

Analysis of the Competitiveness of Growth Enterprise Market Listed Companies IPO in 2015 in China

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Abstract

Based on the 2016 annual data, the article studies the competitiveness of 87 listed companies, who initially went public on China's GEM in 2015. Taking 12 financial indicators (current ratio, quick ratio, equity ratio, receivables turnover, current asset turnover, total asset turnover, operating margin, net profit margin, return on total assets, total asset growth rate, net profit growth rate, net asset growth rate) as research variables, using factor analysis, the article analyzes the solvency, operation performance, profitability, growth capability and overall competitiveness of these 87 listed companies.

Keywords

GEM, Listed Companies, Competitiveness, Factor Analysis

1. Introduction

Since the reform and opening, Chinese economy has obtained considerable progress. Meanwhile, China's capital market has also gradually improved. On November 12, 2013, "The CPC Central Committee's decision regarding several major issues of comprehensive reform" clearly pointed out that "establishing multi-level capital market system and promoting the reform of registration-based stock issuance". Since then, IPOs have significantly accelerated. From December 19, 1990 the first issuance of private stock, to the end of 2013, the total number of stocks in China A-share market has reached 2463, and by the end of 2016, this number reached 3178. Among them, the GEM market's performance has been compelling during the short few years since the official launching in October 2009.

There are many relevant literatures on the competitiveness of listed compa-

nies. Some of them take policy makers, managers and managers as the research perspective [1] [2]. [3] [4] [5] study the company from management, business model and market strategy. The competitiveness of listed companies in an industry is analyzed in some papers [6] [7] and the empirical analysis of regional listed companies' competitiveness is conducted in some papers [8] [9]. There are few quantitative researches on the competitiveness of GEM listed companies. The competitiveness of 355 listed companies in China's GEM was studied by Liu Hongjie, Wang Shuwei (2015) [10]. Through grey correlation analysis on MATLAB, they concluded that companies in cultural industry have the strongest competitiveness, and those in manufacturing have the weakest one.

As an important part of the multi-level capital market, the GEM has been favored by domestic venture capitals since launching, mainly for the high growth capability. In addition, private capital also loves to invest in high-tech enterprises, because these growth-oriented enterprises are the promoting drivers of China's industrial structure upgrades.

GEM has opened up broad financing platforms for the growing innovative enterprises, high-tech enterprises and outstanding SMEs, as well as effectively guided the capital from venture capital and industrial capital to flow to high-tech industries and new economic industries.

The forward-looking, highly risky, and unique structure often leads to radical fluctuations. Meanwhile, as the Chinese stock market is not mature enough, some risk-loving investors did not truly explore the company's long-term investment value and potential. Therefore, nowadays, in the rapid developing capital market in China, the topic of how to possess a rather objective and accurate judgement on the market competitiveness of Chinese listed companies through various financial indicators is worth discussing.

Based on the 2016 annual data, this article studies the competitiveness of 87 listed companies, who initially went public on China's GEM in 2015. Taking 12 financial indicators (current ratio, quick ratio, equity ratio, receivables turnover, current asset turnover, total asset turnover, operating margin, net profit margin, return on total assets, total asset growth rate, net profit growth rate, net asset growth rate) as research variables, using factor analysis, the article analyzes the solvency, operation performance, profitability, growth capability and overall competitiveness of these 87 listed companies.

2. Introduction of Mathematical Models and Analysis Process of Factor Analysis

2.1. Data Collection of Listed Companies

The 87 on China's GEM listed companies fall into 24 industry categories, of which 61 listed companies belong to manufacturing (including special equipment manufacturing, instrumentation manufacturing, pharmaceutical manufacturing, general equipment manufacturing, railway, shipping, aerospace and other transportation equipment manufacturing, computer, communications and

other electronic equipment manufacturing, electrical machinery and equipment manufacturing), 10 listed companies belong to software and information technology services, and the remaining 16 listed companies belong to other sectors. This article chooses four categories of 12 financial indicators to analyze the competitiveness of the above 87 listed companies. The first category reflects the solvency: current ratio, quick ratio, equity ratio. The second category reflects the operating performance: receivables turnover, current asset turnover, total asset turnover. The third category reflects the profitability: operating margin, net profit margin and return on total assets. The fourth category reflects growth capability: total asset growth rate, net profit growth rate and net asset growth rate. These 12 indicators are recorded as X_1, X_2, \dots, X_{12} . According to the 2016 annual data gathered from Shenzhen Stock Exchange website, the 12 financial indicators data can be obtained through calculation.

