

Analysis of China Western Listed Companies Competitiveness under Big Exploiting Strategy

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Abstract—After the big exploiting Strategy of Western China, Western China have made a speeding economy increase higher than Eastern China. Some scholars think few listed companies make a great role in the process, which also decide the future of Western China because of its' competitiveness. We select 90 samples of Western listed companies, analysis its' operating results with component and hierarchical cluster analysis, then find that more than 95% listed companies have an average contribution to Western economy. It gives us a different view on how to look at the role of listed companies in Western economy developing, and government is still an important role in Western China sustainable developing.

Keywords—Western China, listed company competitiveness, hierarchical cluster analysis, government dominant role

I. INTRODUCTION

With the development of economic globalization, Western China is expanding the openness, integrating advantage resources of listed companies in the area, deepening regional division of labor, building different main functional areas, improving the efficiency of regional factor allocation. Promoting the overall development of regional economic becomes an important task of Western China. Meanwhile, the government has introduced a more targeted regional development policy, further co-ordinate regional development. These would be more conducive to the overall improvement of the regional economic.

The development of the western region is to rely on government or market? Most of scholars and people think, under the conditions of the socialist market economy, the market is the basis of the allocation of resources, plays an irreplaceable role. The problem is that on the area that has non-sufficiently market, the role of the market requires further examination. Market microstructure based on enterprises, especially large listed enterprises, they are barometer of regional economic development and the core of regional competitiveness. Listed companies of western region are the essence of the western economy. Through the analysis of the financial structure of the listed company and its operating results, the main driving factors of the economic development of the western region and its competitiveness can be seen from one side. [1]

The concept of competitiveness has multilevel nature, and its meaning in nature continue to be revised and improved with the socio-economic and cultural development. [2] Now there is still no agreed definition of competitiveness. The typical views are: Lausanne International Management Development School (IDM) in Switzerland (1985) defines competitiveness as a country or an enterprise's ability to obtain more wealth than its competitors on the world market; [3, 4] Michael Porter (1990) thinks that the country's economic competitiveness refers to the country's industrial innovation and upgrade ability, the country's high level productivity and the ability to continuously improve productivity. Differences in the connotation understanding competitive derived from different theoretical ideas and research perspective, there is no right or wrong. All can coexist.

Competitive connotation mainly include: ① the main competitor is a domestic economic area with relatively independent development ability. [5] ② the strength of the competitive is the ability of the industry (or enterprise) that can directly create wealth, compete for the strength of the domestic and international market capacity in the region relative to other regions within the industry (or business), and its fundamental goal is to keep the regional economy continued to grow, and the formation and strengthening of this ability is mainly due to the attraction, integrated and effective allocation of global resources. [6-8] ③ the competitive contains not only real competitive, but also the potential competitiveness; it includes not only the competitiveness of individual enterprises, but also the competitiveness of enterprises cluster. [9] Research on competitiveness is to study the viability that a particular stakeholder participates the domestic and international markets by utility its exiting factors of production, and more important relative to other stakeholders in the future potential development. [10] From the above definitions, the financial position of the enterprise can reflect the competitiveness of enterprises. The listed companies in Western China are the core of the allocation of resources. By analyzing the indicators reflect the financial position, the impact factors that influence the listed companies' core competitiveness can be found.

II. THE DATA AND VARIABLE SELECTION

In order to identify the development potential and competitive advantage of the listed companies in Western China, we need to analyze its financial indicators. There are 127 listed companies in Western China till 2009. Because of

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part of the companies missing data, we selected 90 listed companies as samples. We also select 9 financial indicators including earnings per share, net assets per share, return on net assets, current ratio, quick ratio, accounts receivable turnover ratio, debt ratio, net profit margin, and return on total assets ratio as independence variables which can reflect the operating results of the listed companies.

III. THE COMPETITIVE EVALUATION MODEL AND EMPIRICAL ANALYSIS

A. Establish the Mathematical Model

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

We select the principal component analysis as research method. Principal component analysis is a statistical analysis method that transfer the original multiple variables into a few indicators. [11, 12] From a mathematical point of view, this is a dimensionality reduction processing technology. By study the internal dependencies of the correlation coefficient matrix between multiple variables, a few random variables can be identified to synthesize all variables, and these variables named factors are not measured. Then within the same group are high correlation, and the variables of different groups are low correlation. Finally, according to the weights of the common factor score and its corresponding variance contribution rate we calculate a total score.

