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ANALYSIS ON FINANCING EFFICIENCY OF LISTED SMALL AND MEDIUM BUSINESS

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ABSTRACT

All the listed companies are always concentrating on the financing efficiency. Especially after the financial crisis, a great many small and medium companies have suffered from this terrific financial disaster in China because of the close trade relation with America and other developed countries. In order to know about the factor that influences the financing efficiency, principal component analysis is adopted here to do research on this topic. This paper is based on the regional analysis, which aims to provide suggestion for the small and medium business in the northeast of China.

Keywords: *Small and Medium Business, Financing Efficiency, Principal Component Analysis*

1. INTRODUCTION

The financing efficiency of small and medium business has always been the hot topic for the academic research, especially after the financial crisis, the small and medium business in China have been strongly struck, even some have been run into bankruptcy. The situation of small and medium business has enhanced the focus on financing efficiency. Therefore, we try to adopt the quantitative analysis to do research on financing efficiency; especially, we are doing analysis of financing procedure and financing efficiency of listed small and medium business in the northeast of China. Moreover, we focus on the financing efficiency of listed small and medium business existing after the financial crisis. Also, we are trying to give suggestion on how to improve financing efficiency.

From the perspective of relationship between liabilities and total output, Chen Shengquan, Xie Zhongqiu [1] have constructed multiple linear regression model to get the conclusion that the current financing efficiency of small and medium business in China has been low, and the distribution of financing efficiency is imbalanced. At the same time, Menghua Tong, Yingchun Liu [2] has analyzed the financing method and financing efficiency of small and medium business in China based on accounting analysis, then he got the similar conclusion that financing efficiency of small and medium business is low. As far as the small and medium business is concerned, financing by equity could not enhance the profitability or the operation capability of business. Hence, financing by equity is not the appropriate way for the small and medium business. Zhigang Li,XianLiang Chi,ChunZhou Mu [3] has applied Data Envelopment Analysis (DEA) approach for the empirical analysis of financing efficiency of listed small and medium manufacturing business, then he identified that the financing efficiency has stated low, and the financing efficiency has varied from region to region. But the correlation between financing efficiency and number of regional listed companies is not significant. Besides, the financing efficiency of small and medium manufacturing business is related to the time of being listed, and the financing efficiency could be improved by the adjustment of financing scale. [4]

In general, the approach that most researcher adopted in China focuses on Analytic Hierarchy Process (AHP), DEA and entropy, as far as this paper is concerned, principal components analysis is adopted here, additionally, comparative analysis among the small and medium business is used as well. Then we hope that new ideas could be provided as a result of this research for the future research.

2. RELATED WORK

2.1 Selection of Sample

In order to know about the financing efficiency of listed small and medium business in northeast of China in detail, all the listed companies of Shenzhen Stock Exchange in Liaoning Province, Jilin Province and Heilongjiang Province have been selected as the research target. And all the listed small and medium companies in Shenzhen Stock Exchange have been the research sample space, except the companies running in the red. Then there are 13 sample companies in total for this research. Based on this, data of 2008, 2009, 2010 and 2011

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has been chosen for analysis. Additionally, all the data used in this paper has been cited from original financial report and financial statement of these listed companies, and all the indicators and quotations of these listed companies have been attained from "www.fiance.sina.com".

2.2 Variable Definition

The assessment of financing efficiency of a company is considered to be integrated, and one indicator is definitely not enough. [5] Hence, we are going to do the assessment from four perspectives, which cover profitability, developing capability, operating capability, and financing structure. With the help of principal components analysis, an integrated financing efficiency indicator will be concluded. Then the assessment of financing efficiency could be taken into process. And the illustration of financing efficiency indicator is shown on Table 1.

TABLE 1: Indicators Table Of Financing Efficiency Components

Type	Indicator Name	Indicator Definition	Letter
Profitability	Total Asset Profit Rate	Total Profit/Total Asset	x_1
	Major Business Profit Rate	Major Business Profit/Major Business Income	x_2
Developing Capability	Growth Rate of Major Business Income	(Current Major Business Income-Previous Major Business Income)/Previous Major Business Income	x_3
	Growth Rate of Net Asset	(Current Net Asset Amount-Previous Net Asset Amount)/ Previous Net Asset Amount	x_4
Operating capacity	Account Receivable Turnover	Major Business Income/Average Balance of Account Receivable	x_5
	Total Asset Turnover	Major Business Income/Average Balance of Total Asset	x_6
Financing Structure	Time Interest Earned Ratio	Profit before Tax and Interest/Interest Cost	x_7
	Equity Ratio	Liabilities/Owner's Equity	x_8
	Assets-Liabilities Ratio	Liabilities/Total Asset	x_9

3. EMPIRICAL ANALYSIS

3.1 Data Processing

The principal components analysis is adopted here to calculate the integrated financing efficiency of listed companies. And there are 3 steps for data processing procedure:

Step1: Variables standardization. Because of the different dimension and meaning of the selected data, standardization of variables is necessary.

