FACTORIAL ANALYSIS TO MEASURE DEVELOPING ABILITY OF LISTED RETAIL ENTERPRISES

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Abstract: Retail business is the first to start and achieve the marketization in China. In recent years, China's retail business market has been developing rapidly, and in the meantime its status has been rising steadily. The 2008's financial crisis struck the China's retail business to some degree, but the government's effective policy of expanding domestic demand plays an important role in its development. Improving the development of retail business industry will positively influence itself, but also the whole market and the national economy. According to the factor analysis model，by using the method of empirical analysis, this paper objectively evaluates the developing ability of our country's listed retail enterprises and the key factors which influence its developing ability. Meanwhile some proposals are put forward for the development of our country's retail business.

1 INTRODUCTION

Retail business is the industry selling products directly to consumers or community groups. With its growing effect in the national economy, retail business has already become a leader to guide the production and consumption. China's retail business has experienced a process from small to large, closed to open, single to multiple in the nearly 30 years, and its position is rising in the global market year by year. In 2009, the amount of China's total retail sales of social consumer goods is 12.53 trillion Yuan, up 15.5% over 2008, and consumer-driven economic growth is 3.9%. Therefore, I think doing some analysis and research on China's retail business will be profound significant.

1.1 Literature Review

The achievement of factorial analysis in stock value overseas is the conclusion that factorial analysis is suitable for stock market, which contributed by S. Genesalingam and Kuldeep Kumar in 2001. They drew conclusions after analyzing some companies' data obtained from US stock market from 1986 to 1991.

The application of factorial analysis in stock market of China is some concrete analysis based on the existing theories.

Limei Li and Xiangdong Liu. *Factorial Analysis in Stock Market*. They choose five stocks from New York stock market and abstracted two factors finally to calculate scores and ranking of every enterprise.

Bing He and Xingsan Qian. *Cluster Analysis and Factorial Analysis in stock market*. They divided stocks of listed automobile companies into blue-chip share, average share and trash share by cluster analysis, and extracted three integrated factors to reflect companies' financial position which used to evaluate the value of these companies.

1.2 The Trail of Thought

The author selected factorial analysis model to conduct a research on the developing ability of China's retail business. First, I established a set of financial index and collected data of listed retail enterprises as samples. Second, I extracted main components by Spss and drew a score function to elicit a developing ability function. Third, I calculated the scores of all companies and ranked them based on the scores. At last, I made a sound analysis according to the analysis integrated practical situation.

2 MODEL AND INDEX

2.1 Factorial Analysis Model

The author selected factorial analysis as the main method in this article. Factorial analysis is proposed by British psychologist C. Spearman and used in the field of psychology and social pedagogy. It is a method extracting only a few integrated components from a mass of figures based on the internal correlation matrix. The fundamental idea of factorial analysis is dividing the original variables into some groups conformed to the principle that every variable in the group is high related with each other, while variables in different groups have low correlative level. Every group is an integrated factor called component which expresses an aspect of essential features of original data.

2.2 Index

The author selected capital value-retaining and value-increasing rate as dependent variable to evaluate the developing ability of corporations. Capital value-retaining and value-increasing rate equals to the equity at the end of the year dividend by equity at the beginning of the year. Higher this figure is, better the condition of enterprise's capital preserving ability, in turn stronger developing ability.

The author selected six financial ratios as the independent variables:

1. Asset-to-debt ratio equals to the total assets dividend by total debts. Asset-to-debt ratio reflects the borrowing proportion in the total assets. The higher the ratio is, the bigger the financial risk enterprises are facing.

2. EPS reflects the profit level of common stock. The compare between corporations contributes to the evaluating of relative profit ability.

3. Net profit margin equals to the net income divided by sales.

4. Cost-to-operating income ratio equals to operating cost divided by operating income. It is an important figure to evaluate the efficiency of corporations' operation.

5. Total assets turnover equals to operating income divided by average assets. It is an important figure to evaluate the efficiency of assets turnover.

