

# Research on the Application of Risk Matrix in Enterprise Risk Management

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**Abstract:** After the development of recent decades, the scale of China's enterprises is getting larger and larger, how to reduce the loss of enterprise risk has become a problem that can not be ignored in enterprise management. As a relatively complete and tested risk management tool, risk matrix can simultaneously conduct qualitative and quantitative analysis of enterprise risks by combining data, so that it is more practical and can discover dynamic risks of enterprises. In this paper, XiangPiaoPiao company as an example, in the risk management combined with the use of risk matrix and Z-value analysis, related bankruptcy risk analysis, analysis of the existing risk factors, and put forward suggestions for improvement, for the risk management of relevant enterprises to reference.

## 1. Introduction

In the context of the increasingly complex and changeable market situation and the accelerated development of enterprises in recent years, enterprise risks are facing severe challenges, and the demand for risk control in various industries is getting higher and higher. How to rationally allocate limited resources to prevent risk and minimize risk loss becomes the primary key of risk control. The Ministry of Finance has put forward risk management and risk matrix in the guidance on the application of management accounting. Risk management aims at realizing the goal of risk management for enterprises, and realizing a series of risk prevention functions such as risk identification, assessment, early warning, control, reporting and response. The risk matrix, as a relatively mature and perfect risk management tools, it is the probability of risk and the severity of the after be embodied in the form of scoring, find important risk factor for the enterprise risk management and qualitative and quantitative analysis, and data support for risk management and the method support. In this paper, XiangPiaoPiao Company as the research object, the risk matrix is applied to the risk management of XiangPiaoPiao Company, the financial status of the company in recent years through the Z-value analysis method to calculate the risk size, so as to provide reference for relevant enterprises.

## 2. The Research Background

Now Z value analysis method is widely used to explore the financial early warning detection of listed companies. Z-value model is mainly used to predict the possibility of financial bankruptcy of enterprises through Z-value. If z-value is less than 1.20, enterprises will go bankrupt; if Z-value is between 1.20 and 2.90, it is the "gray area"; if Z value is greater than 2.90, enterprises will not have bankruptcy risk. This means that through z-value analysis can be obtained whether there is a huge enterprise risk, can also be applied to determine the situation of the enterprise financial crisis, is currently in the financial crisis early warning analysis of a widely used model.

The z-value calculation formula is as follows:

$$Z=0.717 (X1) +0.847 (X2) +3.107 (X3) +0.420 (X4) +0.998 (X5)$$

Table 1 Risk Matrix

Severity of risk					
4-Likely to happen	4	8	12	16	

3-May occur	3	6	9	12	
2-Occasionally	2	4	6	8	
1-Hardly ever happen	1	2	3	4	
	1-Tiny	2-Smaller	3-Larger	4-Serious	Probability of risk occurrence

Where X1= working capital/total assets, X2= cumulative retained earnings/total assets, X3= EBIT/total assets, X4= book value of owners' equity/total liabilities, X5= sales revenue/total assets.

Risk matrix is a kind of method to enterprise risk, the probability of occurrence of a risk as abscissa and can be set higher in low M a certain score, the severity of the risk happens as ordinate and can set up a small medium, such as the serious N a certain score, the enterprise the risk degree and the probability of drawing in the coordinate diagram, region of M \* N matrix is formed, and the matrix of enterprises in the region's position to represent the size of the enterprise risk.

## 2.1 Company Profile of Xiangpiaopiao

Or company is a milk tea co., LTD., founded in 2005, created the China cup of milk tea category, 2008 annual sales for the first time the billions, to further consolidate the leadership of the China cup tea brands, in 2013 started in tmall, converting sales model, to move into the new mode of “Internet +”, or log in the Shanghai stock exchange in 2017, to become worthy of the first “Chinese milk tea, to enter the international market in 2018, began to layout of the overseas market. However, with the continuous popularity of all kinds of Internet celebrities milk tea brands in recent years and the continuous exclusion of Coca-Cola and other beverage giants, the operation situation of XiangPiaoPiao company appears to be a crisis, there is a high corporate risk.

Nowadays, although The profitability and solvency of XiangPiaoPiao company are still stable, its growth ability is obviously slowed down, and operating performance is under pressure. Although current liabilities can still be repaid in time, the cash flow has declined, the use cycle has been slowly extended, and the cash flow capacity has significantly deteriorated. Therefore, the risk management level of XiangPiaoPiao Company needs continuous improvement and optimization to comply with market changes and withstand pressure.