We build the factor analysis model. We suppose that there are m economic regions and n competitive evaluation of each economic region. Original observations indicator variable denoted as: $X = (X_1, X_2, \dots, X_n)'$

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1p} \\ x_{21} & x_{22} & \dots & x_{2p} \\ M & M & \dots & M \\ x_{n1} & x_{n2} & \dots & x_{np} \end{bmatrix} \quad (1)$$

By taking linear combination of the original variables indicators and adjusting the combination coefficients, the new variable indicators are independent and representative:

$$\left\{ \begin{array}{l} x_1 = l_{11}x_1 + l_{12}x_2 + \dots + l_{1p}x_p \\ x_1 = l_{21}x_1 + l_{22}x_2 + \dots + l_{2p}x_p \\ \dots \\ z_m = l_{m1}x_1 + l_{m2}x_2 + \dots + l_{mp}x_p \end{array} \right. \quad (2)$$

In the formula 2, the coefficient l_{ij} determined by the following principles:

(1) z_i and z_j are independent of each other ($i \neq j; i, j = 1, 2, \dots, m$);

(2) z_i is the largest variance of all linear combinations about x_1, x_2, \dots, x_p ; z_2 is the largest variance of all the linear combination x_1, x_2, \dots, x_p that are not associated with z_1 ;……; z_m is the largest variance of all linear combination x_1, x_2, \dots, x_p that are not related to z_1, z_2, \dots, z_m . So the new variable indicators z_1, z_2, \dots, z_m are respectively named first, the second, and the m-th main component referred to the original variable index x_1, x_2, \dots, x_p . The proportion of z_1 is the largest of the total variance, and the variance of z_1, z_2, \dots, z_m is in descending order. We often select the first few principal components to analyze the practical problems. So it not only reduces the number of variables, but also seizes the main contradiction, which simplify the relationship between the variables. We can see from the above that analysis to find the main components is to determine the load l_{ij} ($i = 1, 2, \dots, m; j = 1, 2, \dots, p$) of the original variables x_j ($j = 1, 2, \dots, p$) on these main components z_i ($i = 1, 2, \dots, m$). From mathematically it's easily known that they are m larger feature value corresponding to eigenvectors of correlation matrix about x_1, x_2, \dots, x_p .

B. Calculation Method

Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".

1) Calculate the correlation coefficient matrix

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1p} \\ r_{21} & r_{22} & \dots & r_{2p} \\ M & M & \dots & M \\ r_{p1} & r_{p2} & \dots & r_{pp} \end{bmatrix} \quad (3)$$

In the formula 3, r_{ij} ($i, j = 1, 2, \dots, p$) is the correlation coefficient of the original variables x_i and x_j , which is calculated as:

$$r_{ij} = \frac{\sum_{k=1}^n (x_{ki} - \bar{x}_i)(x_{kj} - \bar{x}_j)}{\sqrt{\sum_{k=1}^n (x_{ki} - \bar{x}_i)^2 \sum_{k=1}^n (x_{kj} - \bar{x}_j)^2}} \quad (4)$$

Because R is a real symmetric matrix ($r_{ij} = r_{ji}$), we can be simply calculated its upper triangular elements or lower triangular elements.

2) Calculate the eigenvalues and eigenvectors First,

solution of the characteristic equation $|\lambda I - R| = 0$ obtained characteristic values λ_i ($i = 1, 2, \dots, p$), and make it to be arranged in order of size, $\lambda_1 \geq \lambda_2 \geq \dots \geq \lambda_p \geq 0$; . Then we

obtained feature vector λ_i of corresponding to the characteristic value $e_i (i=1,2,\dots,p)$.

3) Calculate the contribution rate of the principal component and the cumulative contribution rate

The contribution rate of principal component z_i is

$$\frac{r_i}{\sum_{k=1}^p r_k} \quad (i=1,2,\dots,p)$$

, and the cumulative contribution rate is $\frac{\sum_{k=1}^m r_k}{\sum_{k=1}^p r_k}$.

We generally admission cumulative contribution rate from 80% to 95% of the characteristic values $\lambda_1, \lambda_2, \dots, \lambda_m$.

4) Calculate the principal component load

$$p(z_k, x_i) = \sqrt{r_k e_{ki}} \quad (i, k = 1, 2, \dots, p) \quad (5)$$

It can calculate the principal component score:

$$z = \begin{bmatrix} z_{11} & z_{12} & \dots & z_{1m} \\ z_{21} & z_{22} & \dots & z_{2m} \\ M & M & \dots & M \\ z_{n1} & z_{n2} & \dots & z_{nm} \end{bmatrix} \quad (6)$$

IV. FACTOR CLUSTERING DATA ANALYSIS

In order to understand the overall financial condition of the listed companies on Western China and identify the key factors that affect operating results even competitive, we analyze the sample data by factor analysis and hierarchical cluster analysis. The first factor analysis of variables extracts their common factors. Because the common factors are not relevant which are in line with the requirements of cluster analysis, we use the common factor score in cluster analysis.