6. Equity turnover equals to sales divided by average equity. It reflects the efficiency of the management of assets.

3 ANALYSING PROCESS

3.1 Selecting Sample Data

This article gathered financial ratios from 58 listed industrial retail enterprises in 2009 as the sample data. According to China's law, A-share and B-share followed different accounting standards, so the compare of their financial ratios is unreasonable. Therefore, the author excluded B-stock listed companies from research. In order to study theses corporations' developing ability in the market full of fierce competition, the author selected financial ratios of all A-stock listed companies.

3.2 Resource of Data

All data used in this article is collecting from Guotaian database (http://www.gtarsc.com).

3.3 Factorial Analysis

The author analyzed sample data by Spss.

Table 1: KMO and Bartlett's Test.

KMO and Bartlett's Test		
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.487
Bartlett's Test of Sphericity	Approx. Chi-Square	109.553
	df	15
	Sig.	.000

KMO test before analysis. The p value is 0.000, less than 0.005. So we can conclude that factorial analysis is available.

Table 2: Communalities.

Communalities		
	Initial	Extraction
Asset-to-debt	1.000	.759
EPS	1.000	.606
Net profit margin	1.000	.522
Cost-to-operating income	1.000	.438
Total asset turnover	1.000	.849
Equity turnover	1.000	.764

The rate of extraction is quite high, which indicates that most information has been extracted by factorial analysis. So the analysis is effective. For example, 0.759 means 75.9% information of sample data has been extracted.

Table 3: Total Variance Explained.

Total Variance Explained			
Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.276	37.935	
2	1.662	27.704	
3	.752	12.535	78.174
4	.685	11.419	89.593
5	.484	8.071	97.664
6	.140	2.336	100.000

According to Table 3, the first two factors' eigenvalues is more than 1. So I extracted them as the main factors.

Table 4: Total Variance Explained.

Total Variance Explained			
Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	2.276	37.935	37.935
2	1.662	27.704	65.638

The accumulated contribution rate of two factors is 65.638%, largely reflected most information of the original variables.

Table 5: Rotated Component Matrix.

Rotated Component Matrix		
	Component	
	1	2
Asset-to-debt	.319	-.811
EPS	.553	.548
Net profit margin	.020	.722
Cost-to-operating income	.637	-.180
Total asset turnover	.878	.280
Equity turnover	.830	-.273

Rotated component matrix reflects the correlation coefficient between two components and six variables.

Component 1 has a heavy loading on cost-to-operating income, total asset turnover and equity turnover, which indicates that operating capacity is an important factor related to developing ability. Therefore, I defined component 1 as Operating Factor.

Component 2 has a heavy loading on asset-to-debt, EPS and net profit margin, which indicates that the proportion of loan and ability to profit are important factors related to developing ability. Therefore, I defined component 2 as Profit Factor.

Table 6: Component Transformation Matrix.

Component Transformation Matrix		
	Component	
	1	2
1	.998	-.060
2	.060	.998

The absolute value of correlation coefficient between component 1 and component 2 is 0.06, which indicates that they are irrelevant.

Table 7: Component Score Coefficient Matrix.

Component Score Coefficient Matrix		
	Component	
	1	2
Asset-to-debt	.133	-.484
EPS	.248	.335
Net profit margin	.016	.434
Cost-to-operating income	.278	-.102
Total asset turnover	.389	.177
Equity turnover	.363	-.156

I arrived at two component score functions by regression method, using the information in Table 7:

$$F_1 = 0.133L_1 + 0.248L_2 + 0.016L_3$$
$$+0.278L_4 + 0.389L_5 + 0.363L_6$$
$$F_2 = -0.484L_1 + 0.335L_2 + 0.434L_3$$
$$-0.102L_4 + 0.177L_5 - 0.156L_6$$

Now, the variables applying to developing ability analysis of retail business are 2 component variables instead of 6 basic variables. Due to different influence on the developing ability, I gave the two components different weight which is their % of variance.

$$\text{Developing ability} = 0.37935F_1$$
$$+0.27704F_2$$

I calculated the scores of developing ability of the 58 listed industrial retail enterprises according to the developing ability equation. Followings are the top five and last five ones:

Table 8: Scores.

