

An Assessment on Financial Performance of Listed Companies in the Industry of the New Energy Automobiles in China

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Abstract—The thesis in hand analyzes, from a financial perspective, the overall status of global new energy automobiles industry with a special focus on issues emerging in china domestic companies. It chooses 10 financial indicators as research variables and it applies the method of factor analysis. It is an empirical study which has built analytical models and regressive equations for financial assessment within the industry. It finds the financial performance of those listed companies is optimistic in general, but their development process is imbalanced and unstable. It suggests that the companies have to pursue a balanced development, improve their financial management system, and make full use of government policies so as to have a better financial performance. At the same time, the government had better continue to allocate more resources to the industry.

Keywords—new energy automobile; factor analysis; financial performance assessment; financial management

I. INTRODUCTION

Under a circumstance of increasingly severe energy crisis and environmental pollution, it seems inevitable for all countries to develop low-carbon economy and encourage energy saving and emission reduction. For the automobile industry, it is a very critical moment - developing new energy cars will not only have numerous benefits in environment protection, energy security, and expansion of domestic demand, but also boost the industry to leap forward and change the way of economy growth, thus increasing the competence of whole industry. In western countries, environmental issues have been always treated seriously, so new energy cars play an important role in the development of the automobile industry. Some of

the countries support the industry with favorable policies, inputting considerable capital and human resources that help make breakthroughs.[1] In China, recent years have seen a thriving trend in the new energy automobile industry. Its rise is also a beneficial supplement to the comprehensive and sustainable development of China economy. Similar to western countries, much resources and many favorable policies are allocated to the industry in China. Meanwhile, domestic new energy automobile companies have been adapting themselves to the government policies of innovation in science and technology, environment protection, and sustainable development; and they continue to grow by taking the opportunity and advantageous situation. [2] This study is to analyze the existing problems in the listed companies in new energy automobile industry in China. It also gives possible solutions from company perspective and government perspective.

II. CONSTRUCTION OF INDEX SYSTEM

On the basis of “Enterprise Performance Assessment System” (by Ministry of Finance) and “Interim Measures on Comprehensive Performance Assessment of state-owned Enterprises”(by State Council), the study in hand has set up an assessment system including ten financial indicators, which can be divided into three categories: operating ability, solvency, and profitability. In specific, indicators of operating ability include: receivables turnover, inventory turnover, current assets turnover, and total assets turnover; the solvency category measures: current ratio, cash ratio, asset-liability ratio, and equity ratio; while profitability is measured by rate of return on total assets and net profit margin. [3] (see Table I)

TABLE I. INDEX SYSTEM

Primary Index	Secondary Index	Computational formula
Operating ability	Receivables turnover	The average balance of operating income / accounts receivable Operating cost/average inventory balance Operating income / average balance of current assets Average operating income / total assets balance
	Inventory turnover	
	Current assets turnover	
	Total assets turnover	
Solvency	Current ratio	Current assets/current liabilities Monetary funds/current liabilities Total liabilities/total assets Total liabilities/total equity of shareholders
	Cash ratio	
	Asset-liability ratio	
	Equity ratio	

Cont. to TABLE I		
Profitability	Rate of return on total assets Net profit margin	Total net profit / average assets Net profit / operating income

III. DATA COLLECTION AND RESEARCH METHODOLOGY

In this study, 21 new energy automobile companies listed in Shanghai Stock Exchange or Shenzhen Stock Exchange are chosen to build a factor analysis model; financial data is cited or derived from their annual reports from 2015 to 2018, which are recorded in China Stock Market & Accounting Research (CSMAR) Database. Three kinds of data are excluded for the following reasons:

- 1) Companies with their stocks labeled as “special treatment(ST)” or “particular transfer(PT)”. Data of such companies are excluded because they have had deficit for 3 years in a row, or other abnormal financial problems. Such data will affect the accuracy of this study;
- 2) Companies that are listed in stock markets less than two years. It is likely for these companies to technically beautify their performance in a short period, so as to go public successfully. Such data might be biased;
- 3) Companies that have abnormal information change or delisted companies. Data of such companies is excluded for its special feature.

As described earlier, ten financial indicators are cited or deprived from recorded data, i.e. receivables turnover, inventory turnover, current assets turnover, total assets turnover, current ratio, cash ratio, asset-liability ratio, equity ratio, return on total assets, and net profit margin. [4] The research method

is using Excel as tool for primary data processing and SPSS for factor analysis.

IV. RESULTS OF FACTOR ANALYSIS

A. KMO & Bartlett test

The tool, SPSS, is applied here to standardize 10 financial indicators of each sample company. After processing 210 groups of data, the results of their correlation test are shown in Table II.