## 2.2 Analyze the Operating Risk Value of Xiangpiaopiao Company

The annual report of XiangPiaoPiao Company in recent years 2016-2020 is as follows:

Table 2 2017-2020 Annual Report of Xiangpiaopiao Company

	2020	2019	2018	2017
liquidity	2683635500	2097704200	1948839500	1809992800
Current liabilities	1818975300	1305967400	1080749500	738963200
Working capital	864660200	791736800	868090000	1071029600
Surplus reserves	179719600	131489800	98609300	61786900
Undistributed profit	1651170900	1445292400	1235601500	997725500
Accumulated retained earnings	1830890500	1576782200	1334210800	1059512400
Profit total	455402600	441568700	402455400	345282000
Interest charges	26400100	15135100	4407900	11454600
Profit before interest and tax	481802700	456703800	406863300	356736600
Book value of equity	2838393800	2534120300	2215114200	1927647600
Sales revenue	3760849722	3977995637	3251089618	2640383870
Total assets	4737859900	3915618500	3339620700	2807866900
Total liabilities	1899466100	1381498200	1124506400	880219300

Z value calculation table of XiangPiaoPiao Company is obtained through Z value analysis:

Table 3 Calculation and Analysis of Z-Value of Xiangpiaopiao Company in 2017-2020

	2020	2019	2018	2017
X1	0.1825	0.2022	0.2599	0.3814
X2	0.3864	0.4027	0.3995	0.3773
X3	0.1017	0.1166	0.1218	0.127
X4	1.4943	1.8343	1.9699	2.19
X5	0.7938	1.0159	0.9735	0.9404

Z value	2.1939329	2.6326147	2.7020684	2.8459451
Z-value result description	unstable	unstable	unstable	unstable

As can be seen from The data in Figure 3, although the sales revenue, working capital and other indicators of XiangPiaoPiao Company are increasing year by year, the corresponding current liabilities and other indicators are also increasing year by year, and the Z value is in a gray area and presents a trend of decline year by year, with certain bankruptcy risk. All these indicate that the management of XiangPiaoPiao Company should start to pay attention to the risk management level of the company. While developing new business, it should also find out the high-risk factors and control the risk of the company within a controllable range.

Meanwhile, as corporate bankruptcy is the most serious consequence, the risk severity should be set at the highest level of 4. According to the previous data, the z-value of XiangPiaoPiao company from 2017 to 2019 was about 2.7 on average, while the Z-value of XiangPiaoPiao company in 2020 significantly decreased to 2.2, corresponding to the level of 2.0 in the second paragraph of the risk matrix. Therefore, it can be concluded that the risk product of XiangPiaoPiao company in the risk matrix is 8, which belongs to the major risk area.

### 2.2.1 Calculate the Debt Repayment Risk of Xiangpiaopiao Company

This paper randomly selected to join the farmer mountain spring, bright dairy, Erie shares, unified group, d d group, three yuan shares, master kong, huang's dairy, drunk wine, hainan coconut island the ten, and for the Chinese beverage industry listed company financial data, it is concluded that the industry average current ratio, quick ratio, equity ratio and the asset-liability ratio, and used with or the company's financial situation.

The short-term solvency index and industry average index of XiangPiaoPiao Company are as follows:

Table 4 the Short-Term Solvency Index and Industry Average Index of Xiangpiaopiao Company

	2020	2019	2018	2017
Current ratio	1.475355658	1.606245455	1.803229611	2.449367979
Quick ratio	1.390657421	1.390696506	1.573611091	2.121750447
Industry average liquidity ratio	1.143661694	1.174232	1.407131977	1.438960462
Industry average quick ratio	0.880265914	0.837305898	1.061246483	1.069606496

XiangPiaoPiao's long-term solvency index and industry average index are as follows:

Table 5 the Long-Term Solvency Index and Industry Average Index of Xiangpiaopiao Company

	2020	2019	2018	2017
Equity ratio	0.669204569	0.545158886	0.50765166	0.456628743
Asset-liability ratio	0.400912256	0.352817365	0.336716801	0.313483271
Industry average equity ratio	1.10149691	1.16661406	0.993678109	0.967528641
Industry average asset-liability ratio	0.508187059	0.511070814	0.469207914	0.459889575

In the index of short-term solvency of enterprises, liquidity ratio is generally used to reflect the extent to which current assets meet the needs of current liabilities. The larger the value is, the stronger the ability of enterprises to meet current liabilities with working capital is, the stronger the liquidity of enterprises is, and the higher the activity of enterprises is. Due to the liquidity requirements of each industry is different, also is different to the requirement of business activity, and or company as a beverage industry leading enterprises, although has been higher than the average level in the beverage industry, but presented the downward trend year by year, it illustrates the risk management of the enterprise in a certain extent on the rise year by year, in the short term debt risk probability increasing, when the need to make a risk assessment and risk adjustment.