A. Factor Analysis

We calculate the listed companies' financial indicators. The test value of KMO is 0.641, which is large than 0.15, so it can be used in the factor analysis. The test statistic of Bartlett is 421.598, and its relative probability is 0.000, which means that there are significant differences between the correlation coefficient matrix and the unit matrix (see Table I).

TABLE I. KMO TEST AND BARTLETT SPHERICITY TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.641
Bartlett's Test of Sphericity	Approx. Chi-Square	421.598
	df	36
	Sig.	.000

Table II shows the three common factors extracted, most of the information of the nine variables can be explained by these three factors. The first factor characteristics value is high, which means the largest contribution to the interpretation of the original variables. The characteristic values are smaller after

the fourth factor, which means the interpretation of the contribution of the other variables is very small, so it is appropriate to extract three factors. Then we use component analysis method to get varimax principal rotation, and the results are shown in Table III.

TABLE II. TOTAL VARIANCE EXPLAINED TABLE

Com	Initial Ev		Extract Sum of V		Rotation Sum V				
	Total	% of Var	Cum%	Total	% of V	% Cum	Total	% of V	% Cum
1	3.276	36.404	36.404	3.276	36.404	36.404	2.851	31.674	31.674
2	2.094	23.271	59.675	2.094	23.271	59.675	2.504	27.825	59.499
3	1.014	11.266	70.941	1.014	11.266	70.941	1.030	11.442	70.941
4	.963	10.701	81.642						
5	.701	7.792	89.434						
6	.385	4.279	93.713						
7	.350	3.893	97.606						
8	.129	1.428	99.035						
9	.087	.965	100.000						
1	3.276	36.404	36.404	3.276	36.404	36.404	2.851	31.674	31.674
2	2.094	23.271	59.675	2.094	23.271	59.675	2.504	27.825	59.499
3	1.014	11.266	70.941	1.014	11.266	70.941	1.030	11.442	70.941
4	.963	10.701	81.642						
5	.701	7.792	89.434						
6	.385	4.279	93.713						
7	.350	3.893	97.606						
8	.129	1.428	99.035						
9	.087	.965	100.000						

TABLE III. THREE COMMON FACTORS

Factor	Explained Variable
The ability of investment and earnings	Return on total assets, earnings per share, return on net assets, net profit margin, net assets per share
Solvency	Current ratio, quick ratio, debt ratio
The ability of operating	Accounts receivable turnover ratio

We analyze the financial indicators of listed companies in Western China by factor analysis. The name and score of the three factors are shown in Table IV.

TABLE IV. THE SCORES OF THE FACTORS OF WESTERN LISTED COMPANIES

Samples	The ability of investment and earnings	Solvency	operating
1	-0.11435	-0.52753	0.18717
2	0.67616	2.55804	-1.07325
3	-0.10459	1.13255	-0.09588
4	-0.15793	-1.30669	0.36442
5	-0.33369	-0.60672	-0.05791

6	-0.19606	0.75225	0.24411
7	0.14205	-0.5999	-0.273
8	-0.01998	0.09604	0.0072
9	-0.74326	-0.37801	0.09668
10	0.12281	0.42693	0.07627
11	-3.10648	-1.55452	-0.04396
12	0.2538	-0.74211	0.23986
13	0.50277	0.95121	0.09467
14	-0.23391	1.70407	-0.04055
15	0.44575	1.30137	-0.98642
16	-0.62907	-0.7995	0.01653
17	-0.05009	-0.30418	0.03366
18	0.65511	0.45909	8.41099
19	0.01001	-0.77186	0.05782
20	-0.6185	0.15252	0.12624
21	0.22315	-0.45756	0.07169
22	-0.12364	-0.17587	0.20713
23	-0.18278	-0.10117	0.06326
24	0.48303	-0.69447	-0.11146
25	0.07476	0.14953	-0.1898
26	0.95744	0.21091	-0.38647
27	0.14479	-0.57695	-0.31892
28	0.06308	-0.7695	0.14833
29	-0.12106	-0.64047	0.02076
30	-0.05807	1.54398	0.50379
31	0.02813	-0.47532	0.14908
32	0.07697	0.29291	0.0694
33	-4.95696	0.31283	-0.61251
34	-0.93518	-0.39441	0.05116
35	-2.10491	-0.31098	-0.02639
36	0.13758	1.28198	-0.00091
37	1.26841	0.52504	0.41882
38	-0.09134	0.18672	0.09765
39	2.13554	0.69989	-0.21322
40	2.15324	-3.20724	1.34375
41	-1.8339	-1.11803	0.00527
42	-1.37569	-0.54703	0.27185
43	-0.02	0.1966	0.0974
44	0.28647	-1.14914	-0.16715
45	0.51285	-0.59932	-0.81319
46	0.06854	-0.90641	0.34226