TABLE II. KMO AND BARTLETT’S TEST

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.469
Bartlett's Test of Sphericity	Approx. Chi-Square df Sig.	73.508 28 .000

KMO and Bartlett tests are used to preliminarily determine whether the quoted data is suitable for factor analysis. The statistics of Bartlett test are based on the determinant of the correlation coefficient matrix. If the value is large, then the zero-hypothesis should be rejected. Instead, It should be considered that the correlation coefficient matrix is not a unit matrix, that is, the correlation between the original variables is suitable for factor analysis. [5] The value of Sig in Table II is much less than 0.05, which is acceptable for factor analysis.

B. Extracting the common factors

TABLE III. TOTAL VARIANCE EXPLAINED

Initial Eigenvalues				Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
C	T	% of V	Cum %	T	& of V	Cum %	T	% of V	Cum %
1	3.1	31.38	31.38	3.13	31.4	31.4	3.01	30.13	30.13
2	2.6	26.09	57.47	2.61	26.1	57.5	2.37	23.71	53.84
3	1.4	14.90	72.38	1.49	14.9	72.4	1.85	18.5	72.38
4	.88	8.887	81.26						
5	.73	7.306	88.57						
6	.53	5.377	93.95						
7	.37	3.696	97.64						
8	.13	1.374	99.02						
9	.08	.858	99.88						
10	.01	.120	100.0						

Extraction Method: Principal Component Analysis.

As factor analysis is used here, three principal components in Table III with characteristic roots greater than 1 are extracted. The variance contribution rate of the first principal component is 31.38%; the second, 26.09%; and the third, 14.90%. The subtotal of the three components is 72.38%, which is much greater than 60%, showing that the degree of information loss after extracting the common factors is acceptable. That is to say they can accurately describe the financial performance of sample companies in the new energy automobile industry.

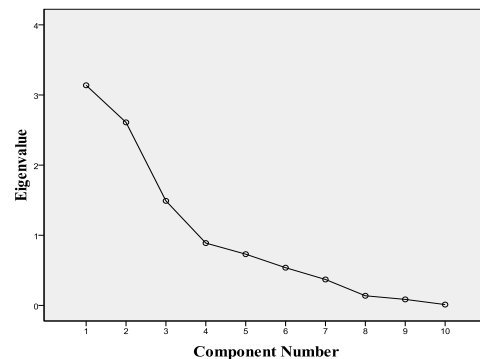


Fig.1 Scree Plot

A scree plot displays the proportion of the total variation in a dataset that is explained by each of the components in a principle component analysis. Those components on the curve with greater slope are considered to represent the vast majority of the information of the original variables. The slope of the first three components in Fig. 1 is steeper and from the fourth one, the slope of the curve gradually decreases and eventually tends to be flat. Therefore, it can be suggested that the first three ones are sufficient to accurately summarise the financial performance of sample companies.

C. Defining the factor variables

In order to more clearly display the common factors represented by each variable, the maximum variance method is used and the load matrix is rotated, as shown in Table IV.

TABLE IV. ROTATED COMPONENT MATRIX

	Component		
	1	2	3
Current assets turnover	.948	-.108	
Total assets turnover	.830	.103	.240
Receivables turnover	.689	-.373	-.286
Current ratio	-.677	-.493	.194
Net profit margin	.593	.493	.404
Asset-liability ratio		.884	-.371
Equity ratio	-.258	.738	-.283
Inventory turnover	.149	.536	.178
Rate of return on total assets	.170		.844
Cash ratio	-.152	-.331	.739

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

The proportion of each variable shows the explanatory power and varying amount of the three principal components. The first common factor, F1, takes considerably large loads on current assets turnover A (94.8%), total assets turnover A (83.0%) and accounts receivable turnover rate (68.9%), thus reflecting the company's operating ability; the second common factor, F2, has larger loads on assets-liabilities ratio (88.4%) and equity ratio (73.8%), reflecting the company's solvency; the third common factor, F3, accounts for larger loads on net profit margin (40.4%) and return on total assets (ROA) A (84.4%), reflecting the profitability of the company. The above three principal components exactly reflect the three representative indicators of sample companies.

