The Research on Financial Early Warning of China's New Energy Listed Company

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Abstract

As we all know, resource consumption and environmental pollution, especially climate warming has become the focus of the world since the 21st century. Under this background, the development of new energy companies and their financial situation have also been concerned by investors and other stakeholders. Given this situation, the paper analyzes the financial risk of China's new energy companies since 2008 in a sample of 165 listed companies in Sohu Securities Network division of China's new energy sector, and draws a few of relevant conclusions in the end.

Keywords: Z-Score model, new energy, listed company, financial early-warning

1. Introduction

With the development of the economy and society, the environmental problems that human beings are facing have become worse and worse. The production of nonrenewable resources like petroleum and coal has declined year by year. All of the countries in the world are facing the same significant issue which is to find alternative energy sources. As the biggest developing country, China's economic development is rapid, and the per capita GDP is increasing constantly. It is a process associated with the consumption of energy and environmental pollution. Some relevant statistical data showed that China's total energy consumption has reached 30.66 billion tons of standard coal in 2009. Compared with the data of 2005, the total of energy consumption increases by 29.94%. China's economy belongs to extensive economy, which is along with serious environmental pollution in the process of development. Emissions of greenhouse gases are contributing to climate warming. In addition, the hazy weather is even more serious. Faced with such serious energy consumption and environmental pollution, it is necessary for us to make full use of the alternative new energy to achieve sustainable developments imminent. In China, a lot of listed companies related to energies are making use of new energies in order to achieve sustainable development. As a result, the investors and other stakeholders pay more attention to new energy companies.

After the economic crisis in 2008, the state of listed companies' operation is unstable. The financial problems have being appearing, which have bad influences on companies' business. Investors also face greater risks of the enterprise. Considering about the two points, researching the financial risk of new energy listed companies has an important practical significance.

In addition, the Z-score model as a multiple discriminant analysis model evaluating the enterprise financial status is widely used in real estate, automobile and machinery and other industries of the listed company financial warning system. However, dose this model also apply to financial early warning analysis new energy enterprise? So the paper analyzes the financial risk of China's new energy companies since 2008 in a sample of 165 listed companies in Sohu Securities Network division of China's new energy sector, and concludes a few of relevant conclusions in the end.

2. Research Overview

The research on companies' financial warning system is on the basis of the enterprise financial analysis. The economy of the Western developed countries started early and developed rapidly in the next few decades. Their market system is sound. Therefore the research on companies' financial warning system is more mature, and large numbers of remarkable achievements have been made.

In the 1930 s, Fitzpartic conducted a comprehensive research on the enterprise financial early warning system. He chose two financial indicators, the property ratio and net interest rate of the rights and interests, to measure the financial situation of enterprises, which created a single variable early warning model research. Based on Fitzpartic's research, Beaver put forward one element discriminated analysis model. Although his research belonged to a single variable in the study of early warning model, he adopted five financial indicators. Compared with Fitzpartic's research, his studies were much more systematic and standardized. With the continuous development of researches on enterprise financial early warning model, multivariate financial early warning model gradually replaced the single variable model. In 1968, Professor Edward Altman put forward the multiple discriminated analysis model, the Z-score financial risk early warning model. Martin (1977) introduced multivariate logistic regression model in the study of financial warning. Ohlson (1980) took advantage of conditional logistic regression model to analyze the financial condition of enterprises, and established the early-warning system. Since the 1980 s the neural network model has been created. Odom, Shardal (1990) and Coats, Fant (1993) made use of the five financial ratio indicators involved in the Z-score model and combined with the neural network model to build the financial early warning system.

Compared with the study of enterprise financial early warning system abroad, research in China started relatively late, which mostly in the form of drawing lessons from foreign research results directly. In 1986, Wu Shinong and Huang Shizhong introduced foreign financial early-warning model for the first time, but there is no empirical test, and they judge the financial position of the enterprise just through subjective experience. Zhou Shouhua, Yang Jihua and Wang Ping (1996) created the F-score model. Chen Xiao, Chen Zhihong (2000) used multivariate logistic regression model to forecast the companies' financial crisis. Wu Shinong, Lu Xianyi (2001) took advantage of Fisher linear decision analysis, multiple discriminate analysis and Multivariate logistic regression model to establish three kinds of financial crisis warning system. Cheng Tao (2005) put cash management characteristic variables and cash management result variables into logistic regression method, and build the integrated early warning model from the perspective of financial indicators and cash flow.