47	0.0981	0.69414	-0.11973
48	0.14056	-0.74122	0.11534
49	-0.25103	0.65875	0.17763
50	-0.02412	-0.6305	-0.03293
51	1.4788	0.77567	-1.41907
52	0.60318	-0.00712	-0.35166
53	0.1763	-0.58895	-0.10019
54	-0.35721	3.00297	0.5531
55	0.8776	0.57482	0.11583
56	0.21041	0.32684	0.02901
57	-0.11071	2.30648	0.26359
58	0.20109	-0.36551	-0.31148
59	0.09478	-0.64216	0.01998
60	0.17891	-0.28522	0.11703
61	-0.61608	0.20643	-0.1177
62	0.08187	0.09298	-0.46318
63	0.09278	-0.15833	-1.14875
64	0.13664	-0.49234	-0.08954
65	3.21918	-0.30092	-2.16278
66	0.2825	-0.20655	-0.50468
67	0.23445	1.14872	0.22167
68	0.64278	-0.1695	-0.2359
69	0.01689	-0.76947	0.08465
70	-0.37565	-0.54335	-0.12457
71	0.32192	0.30045	-0.25104
72	0.12252	-1.01423	-0.0842
73	0.57824	0.20491	-0.60304
74	-0.23094	-0.40931	0.02271
75	0.27948	-0.39605	-0.52935
76	0.16482	-0.79649	-0.26735
77	0.11652	-0.38601	-0.26468
78	0.64621	0.34611	-0.34687
79	0.08319	-0.26182	-0.07962
80	0.58239	-0.99919	-0.16226
81	-0.57285	3.22839	0.65627
82	0.07724	2.92744	-0.06567
83	0.07879	0.04326	-0.20579
84	-0.75999	-0.47593	0.20789
85	0.06785	-0.07229	-0.03497
86	-3.23108	0.5587	-0.78095
87	0.06459	-0.23594	-0.05091

88	0.75074	0.08035	-0.42431
89	0.45394	-0.72721	0.32023
90	0.06343	-1.02137	0.02203

Table IV shows the factor loading matrix of the 90 listed companies, indicating that the relative importance of the three common factors. According the cluster analysis, the samples are divided into the categories of a similar nature.

B. Cluster Analysis

Hierarchical cluster analysis first participate in each cluster sample as a class, and then based on the similarity between the sample gradually merge until all samples (or variables) merger for up to a major category. At the end there are four categories.

TABLE V. THE MEAN VALUE AND PERFORMANCE OF 3 COMMON FACTORS OF FOUR TYPES OF LISTING COMPANIES

Types	The ability of investment and earnings factor	Solvency factor	The ability of operating factor	No of companies
First	-0.3803725	-0.544507	-0.01561708	48
Second	0.386239	0.7221127	-0.2251275	40
Third	0.65511	0.45909	8.41099	1
Fourth	2.15324	-3.20724	1.34375	1

The analysis results (Table V) show that the financial position of 90 listed companies in Western China in 2009. We find that the third class is inferior strong, the ability of investment, profitability and operation are all inferior strong, and general debt paying ability. The fourth class of listed companies followed are not so good, the ability of investment and profitability are also inferior strong, but the poor solvency. These two types of companies each have one sample, which is belong to ST type of company, so there is no representative.

According to the three common factor scores of the rest of the 88 listed companies, most indicators values are low but the solvency factor value for the second class higher. These reflect that the ability of operating is weak, and the ability of investment and earnings is general.

V. CONCLUSIONS AND COMMENT

Such situation is not means that all listed companies in Western China are poor performance and low competitiveness, though the mean and fundamentals are lower. We can logically infer that Western Chinese rapid economic growth rate higher than the eastern and central regions is only part of the contribution from the listed companies. The majority of private

enterprises as well as other non-listed companies occupy another part of the region's economic growth, and its contribution should be larger. There are similarities in the listed companies of Western China. [13] These show that a region's economic development and prosperity rely on industry clusters, rather than independent development of several large public companies.

In addition, the potential for economic growth and competitiveness in Western China part come from the government's public policy factors. Special policies of the central and local governments also play a greater role in public service project to promote economic growth. [14] On the western development strategy of the Twelfth Five Year Plan, in addition to actively enhance the economic performance of listed companies as the core of the regional competitiveness, it's important to play the positive role of the government. At least from the short-term and medium-term, the protagonist of the development of the western region is the government, instead of listed companies. So the main body of resources allocation is the government, rather than the market.

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