D. Calculating the scores of the factors

TABLE V. COMPONENT SCORE COEFFICIENT MATRIX

	Component		
	1	2	3
current ratio	-.221	-.163	.104
cash ratio	-.088	-.055	.401
asset-liability ratio	-.028	.356	-.111
equity ratio	-.108	.313	-.060
receivables turnover	.278	-.237	-.258
inventory turnover	.010	.253	.154
current assets turnover	.327	-.091	-.038
total assets turnover	.263	.029	.092
rate of return on total assets	-.003	.100	.479
net profit margin	.149	.236	.248

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

According to the score coefficient matrix of regression factor shown in table VI, the three factors are expressed as linear combinations of the 10 variables, and the formulas are as follows:

$$F_1 = -0.221X_1 - 0.088X_2 - 0.028X_3 - 0.108X_4 + 0.278X_5 + 0.010X_6 + 0.327X_7 + 0.263X_8 - 0.003X_9 + 0.149X_{10}$$

$$F_2 = -0.163X_1 - 0.055X_2 + 0.356X_3 + 0.313X_4 - 0.237X_5 + 0.253X_6 - 0.091X_7 + 0.029X_8 + 0.100X_9 + 0.236X_{10}$$

$$F_3 = 0.104X_1 + 0.401X_2 - 0.111X_3 - 0.060X_4 - 0.258X_5 + 0.154X_6 - 0.038X_7 + 0.092X_8 + 0.479X_9 + 0.248X_{10}$$

E. Analyzing the results

According to the above three formulas, the factor scores of sample companies are calculated respectively in terms of operating ability, solvency and profitability from 2015 to 2018. Then, the average scores of each factor are calculated with the formula below:

$$Y = (0.30134F_1 + 0.23715F_2 + 0.18533F_3) / 0.72383$$

The calculation results are shown in Table VII.

TABLE VI. SUMMARY OF FACTOR SCORES

Company Name	F ₁	F ₂	F ₃	Y
Ankai Bus	0.210045	7.810332	2.675391	3.331369685
Zhongtong Bus	0.548282	5.055162	2.33574	2.482535317
Yaxing Bus	-1.62225	8.590875	0.448292	2.254065036
Jianghuai Car	5.314518	2.271278	-0.87422	2.732811956
Jinlong Car	0.354574	3.527462	1.178863	1.605160996
Yutong Bus	0.924985	2.473565	1.258012	1.517605446
Futian Car	1.747217	2.314451	0.440066	1.598352975
Dongfeng Car	1.625637	1.376543	0.086167	1.149836158
Shangqi Group	7.274609	-1.30507	-3.55993	1.689446482
Jiangling Car	4.923939	-1.0326	-2.07221	1.181016331
BYD	0.929898	1.076417	-0.0492	0.727201529
CHA	2.662647	0.243856	-1.26029	0.86570584
Longmahuanwei	0.728119	0.554123	0.457505	0.601814173
Hualingxingma	0.808473	1.002774	-0.43638	0.553387541
Zhongtai Car	0.747084	0.331283	0.055896	0.433871426
Beiqilangu	-0.95868	0.805594	0.466815	-0.015647879
Guangqi Group	11.81985	-6.52717	-8.21724	0.678298065
Changan Car	15.59533	-10.0448	-12.3901	0.029186295
Haima Car	20.4196	-15.1734	-17.4781	-0.945470452
Changjiang Car	31.60791	-22.5204	-26.4168	-0.983412049
Yiqi Car	98.5728	-80.988	-89.3673	-8.37877017

In general, the results show an optimistic financial performance of Listed Companies in the new energy automobile industry, whereas development of each one tends to be unbalanced and unstable., 16 companies, accounting for 76.19% of the total 21 sample companies, score more than zero, indicating that their financial performance is sound. However, 8 of them score slightly greater than zero, showing their performance level is obviously lower than that of other industries, which indicates that the capital and human resource input into the industry is still insufficient. The top three listed companies are Ankai Bus, Zhongtong Bus and Yaxing Bus. Ankai Bus and Zhongtong Bus, which ranked first and second, have higher scores on solvency (7.810332 for the former and 5.055162 for the latter) and profitability (2.675391 and 2.33574 respectively) The third-ranked Yaxing Bus has the

highest factor score of 8.590875 compared within the industry. Fig. 3, Fig. 4 and Fig. 5 are the scores of three main factors of Ankai Bus, Zhongtong Bus and Yaxing Bus from 2015 to 2018.