Stock code	F1	F2	Scores	Ranking
600729	5.16200	-0.08833	1.93373	1
600306	4.61499	0.32048	1.83948	2
600693	4.17611	-0.95516	1.31959	3
600361	3.75471	-0.47394	1.29305	4
600560	3.14885	0.28592	1.27373	5
600738	0.41196	-0.29371	0.07491	54
600515	0.25753	0.37288	0.00561	55
600628	0.44913	0.92913	0.08703	56
600774	0.31733	-0.83568	-0.11114	57
000026	0.32905	-0.90545	-0.12602	58

3.4 Summary

There are two extracting factors affect developing ability - Operating component and Profit component. Both of them play crucial roles, while Operating

component is relatively more important than Profit component.

Chongqing Department Store (600729) ranked first in the developing ability, and Commercial City (600306) landed just behind it. At the bottom of the table, are Hanshang Group (600774) and FIYTA A (000026).

The operating ability of Chongqing Department Store ranked first among the 58 stocks, which indicates its outstanding asset management ability. It can be revealed from following figure: Total asset turnover ratio of Chongqing Department Store is 368.28%, while 10.29% of Hanshang Group. The high ratio indicates a fast turnover speed of assets from input to output, in turn a strong sales force. This result corresponds to reality. Chongqing Department Store adopted the advanced chain-like management developing model. Due to splendid management team, rich market resource and gook prestige, its brand has stricken root in the hearts of the consumers. As a result of 2008 Financial Crisis, retail business experienced a recession. However, Chongqing Department Store maintained sound momentum of development.

Among 58 listed companies, the operating ability of FIYTA ranked the bottom three, and the profit ability of FIYTA ranked fifth from the bottom. FIYTA is a leading enterprisee in China's watch making industry. Its poor performance in the analysis should be attributed to 2008 Financial Crisis, which had many impacts of luxury industry. Facing this situation, FIYTA has adjusted strategies to tide over the difficulty and wormed out of trouble in 2010.

4 CONCLUSIONS

The empirical analysis of developing ability of China's retail business by using the method of factorial analysis supports some conclusions as follows:

First, according to the practical situation, the results of empirical analysis are in general agreement with the market status. Hence, the index system, models the author used in this article is appropriate.

Second, the developing ability equation shows that: Operating ability and profitability are two key factors to the development of company. China's retail business has been facing severe challenges since China joined to WTO. Domestic market is occupied by some well-known multinational groups. China's companies won't win this battle only by low

pricing, operation expanding. They need to focus on improving the operating ability and profitability. Our government has established lots of policies to expand domestic demand theses years; it comes easier to make a profit for most of retail corporations. However, in a positive situation, many retail corporations ignore operation management. It will weaken their developing abilities, make them expose to huge risk in future development and be in a position of disadvantage ultimately. So it's very important for retail corporations to keep high efficiency and high turnover ratio to avoid breaks of fund chain which will lead to a financial crisis.

Third, the ranking of retail corporations shows that: The financial crisis has considerable influenced on retail business. Some corporations lived through the difficulty. On one hand, these corporations may have low price elasticity of revenue. On the other hand, they have built mature operation and management systems. To sum up, although the influence of 2008 financial crisis has been weakening gradually, it is necessary for corporations to learn something from the experience. Pay more attention to the internal management. Try to defuse potential risks and adjust strategies timely to keep a stable condition in any situation.

REFERENCES

Weidong Li, 2008. *Applied Multivariate Statistical Analysis*, Peking University Press. Beijing, 1st edition.

Zinai Li, 2008. *Econometrics*, Higher Education Press. Beijing, 2nd edition.

Quan Liu, 2010. *Factorial Analysis Applied in the Stock Market.* In China Academic Journal Electronic Publishing House(2010).

Banguo Dong and Zhiyong Wang, 2010. *The Analysis of Asset Atructure of Listed Retail Enterprises.* In China Market (2010).