2.2. Mathematical Models and Analysis Process

Factor analysis is a multivariate statistical method that transforms multiple measured variables into a few unrelated composite indicators. These composite indicators are not related to each other, that is, the information represented by each indicator does not overlap and reflects the nature of things. Thus, we are able to name the composite indicators based on professional knowledge and the unique meanings reflected by indicators. These composite indicators are called factors.

Let the original variables and factors be X_1, X_2, \dots, X_m and F_1, F_2, \dots, F_p respectively. The mathematical model of factor analysis is

$$\begin{cases} X_1 = b_{11}F_1 + b_{12}F_2 + \dots + b_{1p}F_p + \varepsilon_1 \\ X_2 = b_{21}F_1 + b_{22}F_2 + \dots + b_{2p}F_p + \varepsilon_2 \\ \vdots \\ X_m = b_{m1}F_1 + b_{m2}F_2 + \dots + b_{mp}F_p + \varepsilon_m \end{cases}$$

Expressed as a matrix form $X = BF + E$, where B is the factor load matrix, F_1, F_2, \dots, F_p which is not related to each other, E is a special factor, contains random errors. The purpose of factor analysis is to get the common factor load factor and residual E , if the residual E effect is negligible, then $X = BF$. That is a special form of factor analysis when F_1, F_2, \dots, F_p are not related to each other, the mathematical model can be expressed as:

$$\begin{cases} F_1 = a_{11}X_1 + a_{12}X_2 + \dots + a_{1m}X_m \\ F_2 = a_{21}X_1 + a_{22}X_2 + \dots + a_{2m}X_m \\ \vdots \\ F_p = a_{p1}X_1 + a_{p2}X_2 + \dots + a_{pm}X_m \end{cases}$$

Expressed as a matrix form $F = AX$, F_1, F_2, \dots, F_p are also known as the principal component. The principal component analysis is to find the coefficient matrix A , so that the proportion of F_1, F_2, \dots, F_p in the total variance decreases in turn.

The specific process of factor analysis goes as follows:

1) Conduct applicability test. In this paper, KMO and Bartlett spherical tests are performed, where the Kaisex-Meyer-Olkin measure verifies whether the partial correlation between the variables is small and whether the Bartlett's test of sphericity is a unit matrix.

2) Select the analysis matrix. This paper specifies the basis for analyzing the correlation coefficient matrix of the variables as the extraction factor.

3) Conduct factor extraction. In this paper, we will select the principal component analysis to obtain the initial factor analysis results, which specify the extraction of eigenvalues greater than 1 factor.

4) Conduct factor rotation, so that the meanings of factors are clear, and the factors are named. In this paper, we choose the maximum rotation of variance, which is an orthogonal rotation method that minimizes the number of variables with the highest load on each factor, and simplifies the interpretation of the factor.

5) Calculate factor scores for further analysis.

3. Empirical Analysis of the Competitiveness of GEM Listed Companies IPO in 2015 in Chin

In this paper, software "Statistical Product and Service Solutions (SPSS)" is used to analyze the selected 12 financial indicators data.

3.1. Applicability Test of Data

The correlation coefficient matrix of the original data is verified by KMO and Bartlett sphericity, and the KMO test value is obtained $0.708 > 0.6$. The spherical test is significant, $P(\text{sig.} = 0.000) < 0.05$. The data selected in this paper is suitable for factor analysis.

3.2. Factor Extraction and Naming

The principal component analysis method is used to obtain the eigenvalue and the cumulative variance contribution rate of the correlation coefficient matrix. The maximum variance method of the chair load matrix is selected to obtain the **Table 1** and **Table 2**.

There are totally 4 factors with eigenvalues of more than 1, their cumulative contribution rate was $89\% > 85\%$. This result meets the requirement of cumulative contribution rate. Therefore, these four factors are selected:

The principal component F1 is mainly used to explain current ratio, quick ratio, equity ratio, which mainly reflect the solvency of listed companies. Thus, F1 can be called as solvency capacity factor; F2 is mainly used to explain operating margin, net profit margin, return on total assets, which focus on the level of profitability of listed companies. Thus, F2 can be called profitability factor; F3 is mainly used to explain receivables turnover, current asset turnover, total asset turnover, which reflect the level of operation of listed companies. Thus, F3 can be

Table 1. Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings after rotation		
	Total	% of Variance	cumulative %	Total	% of Variance	cumulative%
1	4.499	37.494	37.494	3.017	25.142	25.142
2	2.628	21.897	59.392	2.881	24.006	49.149
3	2.357	19.640	79.032	2.455	20.462	69.610
4	1.233	10.274	89.306	2.363	19.696	89.306

Table 2. Component matrix after rotation.

