Research on Financial Risk Early Warning of H Medicine Company Based on Efficacy Coefficient Method

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Abstract: The research idea of this paper is: firstly, 14 alternative financial indicators are selected and the corresponding index weights are calculated by entropy method; Then, under the guidance of the improved theory of efficacy coefficient method, the financial early warning of the company is carried out. Finally, according to the early warning results, find out the problems in the development of H Company.

1. Introduction

The pharmaceutical industry has always been regarded as a barometer of the national economy. With the improvement of people's living standards and the increasing demand for medical care in China, the development of the pharmaceutical industry in China has been on the rise, which also puts forward higher requirements for the management of the industry. The pharmaceutical industry is characterized by strictness and prudence. Due to the particularity of the industry, once the financial loopholes or other unexpected situations are found, it will affect the investors and creditors of the enterprise, and even lead to a series of social phenomena and major economic problems in the whole pharmaceutical market. In recent years, financial fraud cases caused by weak financial risk control in pharmaceutical enterprises have emerged one after another. For example, in 2019, Kangmei Pharmaceutical was found to have financial fraud, which brought serious debt crisis to the enterprise, with a sharp drop in market value and serious damage to the corporate image. The financial risk of pharmaceutical industry can not be ignored. Based on this, this paper selects H Company, the representative enterprise of Chinese pharmaceutical enterprises, to study the financial risk early warning.

2. Literature review

With the deepening of scholars' research, the univariate judgment model, multivariate judgment model, artificial neural network model, etc. have gradually entered the public's field of vision. [1] established a univariate model to predict the financial risk of enterprises by using the method of financial ratio. [2]constructed the famous Z-score model, and the multivariable model was widely used in the field of financial early warning. [3]applied multiple Logistic regression model to enterprise financial risk early warning for the first time, and put forward logistic regression method, which greatly improved the accuracy of early warning results. [4] introduced the cash flow index into the early warning model for the first time, reformed the traditional Z model and established the F model with higher accuracy. [5]taking bankrupt companies as samples, a logistic regression model is established, which has a good effect on the overall accuracy and fault state prediction. The prediction effect of the early warning model is further improved.

3. Analysis of financial risk early warning

Enterprise financial risk early warning refers to a means by which enterprise managers take certain control measures in advance to prevent and control future business development activities of

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enterprises from deviating from normal expectations. Different from the financial analysis and evaluation of the post-event evaluation of the production and operation activities of enterprises, it constructs the financial index system by means of a series of related accounting information such as the financial report and business plan of enterprises, and then applies the financial risk early warning model to the forecast analysis of various activities such as the operation and finance of enterprises, so as to identify the current alert state of the financial risks of enterprises. Enterprise financial early warning can warn before the crisis occurs, thus urging enterprise management to take effective measures to reduce losses, improve business decisions and allocate resources effectively.

4. Construction of financial risk early warning model of H pharmaceutical company

One of the most important steps of financial risk early warning lies in the establishment of the model. On the basis of the previous research in this chapter, a scientific and effective financial early warning model is established by using various analysis methods and financial data calculation, and the financial risk is analyzed and predicted according to the early warning results.

4.1. Company profile

H Pharmaceutical Company is a large pharmaceutical industry group listed in Shanghai and Hong Kong. It is a national state-controlled pharmaceutical industry group headquartered in S city. The company's main business scope covers pharmaceutical R&D and pharmacy, distribution and retail. Its main business, pharmaceutical industry, distribution and retail, is in the leading position in China, with unique comprehensive advantages of industrial chain, which can share the sustainable growth opportunities of China's pharmaceutical and health industry to the greatest extent, and generate synergy through resource sharing among business segments.

4.2. Construction and weighting of financial index system

This paper selects 14 financial indicators based on profitability, solvency, operational capacity and development capacity, and uses entropy method, an objective weighting method, to determine the weights of indicators, so as to complete the construction of financial indicator system and improve the accuracy of financial risk early warning model.

Among them, total return on assets, return on net assets, cost and expense ratio and surplus cash guarantee multiple are selected from profitability, quick ratio, cash flow liability ratio and asset liability ratio are selected from solvency, accounts receivable turnover rate, total assets turnover rate and asset cash recovery rate are selected from operational capacity, and business growth rate, total assets growth rate, operating profit growth rate and capital preservation growth rate are selected from development capacity. And the above financial indicators are marked as X1, X2 …X14 in turn.

