Regional Economic Development in the Chinese Mode

------the central has a rapid development, at the same time ,
there has a big gap between east and west.

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Abstract--The integrated development of central city is an important driving force for the boo-ming economy of a region. In paper, I study the level of development of the 35 central cit-ies and the surrounding areas in China. Wit h the factor analysis model, I selecting 12 signific-ance indicators and using the SPSS 13.0 to make a rank for the 35 central cities' develop-ment standard. Besides, making an analysis and giving some suggestions base on Chinese actual economic policies and regional realities.

Keyword-----the indicators of assessment , the integrated development of center cities, factor analysis

1 The indicators of assessment

In paper, I select 12 indicators. They are :

Eight indicators of social economy

X1---The city's annual average population (ten thousand people);

X2---The city's total industrial output value (te n thousand yuan);

X3---Total freight(Ten thousand tons);

X4---Wholesale and retail Accommodation and Catering Industry Employed Persons (ten thousand people);

X5---Local financial Budget revenue (te n thousand yuan);

X6---Urban and rural residents years The end of the savings balance (ten thousand yuan);

X7---The end of the unit Number of employee s (ten thousand people);

X8---- Workers in the post Total wages (ten thousand yuan);

Four indicators of urban public facilities .

X9---- Residential land area (square kilometer s);

X10---Per million people have bus (vehicle);

X11--- Per capita urban Road area (Square meters);

X12---- Green space per capita Area (square meters).

2 Assessment of method

Using factor analysis method to analyze the lev el of development of the central cities in paper.

Factor Analysis method is a multivariate sta tistic-al method. The main idea of the factor an alysis is that researching the internal depende ncies rel-ation of the raw data's correlation m atrix and reducing the dimension of variables. In addition, It can transform some intricate rel ationship vari-ables to a few factors that contain the most infor-mation.

3 The process of analysis

3.1 Standardization of data in order to eliminat e the influence of the dimensionless. Using the Standard deviation of standardized method.

The formula :

$$Y_i = \frac{X_i - X}{S}, \qquad \overline{X} = \frac{1}{N}\sum_1^N X_i,$$

$$S = \sqrt[2]{\frac{1}{N-1}\left(X_i - \overline{X}\right)^2}$$

Y_i-----Indicators normalized values ,

X_i-----Indicators of the initial value ,

$\overline{X}$ ----Indicators of the initial average ,

S-----Indicators of the initial standard deviation,

N--Number of samples.

The following is Standardization of data :