The quick ratio is used to determine the more short-term corporate liquidity value by subtracting the value of inventory and prepaid expenses from current assets and then dividing by current liabilities. Similarly, the higher the quick ratio of an enterprise is, the higher the liquidity is. In the same industry, the quick ratio of XiangPiaoPiao Company also gradually shows a trend of decline year by year, which indicates that XiangPiaoPiao company may have too many goods for inventory and has poor short-term solvency. The first two indicators show that although XiangPiaoPiao is

higher than the average level of the industry, its short-term solvency has been declining in recent years and there are great risks. It is absolutely impossible to ignore the existing turnover risks and it is in urgent need of improvement.

In addition, among the long-term debt repayment indicators of enterprises, the equity ratio measures the long-term debt repayment ability of enterprises, which is used to measure the protection degree of long-term creditors of enterprises and the dependence degree of enterprises on debt. The higher the equity ratio of an enterprise is, the weaker its long-term debt paying ability will be. Therefore, compared with the average of the industry, XiangPiaoPiao Company is still slightly higher than the average, but it increases year by year, indicating that the company adopts a corporate strategy with lower risks and lower rewards, but its long-term debt paying ability is constantly weakening to obtain higher corporate interests.

The asset-liability ratio is used to measure the degree of protection that the creditors can receive when the company goes bankrupt. If the asset-liability ratio is low, the creditors are in a better protected situation. By comparison, XiangPiaoPiao is still lower than the average index of the industry, but compared with the data from year to year, it also shows a general trend of increase year by year, indicating that the solvency of XiangPiaoPiao is also decreasing year by year.

To sum up, we can see that although the financial indicators of XiangPiaoPiao Company are basically higher than those of the industry, compared with previous years, its long-term and short-term solvency is declining year by year, and corporate risks are also rising year by year. So, because the enterprise itself in recent years, the rising of the risk, we can define the risk of bankruptcy risk is 2 (low probability of occurrence), and for financial indicators generally higher than the industry average index, so we will be defined as 2 (smaller), and the severity of the combined risk matrix, or can be drawn from the company's bankruptcy risk at risk areas) in (4, there is a certain enterprise risk.

### **2.3 Countermeasures and Suggestions for Risk Prevention**

When enterprises make their own long-term development strategy, they can consider the risk matrix to determine the size of the enterprise risk, and optimize the reform from the enterprise's risk tolerance, risk management mode, enterprise resource allocation, enterprise risk control system and other aspects. By improving the efficiency of resource allocation and optimizing the management and control process of enterprises, internal management risks of enterprises can be reduced. According to the actual strength of the enterprise, the risk prevention level is dynamically formulated, and measures including risk avoidance, risk hedging and risk transfer are actively taken to reduce the risk of external control of the enterprise.

Can be seen from above or the company's analysis, although the average index is higher than the same industry or company, but the risk of their own is on the increase year by year, debt paying ability decreased year by year, make it has certain management risk and bankruptcy risk, so you should improve the system of enterprise risk control as soon as possible, establish risk early warning mechanism, perfect the internal financial structure, and only in this way, the company to be more steady and fast development.

### **3. Conclusion**

From the risk matrix analysis in this paper, it can be seen that the risk matrix can combine qualitative analysis with quantitative analysis for risk analysis, objectively reflect the financial data that is not easy to be quantified in the matrix, and thus discover risk problems. However, when risk matrix is actually calculated, it is easy to substitute different risk levels due to subjective judgment, which may lead to differences in risk size and severity and affect managers' decisions. Therefore, further improvement is needed. Only by constantly innovating risk control management methods, standardizing risk management system, improving risk management level and enhancing the competitive strength of enterprises in the market can enterprises remain invincible in the long-term competition in the future and achieve better development.

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