3. Research Method

In this paper we analyze the financial risk of China's new energy listed companies based on Z-score financial risk early-warning model, and draw a few of relevant conclusions in the end.

Z-score financial risk early-warning model was put forward by Edward Altman, a professor in Leonard N. Stern School of Business. In 1968, Altman investigated the bankrupt and non-bankrupt production enterprises in America. After screening of mathematical statistics he made use of 22 financial ratios to establish the Z-score model.

Z-score model is based on multivariate statistical methods, which can analyze and distinguish the operation condition of enterprises, and bankruptcy or not. Its computational formula is as follows:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$$

$$X_1 = \frac{\text{working capital}}{\text{total assets}} = \frac{\text{current assets} - \text{current liabilities}}{\text{total assets}}$$

$$X_2 = \frac{\text{retained earnings}}{\text{total assets}} = \frac{\text{undistributed profit} + \text{Surplus reserves}}{\text{total assets}}$$

$$X_3 = \frac{\text{earnings before interest and tax}}{\text{total assets}} = \frac{\text{total profit} + \text{interest expenses}}{\text{total assets}}$$

$$X_4 = \frac{\text{total shareholder's equity}}{\text{total liabilities}}$$

$$X_5 = \frac{\text{operating income}}{\text{total assets}}$$

The five variables above describe the financial situation for listed companies from five aspects. X_1 reflects the influence of liquidity to financial condition. If the company has more working capital, the risk of insolvency is smaller. This variable mainly reflects the short-term debt paying ability of listed companies. X_2 reflects the accumulated profits in enterprises. This variable is a reflection of the long-term profitability of enterprises. X_3 measures the production of the companies' assets without considering the effects of taxation and finance. It is a variable that reflects the enterprises' profitability making use of the total amount of capital from creditors and owners. If the ratio is higher, it shows that the utilization of assets in the enterprises is better, and management level is also higher. X_4 reflects the relative relationship of capital between the shareholders and creditors, and the basic financial structure is stable or not. If this indicator is better, it shows that the financial structure is low risk and low reward. At the same time, this indicator also reflects the degree of protection of creditor's rights by shareholders' equity. X_5 measures the firm's ability to generate sales, and indicates the utilization effect of companies' assets. The larger the variable is, the higher of the utilization of assets. So the enterprises have a perfect effect in the terms of increasing income.

The standard of listed companies' financial situation based on Z-score model is showed as follows.

Table 1. The standard of listed companies' financial situation based on Z-score model

Z score	The rate of financial crisis
>2.99	Safe area
1.8-2.99	Gray area
<1.8	Bankruptcy area

In the Z-score model, Altman provides the evaluation standard of the company's financial situation: if the Z score is bigger than 2.675, the financial situation of the enterprises is good, and the possibility of financial crisis is smaller. On the contrary, if the Z-score is smaller than 2.675, the listed companies will slip into a financial crisis. The lower the Z value of the enterprises, the greater the likelihood of financial crisis.

4. Data Collection and Analysis Results

The research object of this paper is 165 listed companies of new energy plate divided by sohu securities network. Considering the availability of data and the operating conditions of the enterprises, we get rid of Bohai Zulin, Xinjaing Haoyuan, Tianhao Jieneng, Shenhua Konggu, Aikang Keji, Zhongguo Shuidian and Richu Dongfang 7 new listed companies. The companies whose operating situation is not normal are also rejected, like STGuofa, STXuri. The amount of remaining sample is 156.

In the new energy plate, all of the companies are from different industry. The sample of 156 listed companies in the industry division is shown in figure 1. 15% of the listed companies are electrical machinery and equipment manufacturing industry. Listed companies belonging to the power sector take up 12%. 10% of listed companies belong to general or special equipment manufacturing industry. 8% of the listed companies are chemical materials and chemical products manufacturing industry. It can be seen that in the new energy sector listed companies' in the industry segment more dispersed. Research by the board listed company's financial position can understand the financial situation of information across multiple industries to a certain extent.
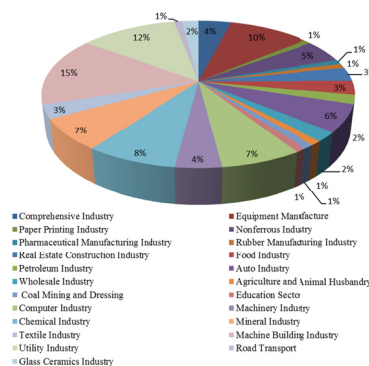