City	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
bei jing	1.0014	1.12785	-0.14771	4.92082	3.07408	2.86009	4.29943	4.51816	3.47923	0.13931	-0.86134	-0.09968
tian jin	0.51006	1.61514	0.85336	0.37216	0.9508	0.83374	0.56629	0.53311	0.92366	-0.45388	-0.24061	-0.53959
shi jia zh	0.51177	-0.15658	-0.26672	-0.30547	-0.54474	-0.64399	-0.46228	-0.48591	-0.66427	0.14826	0.77891	-0.35756
tai yuan	-0.61508	-0.74107	-0.58289	-0.43961	-0.5863	-0.39315	-0.45813	-0.39986	-0.80073	-0.52484	-0.48421	-0.46375
hu he hao	-0.8646	-0.86978	-0.80996	-0.68658	-0.60566	-0.74946	-0.90799	-0.67546	-0.87516	-0.01218	0.31516	-0.56993
shen yang	0.02817	0.47524	-0.39352	-0.28139	-0.04623	-0.26435	-0.23989	-0.23362	0.25375	-0.39891	-0.29114	-0.14519
chang chun	0.10042	-0.12005	-0.74473	-0.37426	-0.5163	-0.46313	-0.38897	-0.39528	-0.01917	-0.23974	0.43426	-0.34239
ha er bin	0.52731	-0.69156	-0.7845	0.05846	-0.42163	-0.5237	-0.03037	-0.25953	-0.05639	-0.32029	-1.02735	-0.49409
shang hai	1.28349	3.74868	3.04515	1.80858	3.93266	3.70142	2.15121	2.42449	.	-0.19052	-0.98224	0.44641
nan jing	-0.13043	0.31509	0.32387	0.05502	0.04207	0.35684	-0.11104	-0.05559	0.81201	-0.30047	0.86191	1.23522
hang zhou	-0.02987	0.70949	0.07051	0.62876	0.2941	1.01732	0.79536	0.47537	-0.21766	0.05877	-0.3164	-0.37273
he fei	-0.3819	-0.45297	-0.31087	-0.40659	-0.38647	-0.51144	-0.57276	-0.49401	-0.11842	-0.24166	1.32927	-0.08451
fu zhou	-0.11072	-0.3338	-0.52549	-0.39903	-0.40564	-0.40008	-0.28179	-0.35998	-0.19285	0.18789	-0.06197	-0.25138
nan chang	-0.36987	-0.61676	-0.88217	-0.68796	-0.57311	-0.61734	-0.60044	-0.53319	-0.76351	-0.26979	-0.30738	-0.32722
ji nan	-0.18043	-0.34335	-0.07943	-0.14999	-0.37539	-0.21525	-0.09276	-0.19779	-0.27969	-0.2423	0.77349	-0.3879
zhen zhou	0.0645	-0.11532	-0.21738	-0.26006	-0.17602	-0.29989	-0.25614	-0.36356	-0.40375	-0.42064	-1.17171	-0.56993
wu han	0.24345	-0.03376	0.84903	0.35633	-0.17043	0.17517	0.33611	0.20958	1.35786	-0.16112	0.27546	-0.44858
chang sh	-0.09232	-0.39447	-0.09728	-0.0523	-0.29583	-0.21038	-0.2387	-0.29491	-0.0812	-0.08058	0.4126	-0.35756
guang zho	0.17824	1.14883	1.73492	0.72301	0.6267	1.18695	0.911	1.00113	.	0.08562	0.35486	1.933
nan ning	0	-0.85431	-0.29474	-0.40453	-0.55719	-0.52154	-0.57741	-0.50182	-0.52781	-0.40658	-0.15219	1.17454
hai kou	-0.99066	-0.99281	-0.89964	-0.55863	-0.73188	-0.83238	-0.89453	-0.68762	-0.9496	-0.57469	-0.5203	-0.55476
cheng du	0.80545	-0.13193	1.05478	0.00273	0.05552	0.60373	0.28184	0.08016	0.51427	-0.2129	-0.11069	-0.43341
gui yang	-0.60631	-0.89056	-0.76997	-0.33986	-0.58989	-0.74015	-0.57919	-0.55749	-0.86276	-0.40914	-1.19336	-0.44858
kun ming	-0.22441	-0.67058	-0.52578	-0.13142	-0.39571	-0.18999	-0.33691	-0.4365	1.2338	0.29784	-0.81262	-0.3879
xi an	0.14509	-0.56053	0.52641	-0.10046	-0.4155	-0.17689	0.01365	-0.13515	-0.57743	-0.21354	-0.57624	-0.61544
lan zhou	-0.69121	-0.80526	-0.89807	-0.63361	-0.69488	-0.77243	-0.73987	-0.60569	-0.7387	-0.36759	-0.43369	-0.5851
xi ning	-0.87879	-0.9396	-1.17179	-0.69071	-0.75806	-0.88742	-0.93212	-0.72058	-1.02403	0.19748	-0.97683	-0.50926
yin chuan	-0.9946	-0.91017	-0.76187	-0.73749	-0.70929	-0.87349	-0.92001	-0.67029	-0.92479	-0.07674	0.85469	-0.03901
wu lu mu q	-0.83973	-0.79247	-0.51026	-0.60128	-0.57058	-0.81247	-0.77534	-0.56185	-0.16804	-0.02624	-0.74045	0.11269
da lian	-0.21336	0.17017	0.34989	-0.40384	0.01238	-0.23778	-0.3772	-0.30045	0.09248	-0.03455	0.16359	0.0065
ning bo	-0.23719	0.6359	0.36637	-0.3433	0.06211	0.22026	0.01213	-0.05102	-0.57743	-0.032	-0.36692	-0.23621
xia men	-0.95554	-0.47055	-0.78685	-0.40522	-0.33732	-0.59479	-0.36764	-0.3293	-0.82554	0.17191	0.70853	0.47675
qing dao	0.11059	0.64294	0.12775	-0.40178	-0.06728	-0.27616	-0.124	-0.21289	-0.37894	0.06133	1.57106	0.0065
shen zhen	-0.82002	1.89855	0.08458	0.62119	1.01359	0.82446	0.9673	0.90119	1.25861	5.57012	3.92046	4.72416

