</td>
<td>47.41</td>
</tr>
<tr>
<td>Alar</td>
<td>21.63</td>
<td>25.09</td>
<td>21.70</td>
<td>50.64</td>
</tr>
<tr>
<td>Tumshuq</td>
<td>17.90</td>
<td>24.51</td>
<td>23.76</td>
<td>44.42</td>
</tr>
</tbody>
</table>

3.7 KMO and Spherical Bartlett Test

KMO gives a test on sample adequacy, which is used for comparing the moderate degree of correlation coefficient value and partial correlation coefficient. The more it close to 1, the better the effect of factor analysis becomes. KMO value in this paper is 0.366, indicating that the result of factor analysis is acceptable.

Value of Spherical Bartlett Test is 785.838, and indicate 2-tailed significant at 0.01 level. This indicates that the correlation coefficient matrix is not a unit matrix, therefore the use of factor analysis is feasible.

4 Measurement result analysis of urban competitiveness in Xinjiang Province

4.1 Main factor interpretation of urban competitiveness

Factor loading matrix after rotation shows that the main factors influencing urban competitiveness in Xinjiang Province are $F_1$ and $F_5$, while $F_2$ and $F_4$ have little effect.
1. $F_i$ has relatively great load on the indices such as per capita GDP, per capita investment in fixed assets, total profits of industrial enterprises, per capita deposit balance of urban and rural residents, proportion of technical personnel in total population, per capita deposits in financial institutions, proportion of industrial added value in GDP, GDP, and proportion of urban GDP in regional GDP. These indices mainly reflect the comprehensive strength of city and the overall level of social development. Therefore, $F_i$ can be named as the economic development level factor. The high score of this factor shows the low economic development level of the city. Variance contribution rate of $F_i$ to each variable is 50.547%.

2. $F_2$ has relatively great load on the indices such as the total enrollment in primary and middle schools, total profits of industrial enterprises, per capita deposits in financial institutions, number of beds occupied by every ten thousand people, per capita deposit balance of urban and rural residents, and highway freight volume. These indices mainly reflect the innovation ability, government's management ability, financial strength, urban services and facilities, logistics and so on. Therefore, $F_2$ can be named as the economic development potential factor. Variance contribution rate of $F_2$ to each variable is 21.020%.

3. $F_3$ has relatively great load on the indices such as the per capita posts and telecommunications business, proportion of technical personnel in total population, and local fiscal expenditure for science research. These indices mainly reflect the frequency of urban communication, and the level of scientific and technological team. Therefore, $F_3$ can be named as the communication and scientific factor. Variance contribution rate of $F_3$ to each variable is 7.216%.

4. $F_4$ has relatively great load on the indices such as highway passenger transportation and average wage per worker. These indices mainly reflect the urban flow and labor cost. Therefore, $F_4$ can be named as the population flow and wage factor. Variance contribution rate of $F_4$ to each variable is 4.793%.

5. $F_5$ has relatively great load on the indices of per capita green area, which mainly reflects the urban living environment. Therefore, $F_5$ can be named as the environment factor. Variance contribution rate of $F_5$ to each variable is 4.786%.

4.2 Rank of the main factor of urban competitiveness Because the comprehensive evaluation value $F$ can be negative or positive, this paper adopts certain mathematical methods to transform the comprehensive evaluation value obtained, in order to compare the strength of urban competitiveness more intuitively, and to make out their differences clearly. The transform method is as follows: evaluation values are added with the same number, and the minimum and maximum values are turned into 1 and 100, respectively; other values are expanded with the same multiples. Table 3 shows the comprehensive value $F_i$, main factor score, rank and score.

1. Cities with the top three scores of $F_i$ are Karamay, Korla and Urumqi. $F_i$ is the economic development level factor. And therefore it indicates that these cities have relatively high economic development level. Correlation matrix shows that the load per capita GDP of this factor has high positive correlation with the total profits of industrial enterprises (correlation coefficient is 0.963), and has negative correlation with the proportion of tertiary industry in GDP (correlation coefficient is $-0.530$). Thus this factor also reflects a special stage of economic development in cities of Xinjiang, that is the level of per capita GDP depending primarily on the production value of secondary industry, especially the output of oil industry. This shows that the industrial structure in more economically developed cities is single, and the urban economic development in Xinjiang Province is still at a relatively low level in general.

2. Cities with the top three scores of $F_2$ are Urumqi, Korla and Akesu. $F_2$ is the economic development potential factor, and therefore reflects the relatively high economic development potential of these cities.

3. Cities with the top three scores of $F_3$ are Shihezi, Hetian, and Wusu. $F_3$ is the communication and scientific factor, and therefore reflects the high frequency of communication of these cities as well as the high level of scientific research and innovation capability.

4. Cities with the top three scores of $F_4$ are Changji, Hetian and Karamay. $F_4$ is the population flow and wage factor, and therefore reflects the high passenger flow and wage level of these cities.

5. Cities with the top three scores of $F_5$ are Altai, Bole and Tacheng. $F_5$ is the environment factor, and therefore reflects the high green level of these cities.

4.3 Urban competitiveness score, rank and urban classification According the comprehensive evaluation scores of urban competitiveness of 22 cities in Xinjiang Province ($F'$ after transformation), they are divided into four types: the first type is $F'\geq 50$; the second type is $39 \leq F' < 49$; the third type is $35 \leq F' < 39$; and the fourth type is $F' < 35$. See table 3.

5 Conclusion Measurement result of urban competitiveness indicates that the urban competitiveness in Xinjiang Province can be classified into four levels.