	Component			
	1	2	3	4
current ratio	0.949	0.249	-0.110	-0.074
quick ratio	0.948	0.233	-0.124	-0.055
equity ratio	0.918	0.235	-0.060	0.171
receivables turnover	0.037	0.191	0.763	-0.008
current asset turnover	-0.196	-0.029	0.935	0.080
total asset turnover	-0.136	-0.107	0.878	-0.091
operating margin	0.348	0.903	-0.082	0.080
net profit margin	0.360	0.902	-0.147	0.047
return on total assets	0.217	0.839	0.377	-0.157
total asset growth rate	-0.033	-0.042	-0.057	0.958
net profit growth rate	-0.079	0.569	0.149	0.652
net asset growth rate	0.105	-0.041	-0.037	0.967

called operating performance capacity factor; F4 is mainly used to explain the total asset growth rate, net profit growth rate, net asset growth rate, which focus on the ability to reflect the development of listed companies. Thus, F4 can be called the development capability factor.

3.3. Factor Scoring and Ranking

The four factor scores of 87 listed companies were calculated by least squares regression method:

$$\begin{cases}
 F_1 = 0.376X_1 + 0.378X_2 + 0.376X_3 + 0.065X_4 + 0.034X_5 + 0.071X_6 \\
 \quad - 0.071X_7 - 0.074X_8 - 0.065X_9 + 0.01X_{10} - 0.148X_{11} + 0.078X_{12} \\
 F_2 = -0.106X_1 - 0.113X_2 - 0.123X_3 + 0.015X_4 - 0.053X_5 - 0.092X_6 \\
 \quad + 0.355X_7 + 0.359X_8 + 0.328X_9 - 0.061X_{10} + 0.247X_{11} - 0.097X_{12} \\
 F_3 = 0.047X_1 + 0.043X_2 + 0.072X_3 + 0.325X_4 + 0.393X_5 + 0.379X_6 \\
 \quad - 0.072X_7 - 0.1X_8 + 0.115X_9 - 0.005X_{10} + 0.018X_{11} + 0.021X_{12} \\
 F_4 = -0.027X_1 - 0.018X_2 + 0.08X_3 + 0.003X_4 + 0.052X_5 - 0.017X_6 \\
 \quad - 0.01X_7 - 0.025X_8 - 0.101X_9 + 0.412X_{10} + 0.25X_{11} + 0.42X_{12}
 \end{cases}$$

The variance contribution rate of each common factor was calculated as weighted average of weight, and the comprehensive factor score:

$$F = (25.142F_1 + 24.006F_2 + 20.462F_3 + 19.696F_4) / 89.306 \\ = 0.2815F_1 + 0.2688F_2 + 0.2291F_3 + 0.2205F_4$$

lists the top 10 and the last 10 ranking companies based the comprehensive factor scores.

In **Table 3**, the serial numbers of companies location are: ① Guangdong; ② Zhejiang; ③ Hubei; ④ Beijing; ⑤ Hebei; ⑥ Jiangsu; ⑦ Shandong; ⑧ Shanghai; ⑨ Shanxi. The serial numbers of companies industry are: I Animal husbandry; II Chemical raw materials and chemical products manufacturing; III Software and information technology services; IV Pharmaceutical manufacturing; V Metal products industry; VI Computer, communications and other electronic equipment manufacturing; VII Press and publishing industry; VIII Special equipment manufacturing; IX General equipment manufacturing; X Electrical machinery and equipment manufacturing industry; XI Internet and related services; XII Research and experimental development.

Table 3. The top 10 and the last 10 ranking companies based the overall factor scores.

Stock abbreviation	Stock code	Location	Industry	F1	F2	F3	F4	F
Wens	300,498	①	I	37	4	1	24	1
Jinke Culture	300,459	②	II	10	36	35	1	2
Century Network	300,494	③	III	1	45	34	43	3
Science Sun Pharmaceutical	300,485	④	IV	2	7	43	46	4
Lucky Innovatie Materials	300,446	⑤	II	4	1	24	85	5
ESTTOOLS	300,488	②	V	3	13	56	53	6
TFC Optical	300,394	⑥	VI	6	3	50	65	7
ChineseAll	300,364	④	VII	9	84	51	2	8
Jinlei Wind Power	300,443	⑦	VIII	23	5	53	16	9
LiXing CO., LTD.	300,421	⑥	IX	5	78	27	11	10
Information Development	300,469	⑧	III	59	74	29	41	78
Hanbang Technology	300,449	④	IX	36	75	36	73	79
Failong Crystal	300,460	①	VIII	51	72	45	68	80
Tanac Automation	300,461	②	VIII	80	60	78	13	81
Luyitong	300,423	⑦	X	40	61	70	76	82
New Universal Science and Technology	300,472	④	VIII	60	70	67	60	83
Precise	300,442	⑧	VIII	45	82	54	79	84
Baofeng Group	300,431	④	XI	32	86	10	14	85
Boji Medical & Biotechnological	300,404	①	XII	19	85	87	86	86
OMH	300,486	⑨	VIII	21	87	76	87	87