Direction: Because the absence of few Residential land area's row data, there have no analy-sis about Shanghai and Guangzhou in the rank about 35 cities.

3.2 Factor analysis

Calculating the operating results. Importing the standardization of data into SPSS software and selecting "Analyze—Data--Factor". Analysis the data with principal components. According to the principle of Eigen values greater than one, electing three common factors. the cumulative variance contribution rate is 90.563%.

Total Variance Explained

Component	Initial Eigenvalues Total	% of Variance	Cumulative %	Extraction Sums of Squared Loadings Total	% of Variance	Cumulative %
1	6.744	56.198	56.198	6.744	56.198	56.198
2	2.755	22.960	79.158	2.755	22.960	79.158
3	1.369	11.404	90.563	1.369	11.404	90.563
4	.396	3.303	93.866			
5	.258	2.148	96.014			
6	.158	1.314	97.328			
7	.137	1.144	98.472			
8	.117	.971	99.443			
9	.041	.342	99.785			
10	.017	.145	99.930			
11	.006	.050	99.980			
12	.002	.020	100.000			

Extraction Method: Principal Component Analysis.

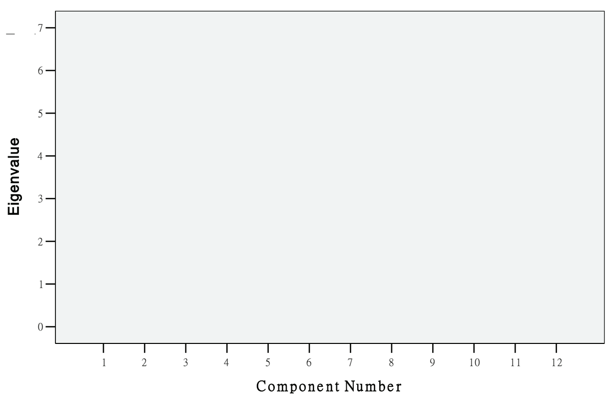
Component Matrix[a]

	Component 1	2	3
X1	.531	-.525	.584
X2	.801	.294	.226
X3	.551	-.271	.753
X4	.895	-.133	-.398
X5	.978	-.030	-.104
X6	.961	-.054	-.112
X7	.963	-.116	-.204
X8	.932	-.073	-.333
X9	.900	-.114	.089
X10	.332	.871	.045
X11	.130	.867	.221
X12	.314	.870	.131

Extraction Method: Principal Component Analysi

a. 3 components extracted.

Scree Plot



Now, the practical significance of the non-rotated common factor is hard to explain. so making a rotation for common factor with varimax, the SPSS output as follow:

Rotated Component Matrix[a]

	Component 1	2	3
X1	.288	-.243	.870
X2	.593	.510	.409
X3	.208	.040	.948
X4	.988	-.017	.027
X5	.927	.167	.285
X6	.918	.138	.278
X7	.965	.059	.217
X8	.987	.062	.080
X9	.785	.114	.451
X10	.184	.910	-.099
X11	-.071	.901	-.019
X12	.132	.924	-.031

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.744	56.198	56.198	5.736	47.800	47.800
2	2.755	22.960	79.158	2.881	24.007	71.807
3	1.369	11.404	90.563	2.251	18.756	90.563
4	.396	3.303	93.866			
5	.258	2.148	96.014			
6	.158	1.314	97.328			
7	.137	1.144	98.472			
8	.117	.971	99.443			
9	.041	.342	99.785			
10	.017	.145	99.930			
11	.006	.050	99.980			
12	.002	.020	100.000			

Extraction Method: Principal Component Analysis.