Figure 1. The distribution of listed companies in new energy sector

Z value model on the calculation formula of this paper have introduced, here is the new energy plate the Z value of listed companies is analyzed. The data used in this article are from the financial statements of listed companies announced on Eastmoney. In order to reflect the financial status of listed companies in new energy plate after the economic crisis, this article selects five consecutive years financial data from 2008 to 2012. In addition, because the interest expense is not a separate disclosure of listed companies, so we choose the financial expenses in the financial statements instead of interest expense in the formula. The specific calculation results are shown in figure 2 to 6.

After calculating the Z value of listed companies in the new energy plate, in order to further observe the scale number of businesses to grasp the new energy sector as a whole the financial status of listed companies, this paper, based on the calculation data of table 2, 2.675 and 1.8 is bounded on the samples of listed companies, divided into specific statistical data as shown in figure 7.
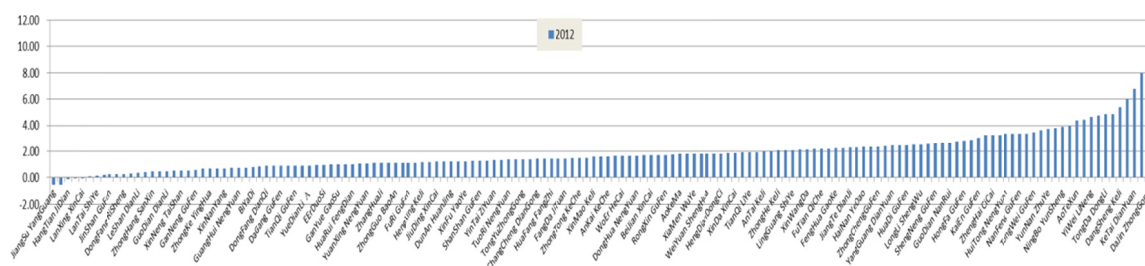

Figure 2. The Z-value of listed companies in new energy plate
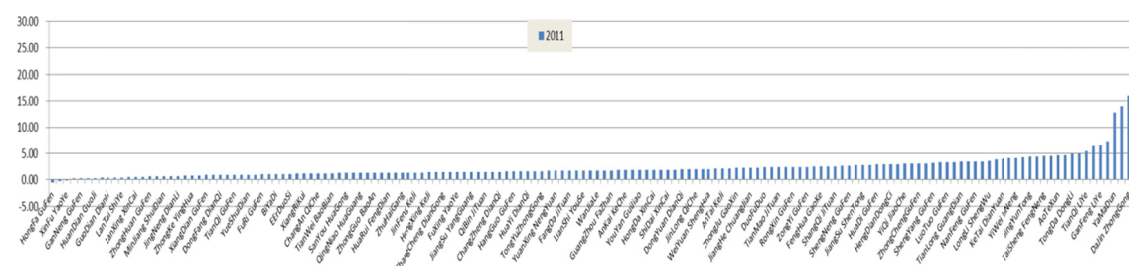

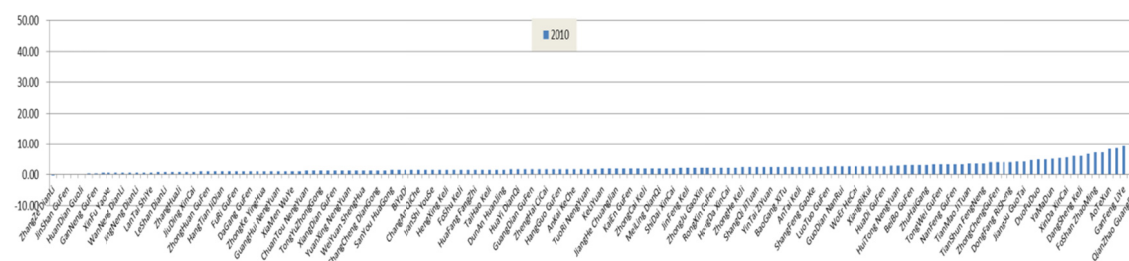Figure 3. The Z-value of listed companies in new energy plate