4. Conclusions and Analysis

The geographical distribution is not even and includes 18 provinces, of which 16 in Beijing, 14 in Guangdong province, 9 in Jiangsu province, 10 in Sichuan province, 9 in Zhejiang province, 5 in Shanghai and the rest 25% of the companies scatter across 12 provinces.

The industry distribution of 87 public companies listed on the China's GEM in 2015 is also uneven, of which 81.6% operate in manufacturing, IT and related servicing industries, while others only occupy 19.4%. This implies a need to further develop enterprises in culture & sports, entertainment, healthcare and social activities.

The result of conducting factor analysis on SPSS has shown that, there are differences in competitiveness between the above-mentioned 87 listed companies, both within the same industry or between different ones. The comprehensive factor scores of the top 10 companies are 2.0133, 1.9386, 1.1839, 1.1439, 1.0994, 0.8474, 0.7765, 0.4792, 0.4353, 0.4270 and the comprehensive factor scores of the last 10 companies are -0.3964, -0.3969, -0.4192, -0.4198, -0.4369, -0.5458, -0.6686, -0.7402, -0.7493, -1.4267.

The No. 1 ranking company "Wens" is the only one who operates in animal husbandry. According to **Table 3**, the company has an outstanding operating ability and ranks among the best candidates for profitability. Its net assets value per share is 7.002 yuan and P/E ratio is 13. The market value of "Wens" is undervalued in China's A share market.

The 8th ranking company "ChineseAll" is the only publisher among the 87 listed companies and is also a digital media company in China A-share market. With the growth of China's Per Capita GDP, consumer demand is upgraded and shifted towards demands for culture, entertainment and education from the basic necessities of life. The size of China's digital publishing industry continues to grow, the rate of digital reading gradually increases and, digital publishing continues to apply in the education industry. "ChineseAll" was established in Tsinghua University in 2000, as one of the pioneers of digital publishing in China. Since its establishment, the company's focus has always been driving business operations with technology development and the tracing, studying and exploration of digital publishing related techniques. Its related technology covers the production, processing, operations, publishing and utilization of digital contents. Meanwhile, "ChineseAll" also involves in the related technology of standard data formats, industry standards and digital right protections. The company's technology advantages are outstanding. "ChineseAll" used its vast technological superiority to drive business operations. Now, the company develops around "literature +", "education +", which is the role model of the cultural industry with new service standards. According to **Table 3**, the firm ranks second in growth capability but 84th in profitability. Its profitability needs to be improved.

Only one of the top 10 companies engages in special equipment manufactur-

ing, and among the last 10 listed companies, five engage in special equipment manufacturing.

“Jinlei Wind Power” services for the global high-end and middle-end wind turbine manufacturers and engages in research, production and sales of wind power spindle and open-die forgings. “Jinlei Wind Power” is committed to technological innovation and R&D. It has 12 core technologies, 7 of which are in domestic advanced levels. It has a complete production process of wind power spindle. It has the advantage of customer resources. In 2016, its domestic market share and global market share was 11.65% and 14.36%. Its customers included GE, Siemens, Gamesa, United Power, Envision, which were among the top 10 wind turbine manufacturers in 2016 according to the “Renewable Energy World” magazine.

The profitability and growth capacity of “OMH” came last among the 87 companies, due to the fact that its main revenue driver is the intelligent logistics delivery system. Affected by the decrease of fixed asset investment in the auto industry, revenue of “OMH” was significantly reduced.

“Precise” engaged in research, production and sales of liquid food packaging machinery and aseptic packaging materials. Affected by the depression in the liquid food industry during 2016, the demand for raw material of liquid food packages and liquid food packaging machines sharply decreased, which led to a substantial decline in the company’s operating profit.

In short, each stock has countless seemingly purchase basis. By careful study and observation, the elements of a company’s success will be found. And investors can get great profits from the companies with good products and good business models.

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