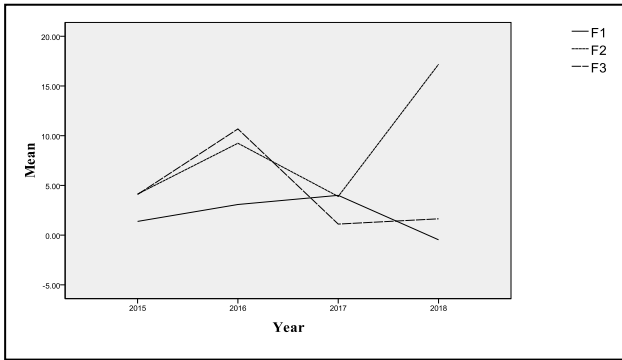


Fig.2 Ankai Bus

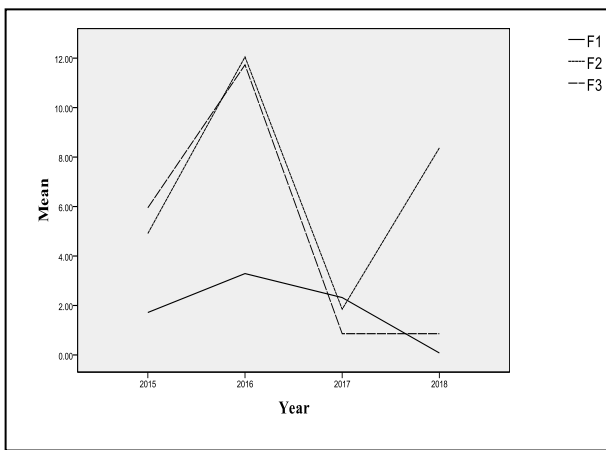


Fig.3 Zhongtong Bus

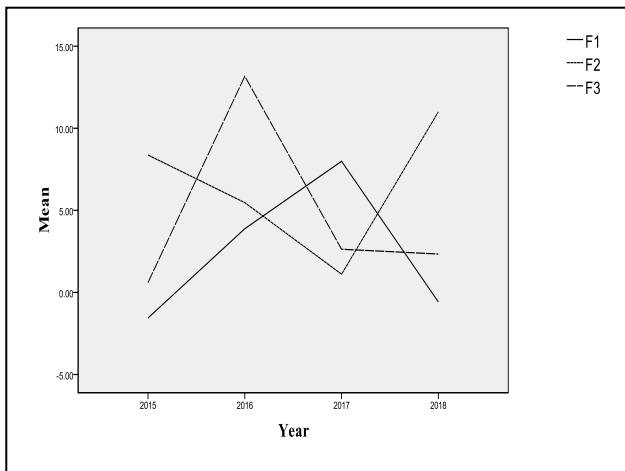


Fig.4 Yaxing Bus

From Fig. 2 to Fig. 4, it can be seen that the operating ability, solvency and profitability of the three listed companies are unstable from 2015 to 2018, and they differ greatly.

However, the solvency and profitability of the three companies are on the rise, though the operating ability is on the decline. Examining a single factor, the common factor F1 represents the company's operating ability, which weighs the highest among the three common factors, reaching 31.38%. It can be identified as a key factor that affects the overall ranking. Looking at the score value of the factor F1, it can be found that operating conditions in the period 2015-2018 are optimistic: 11 companies score greater than 1 on operating factor, and of the rest 10, only two have negative scores, just slightly less than 0, while others score between 0 and 1.

TABLE VII. DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std.Deviation
F1	21	-.51647	4.04375	.0000000	1.0000000
F2	21	-4.02837	.70613	.0000000	1.0000000
F3	21	-4.07025	.49321	.0000000	1.0000000
Y	21	-4.02937	.78558	.0000000	1.0000000

On the basis of Table VII, the results of descriptive statistics analysis are shown as Table VIII. It can be seen that under the premise of standardization, the gap between the minimum value and the maximum value is still large, which also shows that the financial development of new energy automobile listed companies is unbalanced and unstable.

V. CONCLUSION AND SUGGESTION

Based on the results of the above factor analysis, the paper puts forward the corresponding countermeasures and suggestions for the development of Listed Companies in the new energy automobile industry.

From the perspective of companies:

Listed Companies should focus on balanced and stable development. The above analysis shows that the companies with the highest performance scores do not perform well in three aspects at the same time, which indicates that most of the listed companies have some problems in different aspects and have not achieved a real balanced development in an all-round way. As far as a single company is concerned, it should improve its financial management system according to its own shortcomings, and build a suitable financial and operational management mechanism, so as to accelerate its development process.[6]

From the perspective of the government:

The government should invest more in the new energy automobile industry in order to improve the financial performance of listed companies. The performance scores of the sample companies generally remain at a low level. New energy automobiles do not have patents and technological advantages, and there is little differentiation for them to charge a premium price.[7] Therefore, listed companies need to increase their R&D investment, which needs strong support from the government. In 2016, the NPC and CPPCC set the prospectation that by 2020, China will become an innovative country with powerful human resources. An innovative country requires that R&D investment accounts for more than 2.5% of

GDP; that the contribution rate of scientific and technological progress is more than 70%; and that dependence rate of foreign technology is less than 30%. Although the government supports the development of new energy automobile industry, its support is far from enough compared with western developed countries. Besides, the new energy automobile companies should make full use of the national policy, increase R&D investment, and improve the level of scientific and technological innovation.[8] Only by following the guidance of the national policy, can they have better development prospects and greater social contribution, and thus improve the financial performance and increase their competences.

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