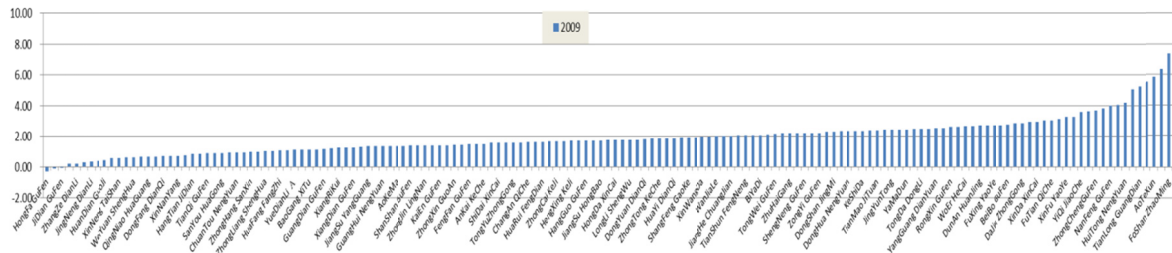Figure 4. The Z-value of listed companies in new energy plate

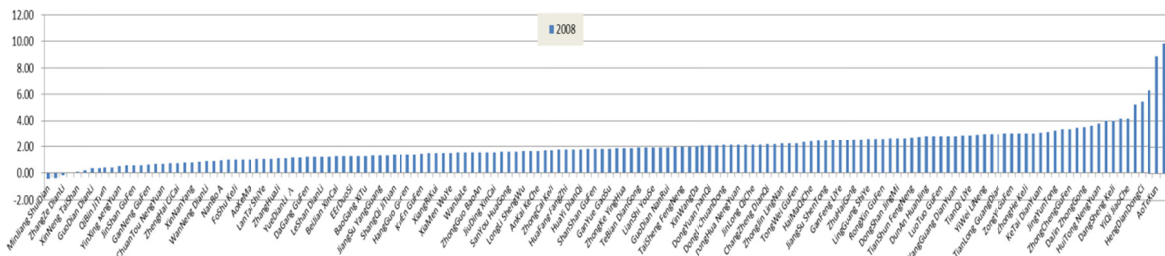Figure 5. The Z-value of listed companies in new energy plate

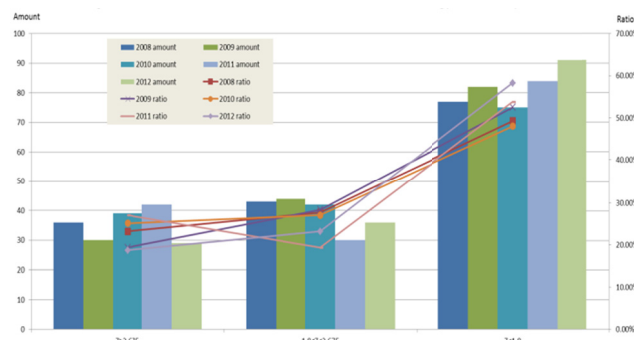Figure 6. The Z-value of listed companies in new energy plate

Figure 7. The amount and ratio of different Z-value of new energy listed companies

4.1 Theoretical Explanation

In view of the above results, only from the perspective of the Z value of computing, the listed companies in good financial condition in China's new energy sector are less than 30% in the past five years. The enterprises on the verge of bankruptcy are over 50%, even up to 58.33% in 2012. The causes of this phenomenon are mainly including two points:

First of all, it is the enterprise's own problems. Some listed companies have a low liquidity ratio, the short-term debt paying ability is insufficient, and the profit ability is weak, as a result ,the financial situation is grim. For example, the liquidity ratio of Zhangze Dianli were 0.36, 0.29, 0.32, 0.25 and 0.24 from 2008 to 2012. The huge difference between current assets and current liabilities leads to calculate the negative Z value. Too much current liabilities bring a greater risk of insolvency. Once the enterprise needs to repay the maturing debt on focus, it may lead to the enterprise capital chain rupture, and bring the risk of bankruptcy.