1. The first type of city: Karamay, Urumqi and Korla. Urban competitiveness of Karamay and Korla rank the top, which is mainly due to the factor of economic development level being at the top; and further more due to the leading oil industry. The major problems of the two cities are the single industrial structure, excessive dependence on oil industry, and neglect of tertiary industry, and extremely unbalanced industrial development. Therefore there exists certain risk in the long-term development. Urumqi has the most population in Xinjiang Province, and is the only mega-city of Xinjiang. As a capital city, Urumqi is not only a political center, but also the base of important industries as well as financial, trade and logistics centers. Its economic development level factor, economic development potential factor and population flow factor are all the top, indicating that both of its economic development level and potential are relatively high, and the passenger flow is also great. However, the living environment and infrastructure of Urumqi still need to be further improved.

2. The second type of city: Hami, Shihezi, Changji, Kuitun, Altai, Turpan and Yining. Each of these cities has its own characteristics, and has strong characteristic factor. Compre-
hensive scores of urban competitiveness in Hami City, Shihzei
City and Changji City are greater than 0, indicating that the ur-
ban competitiveness of these three cities is higher than the av-
erage level of Xinjiang Province. The scores of Hami and Shihe-
zi are in the middle and upper level, indicating that their de-
velopment is more balanced. Economic development factor of Changji
City ranks the forth, and the population flow and wage factor is
the top, indicating that its economic development level is rela-
tively high, and is in traffic main artery of Xinjiang Province with
strong economic development potential. Economic development
level factor and the economic development potential factor of
Kuituan City have gained relatively high scores, and Kuituan has
a relatively good development trend. Economic development po-
tential factors of Altai, Turpan and Yining are in low ranking, and
the other three factors are in the average level, indicating that it
is necessary for the three cities to increase input in economic
strength, scientific and technological strength, innovation capa-
ability, urban services and facilities, logistics, information flow,
quality of residents and so on.

(3) The third type of city: Bole, Hetian, Wusu, Tacheng,
Fukan, Akesu, Kashii and Miqian. Comprehensive scores of
urban competitiveness in these eight cities are lower than the av-
erage level. The major problem of these cities is the insuf-ficient
total amount of urban economy and society, which restricts the
improvement of urban competitiveness. Therefore, strengthen-
ing the industry gathering and enlarging the economic scale are
important directions for their development. Meanwhile, we
should actively improve the investment environment, rationally
choose and make great efforts to cultivate the leading industries,
and strive to achieve greater breakthrough in both volume and
quantity.

(4) The fourth type of city: Wujiaqu, Alar, Atushii and
Tumshu Comprehensive scores of urban competitiveness in
these cities are the lowest ( below -0.300 0). Almost all of the
factor scores are negative, and their competitiveness is the weak-
est. Causations for the above phenomenon are that Wujiaqu,
Alar and Tumshu are new cities, and are restricted by many
factors such as few non-agricultural population, low level of ur-
banization, small scale of economy, inadequate investment in
fixed assets, irrational industrial structure and poor economic
benefits. Therefore, these cities should actively participate in the
regional division and collaboration of labor, improve urban infra-
structure, expand exports, actively integrate the tourism re-
sources, make full use of their own advantages, and improve ur-
ban competitiveness as soon as possible.

In the year 2006, there are overall 6 cities above the aver-
age level of urban competitiveness of Xinjiang Province, occup-
ying 27.27% of the total sample cities. The 6 cities are Kara-
may, Urumqi, Korla, Hami, Shihzei and Changji. Among them,
Hami, Shihzei and Changji are basically at the average level with
competitiveness scores of 0.032 6, 0.021 46 and 0.016 5, re-
spectively. Other cities are below the average level, occupying
72.73% of the total sample cities. And this situation is not opti-
mistic.

In general, differences among the competitiveness levels of
cities in Xinjiang Province are relatively significant; the top three
cities (Karamay, Urumqi and Korla) have significant differ-
cences with the rest. Comprehensive scores of urban competitiveness
(after transformation) of Karamay, Urumqi and Korla are
100.00, 70.70 and 65.52, respectively, which are far ahead of
other cities, reflecting the strong urban competitiveness.

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省域城市竞争力综合评价研究——以新疆为例

万秋成（石河子大学商学院，新疆五家渠 831300）

摘要 建立了城市竞争力的内涵，提出了省域城市竞争力研究的视角，即不但要在省域内对各城市的竞争力进行比较，而且要把省域各城市作为
一个整体加以分析。选取了城市经济实力、产业、科技创新能力、政府管理、创新能力、资金实力和基础设施7个方面共21项具体指标，构建
了省域城市竞争力的评价指标体系。运用因子分析法对2006年中国新疆省22个地市的城市竞争力进行了综合评价，提取出了5个主导因子，构建
了城市竞争力的综合评价模型。根据5个主导因子在不同指标上的载荷值，将其分别命名为经济发展水平、经济潜力、交通和通信、人力和工
资及环境因子。研究表明：克拉玛依、库尔勒和伊犁市的经济发展水平较高，乌鲁木齐、库尔勒和阿克苏市的经济发展潜力较大，石河
子，和田和喀什市的交通密度和科技创新水平较高，昌吉，和田，克拉玛依市的客流量大，工资水平高，阿勒泰、博乐和塔城的绿化较好；按各
城市竞争力得分不同，可将新疆各市分为四个层次，排名前3位的城市竞争力得分远高于其他城市，位于新疆城市竞争力平均水平之上的城市
有6个，竞争力水平处于平均水平以下的城市占样本城市的72.73%。

关键词 城市竞争力；实证分析；新疆