Step2: Positive tendency of variables. [6] It means the larger is the data with specific range, the higher is the financing efficiency. On the observation of data selected in this paper, all the data is positive, then the positive tendency is could be ignored. [7]

Step3: Definition of variables being appropriate for the principal component analysis. The precondition for the principal component analysis is observation of relationship between variables. If there is no obvious correlation between the original variables, it is impossible to get the minor common factor variables that could reflect the common character of some variables. Therefore, analysis of correlation before the principal component analysis is necessary. Table 2 is the correlation matrix between the variables by means of EVIEWS6.0. From the figures of Table 2 shown on the top of this page, we can see the obvious correlation between these variables, and then the precondition of principal component analysis is fulfilled.

Table 2: Correlation Cpefficient Matrix Of Financial Indicators

	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9
x_1	1.00	0.49	0.15	-0.22	-0.01	0.52	0.11	-0.16	-0.04
x_2	0.49	1.00	0.18	-0.06	0.25	-0.27	0.32	0.00	-0.14
x_3	0.15	0.18	1.00	0.14	0.07	-0.08	0.02	0.03	-0.01
x_4	-0.22	-0.06	0.14	1.00	0.24	-0.16	0.59	-0.58	-0.70
x_5	-0.01	0.25	0.07	0.24	1.00	-0.22	0.60	-0.45	-0.54
x_6	0.52	-0.27	-0.08	-0.16	-0.22	1.00	-0.04	-0.14	0.07
x_7	0.11	0.32	0.02	0.59	0.60	-0.04	1.00	-0.37	-0.48
x_8	-0.16	0.00	0.03	-0.58	-0.45	-0.14	-0.37	1.00	0.95
x_9	-0.04	-0.14	-0.01	-0.70	-0.54	0.07	-0.48	0.95	1.00

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3.2 Collecting Characteristic Vectors

After the calculation by EVIEWS 6.0, we can get Table 3: The characteristic value and contribution rate. And from Table 3, it is easy to see the four Characteristic roots of correlation matrix for variables: 3.892, 2.471, 1.432 and 1.291. These Characteristic roots could be the illustration of variance 90.86% of commercial bank performance assessment.[8] Besides, the first to the fourth characteristic vectors have shown the most information of original data. Thus these four characteristic values could be selected instead of the original 9 variables.

TABLE 3: Characteristic Value And Contribution Rate

	Initial Factor x_1 - x_9			Selected Common Factor x_1 - x_4		
Factor	Characteristic Value	Contribution Rate	Accumulated contribution rate	Characteristic Value	Contribution Rate	Accumulated contribution rate
1	3.24	36.03%	36.03%	3.24	36.03%	36.03%
2	1.79	19.86%	55.89%	1.79	19.86%	55.89%
3	1.70	18.83%	74.71%	1.70	18.83%	74.71%
4	1.00	10.99%	85.71%	1.00	10.99%	85.71%
5	0.75	8.32%	94.03%			
6	0.31	3.43%	97.46%			
7	0.14	1.6%	99.05%			
8	0.08	0.88%	99.93%			
9	0.01	0.07%	100%			

But it is not direct to get the expression of these new variables. Then the principal component and its correlation coefficient could be shown after process, which is shown on Table 4.

Table 4: Corellation Coefficient Of Principal Component And Variables

	Factor1	Factor2	Factor3	Factor4
x_1	-0.4073	-0.1026	0.3862	-0.3434
x_2	-0.3651	0.4398	-0.0015	-0.1563
x_3	-0.1832	-0.0483	0.3621	0.5960
x_4	-0.2156	0.0785	0.3802	0.5173
x_5	-0.3472	-0.1605	0.4075	-0.3858
x_6	-0.1050	-0.6943	-0.0632	-0.1031
x_7	-0.2762	-0.4845	-0.3374	0.2640
x_8	0.4472	-0.1628	0.3785	-0.0593
x_9	0.4613	-0.1363	0.3848	-0.0467