Table 1 Results of weight calculation by entropy method

Index group	Single index	Information entropy value	Information utility value	Weight coefficient	Group weight
Profitability	X1	0.7080	0.2920	7.93%	30.15%
	X2	0.7468	0.2532	6.88%	
	X3	0.7076	0.2924	7.94%	
	X4	0.7272	0.2728	7.41%	
Solvency	X5	0.7903	0.2097	5.69%	21.28%
	X6	0.7805	0.2195	5.96%	
	X7	0.6457	0.3543	9.62%	
Operating capacity	X8	0.8280	0.1720	4.67%	18.97%
	X9	0.8321	0.1679	4.56%	

	X10	0.6412	0.3588	9.74%	
Development ability	X11	0.8118	0.1882	5.11%	29.60%
	X12	0.5201	0.4799	13.03%	
	X13	0.8434	0.1566	4.25%	
	X14	0.7349	0.2651	7.20%	

4.3. Operation of financial risk early warning model

Efficiency coefficient method is a research method proposed by Harrington in 1965 to solve multi-objective decision-making problems. According to the principle of multi-objective programming, this method determines an impermissible value and a satisfactory value for each index to be evaluated respectively, then calculates the efficacy coefficient of this index by efficacy function with the impermissible value as the lower limit and the satisfactory value as the upper limit, then calculates the comprehensive index by weighted average for the individual efficacy coefficient of each index, and finally evaluates the comprehensive status of the studied object. Because the principle of this method is simple and easy to understand, the operation is relatively simple, the results are relatively accurate and easy to analyze and explain, so this paper uses the efficacy coefficient method to study the enterprise financial early warning.

At the same time, due to some shortcomings of the traditional efficacy coefficient method, in order to improve the accuracy of financial risk early warning, this paper improves the traditional efficacy coefficient method as follows:

First, the evaluation criteria of traditional methods are refined. Increase the two grades to five grades. The five evaluation criteria are excellent, good, average, poor and extremely poor, and set the corresponding evaluation criteria coefficients of 1.0, 0.8, 0.6, 0.4 and 0.2.

Secondly, adjust the original distribution proportion from a fixed value to a variable value to improve its accuracy. The improved index score value is the sum of the basic score and adjustment score of this file. Among them, the basis of this file is divided into the product of individual index weight and the standard coefficient of this file, while the adjustment is divided into individual efficacy coefficient multiplied by the change value of the basic score of this file, and the individual efficacy coefficient is the difference between the actual index value and the standard value of this file and the standard value of this file. Finally, the comprehensive early warning score is the ratio of the sum of the score values of each index to the weight sum of each index.

According to the optimization and improvement of efficacy coefficient method, the financial data of H Company from 2016 to 2020 are substituted into the model to calculate the comprehensive early warning score.

Table 2 H company's Early Warning Index Score Value in 2016-2020

Financial indicator	2016	2017	2018	2019	2020
X1	5.37	6.01	5.48	5.60	5.71
X2	4.18	4.47	4.44	4.40	4.24
X3	3.75	2.76	2.33	2.33	3.80
X4	4.34	4.39	4.33	4.84	4.46
X5	4.78	4.20	4.14	4.07	4.31
X6	4.65	4.07	3.11	3.04	3.02
X7	5.07	5.31	5.16	5.77	6.03
X8	2.27	2.49	2.23	2.14	2.12
X9	4.56	4.56	4.67	4.56	3.69
X10	5.07	5.59	5.20	5.86	6.02
X11	3.68	3.00	4.80	4.25	2.26
X12	8.43	9.04	13.03	7.67	7.95
X13	4.25	4.25	2.67	4.17	4.25
X14	2.65	3.13	2.83	2.87	3.07
Total score	63.07	63.27	64.43	61.57	60.93

5. Analysis of financial risk assessment results

From Table 2, it can be seen that the risk status of H Pharmaceutical Company in 2016-2020 has been in the middle alarm, and the overall risk is relatively high. Generally speaking, in this case, H Pharmaceutical should analyze some problem indicators and take some improvement measures. However, the company's management didn't have enough risk awareness and foresight, so it couldn't put forward the corresponding rectification opinions of financial risks in time. Therefore, for five consecutive years, the financial index of H Pharmaceutical Company has been in the middle alarm state, and the financial risks have not been effectively solved.

Although there is no significant change in the five-year early warning status, H Pharmaceutical is in the middle warning situation every year, and there is no light warning or no warning situation in five years. Therefore, the early warning situation must be paid attention to by the management of the enterprise, which shows that the overall financial risk of the enterprise is high, and some financial indicators of the company are abnormal, and there is obvious possibility of financial risk. Specifically, the degree of early warning has been declining for nearly three years since 2018. If managers still don't be vigilant and take preventive measures, the early warning status in the future may be even worse, and the possibility of financial risks is very high.

6. Conclusion

On the basis of sorting out the related theories of financial risk early warning, this paper makes some adjustments and improvements to the traditional efficacy coefficient method, and applies it to the financial risk early warning of H Medicine Company, thus drawing the conclusion that the financial risks of H Company in the past five years are all in a moderate state of alarm. The early warning model constructed in this paper can conform to the actual situation of the company, thus providing some reference and thinking for the managers and decision-making of the company, so as to prevent the expansion of the financial crisis and realize the sustainable development of the enterprise.

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