According to the result above ,
X1=.288*F1-.243*F2+.870*F3 ,
X2=.593*F1+.510*F2+.409*F3 ,
X3=.208*F1+.040*F2+.948*F3
X4=.988*F1-.017*F2+.027*F3 ,
X5=.927*F1+.167*F2+.285*F3 ,
X6=.918*F1+.138*F2+.278*F3
X7=.965*F1+.059*F2+.217*F3 ,
X8=.987*F1+.062*F2+.080*F3 ,
X9=.785*F1+.114*F2+.451*F3
X10=.184*F1+.910*F2-.099*F3 ,
X11=-.071*F1+.901*F2-.019*F3 ,
X12=.132*F1+.924*F2-.031*F3

In order to get the conclusion, making a rank for Xi (i=1,2 ,3 ,4,5,6,7,8,9,10,11,12).

Rotated Component Matrix[a]

	Component		
	1	2	3
X4	.988	-.017	.027
X8	.987	.062	.080
X7	.965	.059	.217
X5	.927	.167	.285
X6	.918	.138	.278
X9	.785	.114	.451
X2	.593	.510	.409
X12	.132	.924	-.031
X10	.184	.910	-.099
X11	-.071	.901	-.019
X3	.208	.040	.948
X1	.288	-.243	.870

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

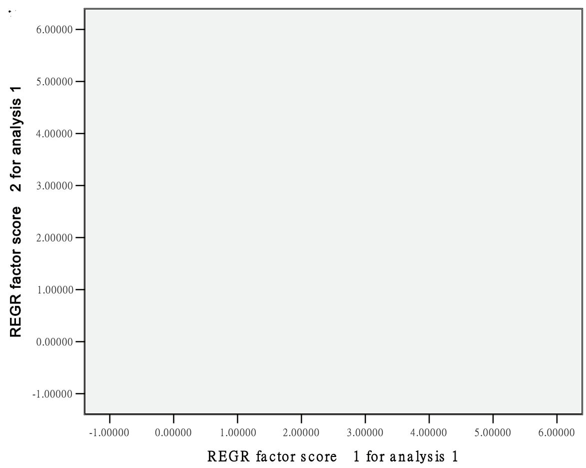
To calculate the Integrated score (F) by
F=(47.800*F1+24.007*F2+18.756*F3)/90.563

In the other hand, the table about F1, F2, F3, F. as follow(Table one):

Table one:

City	F1	F2	F3	F
Beijing	5.08946	-0.90857	-1.03514	2.231033
Tianjin	0.82662	-0.06748	1.13889	0.654279
Shijiazhuan	-0.57661	0.21066	0.27172	-0.19222
Taiyuan	-0.30579	-0.53039	-0.6248	-0.4314
Hohhot	-0.62827	-0.10932	-0.77771	-0.52165
Shenyang	-0.00554	-0.10136	0.10286	-0.00849
Changchun	-0.2926	-0.01541	-0.16225	-0.19212
Harbin	0.00961	-0.79794	-0.32427	-0.27361
Shanghai	.	.	.	.
Nanjing	0.09471	0.76383	0.49203	0.354371
Hangzhou	0.86788	-0.1346	-0.03848	0.414425
Hefei	-0.48761	0.37408	-0.09143	-0.17714
Fuzhou	-0.23809	-0.04347	-0.23462	-0.18578
Nanchang	-0.45842	-0.31601	-0.59906	-0.4498
Jinan	-0.19493	0.04711	-0.00958	-0.09238
Zhenzhou	-0.1033	-0.66859	0.0073	-0.23024
Wuhan	0.26333	-0.09177	0.83108	0.286781
Changsha	-0.16452	-0.02634	0.0116	-0.09142
Guangzhou	.	.	.	.
Nanning	-0.53779	0.14367	-0.0985	-0.26617
Haikou	-0.55364	-0.594	-0.96964	-0.65049
Chengdu	0.13262	-0.24298	1.17254	0.248426
Guiyang	-0.341	-0.76483	-0.80683	-0.54983
Kunming	0.05217	-0.38457	-0.27199	-0.13074
Xi'an	-0.19927	-0.51875	0.36215	-0.16769
Lanzhou	-0.50563	-0.49301	-0.78259	-0.55964
Xining	-0.55336	-0.49098	-1.12268	-0.65473
Yinchuan	-0.75933	0.24045	-0.7717	-0.49686
Urumqi	-0.47635	-0.21316	-0.56036	-0.42398
Dalian	-0.24899	0.23054	0.45762	0.024469
Ningbo	0.02462	0.03295	0.35688	0.095641
Xiamen	-0.31068	0.46719	-0.85194	-0.21657
Qingdao	-0.33614	0.78184	0.53979	0.14163
Shenzhen	0.82311	5.03195	-0.05425	1.75711
Chongqing	0.09372	-0.81076	4.44335	0.754783