3.3 Constructing Function

According to Table 4, all the expression of principal components could be written as follows:

$$F_1 = -0.4073X_1 - 0.3651X_2 - 0.1832X_3 - 0.2156X_4 - 0.3472X_5 - 0.1050X_6 - 0.2762X_7 + 0.4472X_8 + 0.4613X_9 \quad (1)$$

$$F_2 = -0.1026X_1 + 0.4398X_2 - 0.0483X_3 + 0.0785X_4 - 0.1605X_5 - 0.6943X_6 - 0.4845X_7 - 0.1628X_8 - 0.1363X_9 \quad (2)$$

$$F_3 = 0.3862X_1 - 0.0015X_2 + 0.3621X_3 + 0.3802X_4 + 0.4075X_5 - 0.0632X_6 - 0.3374X_7 + 0.3785X_8 + 0.3848X_9 \quad (3)$$

$$F_4 = -0.3434X_1 - 0.1563X_2 + 0.5690X_3 + 0.5173X_4 - 0.3858X_5 - 0.1031X_6 + 0.2640X_7 - 0.0593X_8 - 0.0467X_9 \quad (4)$$

Finally, construct the integrated financing efficiency function. After taking the information contribution rate of principal component as the weight, integrated financing efficiency (ife for short) function of listed companies could be expressed as this equation: [9]

$$\text{Ife} = \begin{pmatrix} 36.03\%F1 + 19.86F2 + \\ 18.83\%F3 + 10.99\%F4 \end{pmatrix} / 85.71\% \quad (5)$$

3.4 Analysis of Result

After substituting the data of listed companies for 2008, 2009, 2010 and 2011 for integrated financing efficiency function, then we can get the integrated financing efficiency of all the listed companies and efficiency ranking. See Table 5.

From the figures of Table 5, the tendency of financing efficiency in 2008, 2009, 2010and 2011 is obvious. 002501 has been the highest efficient in financing all of the sample companies, but its financing efficiency decreased in 2010 and 2011, the decline on its main income growth and the

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lengthened period of account receivable should be the reason for that. Besides this, 002204,002220 and 002354 have the high financing efficiency as well, and the ranking of these companies is stable. When it comes to 002069 and 002123, the financing efficiency is in the middle of the ranking. In terms of 002437, 002232, 002338, 002566 and 002447, the ranking is not positive; it means the financing efficiency of these companies is relatively low. But 002118 is special, its financing efficiency in 2008 and 2009 was low, and 2010, 2011 have seen its obvious improvement of financing efficiency. Decrease on financing capital and liabilities should be responsible for the change. The financing efficiency of small and medium business in the northeast of China is low on the whole, but the situation could be improved by means of management optimization.[10]

Table 5: Integrated Financing Efficiency And Its Ranking

Stock Code	Integrated Financing Efficiency and ranking			
	2008	2009	2010	2011
002437	-1.9067	-1.4367	-1.3814	-1.2916
002118	-0.0719	-0.0277	1.4218	1.9728
002232	-1.3256	-1.5693	-0.4863	0.2471
002338	-0.4479	-0.1363	-0.0434	0.3697
002501	1.7041	1.3653	0.1929	-0.3678
002566	-0.3083	-0.6374	-1.0183	-1.2592
002069	0.0931	0.2038	0.0561	0.2147
002123	0.3891	0.0571	0.1799	0.0639
002204	0.9343	1.1217	0.9937	1.2750
002220	0.6452	0.5485	0.1992	-0.2697
002354	0.4519	0.3213	0.5743	0.6647
002447	-0.3488	-0.1533	-0.6253	-0.4451
002487	0.0239	0.3434	-0.1246	0.5174
002437	13	12	13	12
002118	8	8	1	1
002232	12	13	10	6
002338	11	9	8	5
002501	1	1	5	10
002566	9	11	12	11
002069	6	6	7	7
002123	5	7	6	8
002204	2	2	2	2
002220	3	3	4	9
002354	4	5	3	3
002447	10	10	11	11
002487	7	4	9	4

4. CONCLUSION

Based on the data of 13 listed small and medium businesses in the northeast of China for 2008, 2009, 2010 and 2011 we have tried to construct the assessment system of financing efficiency for the small and medium business in this region by using principal components analysis. And the analysis of financing change and reason for that has been carried out as well in this research. To conclude, the financing efficiency of small and medium business in the northeast of China is low. And the financing way of some businesses is limited, which results in the change of financing efficiency. In addition, profitability and developing capability are important indicators to evaluate the financing efficiency of a company. [11] From the perspective of profitability, developing capability and operating capability, financing efficiency of a business could be improved beyond comparison of financing capital. According to the similar research report, [12] it is thought, the less the debt financing capital is, the more is the equity financing capital. But according to our analysis, financing efficiency could be improved by the decrease on debt financing. And it also depends on the capital environment. This opinion is similar to that of some other researchers.

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