Second, in the process of calculation, we found that evaluating the financial status of listed companies only based on Z value model is lopsided. From the Z value calculation formula we can find that the Z value model considers the company's short-term debt paying ability, profitability and operation ability and so on various aspects. However, the Z value model is not suitable for all enterprises' financial situation analysis. Some of the listed

companies' investment payback period is long, the proportion of non-current assets account for the company's total assets is large, the difference between the current assets and current liabilities is less, and the companies' recent profit ability is not strong. All of these factors contribute the low Z value of listed companies. But this doesn't mean that the companies exist significant financial risk. Jinshan Gufen is a electric power enterprise, whose total assets is 6.24 billion yuan in 2009, and the current assets is 1.87 billion yuan accounting for 29.97% of total assets. Its current liabilities is 2.17 billion yuan, and the working capital is 300 million yuan. Since 2008, Jinshan Gufen has the original 28.02 million yuan net profit growth to \$2012 by 192 million yuan, an average growth rate of 4.24%. But because of the less working capital, the Z value calculated is lower. However it doesn't mean that Jinshan Gufen is in poor financial situation, on the verge of bankruptcy.

In the new energy plate, the enterprises belonging to mechanical industry, energy industry and electric power industry account for large proportion. The common characteristics of listed companies in these industries is that the payback period is long, the non-current assets account for large proportion, the liquidity ratio is less, and the net profit growth is slow. All of these factors have a great influence on the Z value distribution of listed company in the new energy sector.

By concrete analysis of listed companies' Z values in new energy plate in 2012, we found that the share of companies whose Z value is lower than 1.8 is as high as 91%. Among them, the amount of listed companies in power industry is 17. There are 9 general and special equipment manufacturing enterprises. The number of metal,oil and coal industry listed companies is 13. There are 5 listed companies in the housing construction industry, and 4 enterprises in transportation industry. All of these listed companies have a longer payback period than other enterprises, and their upfront investment is large. Especially the listed company of real estate construction, their asset-liability ratio is higher, generally over 50%. As a result, their Z value is lower. So only using the Z value model to forecast the financial risk is unilateral.

It is important to note that, among the 93 listed companies in new energy plant, WoEr HeCai, RongXin GuFen, TianLong GuangDian, JiangHe ChuangJian, DongShan JingMi, ZhongMei NengYuan and DongFang RiSheng have a lower Z value compared with the first four years, especially TianLong GuangDian. The Z value of TianLong GuangDian in 2012 is 0.52. By contrast, its Z value in 2008-2011 respectively are 2.98, 5.25, 4.92 and 2.98. The main cause of this gap is that its current ratio in 2012 drops by 52.23% compared with 2011, the current assets fall by 28.92%, and the liabilities increase by 49.4%. The decrease of current assets and increase of current liabilities at the same time, make TianLong GuangDian face with severe repayment risk.

In addition, we find that the Z value of listed companies is not the higher the better. Although the Z value is higher, the smaller the financial risk of the enterprise, the Z value too high may lead to idle funds. In the new energy sector, the Z value is the highest in Yunnan Zhuye. Its Z value is as high as 41.43 in 2010. Yunnan Zhuye's liquid assets is 1.01 billion yuan in 2010, the monetary funds is 929 million yuan, accounting for 91.98% of the current assets, and the liquidity ratio is as high as 54.36. Although the company's short-term solvency risk is very small, or little, the monetary fund is too much, and it likely exists the problems of idle funds, a waste of corporate resources.

5. Conclusion

By using the Z-Score model analyze the financial status of listed companies of Chinese new energy sector, we draw the following conclusions.

First of all, in the new energy sector, some enterprises need to adjust the financial strategy and business strategy, on the basis of making full use of the working capital, to reduce the enterprise short-term debt risk and avoid the enterprise capital chain rupture risk which caused by the emergency.

Second, the Z-score model does not apply to all types of enterprises. Different enterprises can properly adjust the variable when using the Z-score model. General manufacturing enterprises can directly use the Z-score model to analyze the enterprise financial problems, and the enterprise which the investment payback period is long, and the assets are mainly composed of non-current assets can modify the Z value model, such as modify the variable X_1 into the variable which related to its asset-liability ratio, fully considering the non-current assets and non-current liabilities' influence on enterprise financial condition, or increasing other relevant financial ratio index, to comprehensive analyze the enterprise financial early warning system.

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