F1 factor score for the x-axis, F2 factor score for the y-axis, drawing the city factor score plot.



4 Analysis the result from the experiment with the Chinese actual economic policies and regional realities.

Explain the mean of Xi

Common factor F1 has a large proportion of value on X4, X5, X6, X7, X8,X9 .

X1,X7 andX8 are the indicators to reflect the siz e of the cities;

X2,X3, the index reflecting the urban industrialize - tion;

X4 is stand for the scale of development of the tertiary industry in cities;

X5 is the income of Government as the manage r of the state and the owner of state-owned ass ets . It reflect the income level of residents to a certain extent, In the current Distribution Po licy,

Government and residents are the major to obt a-in the distributable income . So X5, X6, sho w the city's national income level;

F1 is the common factor to reflect the size of city and living conditions of urban residents. Higher the score, better the living condition of urban residents, greater the size of the citie s.

Common factor F2 has a large proportion of value on X10, X11, X12. It reflects the leve l of urban infrastructure, the score of this facto r reflects the level of a city's infrastructure;

Common factor F3 only has a large load on the X1, X2, X3. It is a common factor to reflect the level of economic development.

Table one show that more score of cities on the urban scale factor F1 is Beijing , Tianjin ,Hangzhou, Shenzhen. Among those cities the score of Beijing is 5.08946 much higher t han other cities.It means that the size of those cities are big enough and living conditions o f urban residents are very good . The size of Yinchuan , Hohhot, Haikou, Xining are small er and the living conditions of urban residents are worse .

More score on the F2 are Shenzhen ,Qingdao, Nanjing, Xiamen,the lower score are Chongqi ng ,Harbin, Guiyang, Zhenzhou .The score of F2 indicate the level of a city's infrastructure; th e more score ,the higher level. So there hav e the better infrastructure in Shenzhen, Qingda o, Nanjing ,Xiamen. However, the infrastructur e of Chongqing is bad and government shoul d to devote more funds to improve. Chongqing, Chengdu ,Tianjin ,Wuhan ,Qingdao have goo d score on F3. F3 is the common factor stan d for the level of economic development Xi ning, Beijing, Haikou, Xiamen are worse.

In recent years, Chinese government increase d the investment in economic development of the central region of china. undoubtedly,The la rge investment contributed to the rapid develo pment of the central region . Chongqing, Chengdu, Wu han have experienced rapid development depen d on the large investment. Beijing's score is l ow on the F3, the reason is that Beijing i s not only the capital of China but the China's political and cultural center. Its special status inhibited the rapid development in economic terms. Using formula

(F=(47.800*F1+24.007*F2+18.756*F3)/90.563)

to calculate F. The rank of higher score citie s are Beijing ,Shenzhen ,Chongqing ,Tianjin , Hangzhou ,Nanjing .and the low score cities are Xining ,Haikou ,Lanzhou, Hohhot.

5 Conclusion

On the size , the historic city bigger than th e new city; on the level of urban facilities, south ern of China is better than the North, the new cities are better than the old cities; on the level of urban development ,the eastern region of China

is higher than the western region. On the othe r hand, distributing near the origin in two-dimensional coordinate system are cities that the urban factor score is less than zero. Not only their low development level but simi lar mode. They mostly locate in the northwe st of China . lastly , The central region of China has a rapidly development in the past years.

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