

# Financial Risk Evaluation of Listed Liquor Companies

-- Based on 2011-2020 Financial Report Analysis

Xinyue Wu<sup>1</sup>, Shaolun Zeng<sup>2</sup>

<sup>1</sup>School of Management, Sichuan University of Science & Engineering, Zigong 643000, Sichuan, China

<sup>2</sup>School of Economics and Finance, Guizhou University of Commerce, Guiyang 550014, Guizhou, China

**Abstract:** Based on the financial data of Shanghai and Shenzhen stock markets from 2011 to 2020, we evaluate the financial risk of 15 listed companies in the liquor industry using principal component analysis method in this paper. Selecting 16 indicators in four aspects: debt solvency, operating ability, profitability, and development ability for principal component analysis, five principal component models are obtained. From the comprehensive evaluation model of financial risk obtained in this paper, it can be concluded that the first and second, the third and fourth principal components have an important impact on risk evaluation, especially the first principal component, which reflects the solvency of the liquor industry companies such as cash flow or liquid assets realization, and the company's profitability with all assets to obtain income levels. The financial risk of the company is greatly affected. This paper analyzes and discusses the financial risks of Chinese liquor listed companies from four aspects, including solvency.

**Keywords:** Liquor listed companies, Financial risk, Principal component analysis.

## 1. Introduction

In recent years, sales of high-end liquor have been greatly affected due to the reform of the consumption structure of the liquor industry. Listed companies in the liquor industry have experienced large fluctuations in the stock market in the past year. For example, the stock price of Moutai fell from RMB 2,680.59 on February 26, 2021 to RMB 1,620.72 on August 6, 2021, a drop of approximately 39.54%. Even since 2012, the liquor industry has not experienced such a big market shock since it entered a period of deep adjustment. As a result, the financial risks of listed companies in the liquor industry have attracted a great deal of attention from the industry and academia.

Financial risk in a broad sense is considered to be a risk that runs through all aspects of business development and is not limited to the financial risk caused by liabilities. Specifically, it refers to the possibility that an enterprise may suffer losses due to changes in the internal and external environment and various factors that are difficult to predict or control, which may cause the enterprise's operating income to deviate from the expected income (Xu and Wnag, 2008; Zhou, 2004; Huang, 2013).

Therefore, evaluating the financial risks of listed liquor companies has the following advantages. First, it provides investors with scientific and reliable decision-making. Second, it can identify potential financial risks for listed liquor companies. Third, it can remind corporate managers to adjust operational strategies in a timely manner and improve their ability to resist risks, thereby promoting the healthy development of listed liquor companies. This paper constructs a financial risk evaluation model for listed liquor companies in China based on principal component analysis, and evaluates their financial risks in four aspects, namely, solvency, operating capacity, profitability and development capacity, in order to provide relevant reference materials for listed liquor companies and investors.

## 2. Literature Review

Regarding financial risk assessment, domestic and foreign scholars have conducted in-depth research and then formed a wealth of research results, mainly including two aspects of enterprise financial risk early warning and enterprise financial risk analysis.

In terms of financial risk early warning, the first scholar who used statistical methods to study financial risk early warning models was Fitzpatrick (1932). He proposed a univariate model and used financial ratios to compare normal enterprises with those in financial crisis. Net profit/shareholders' equity and shareholders' equity/liabilities have the greatest impact on financial risk. On the basis of his research, a more complete univariate model was proposed by Beaver (1966) at Stanford University, which links financial ratios to bankruptcy risk. After that, this model was developed from a single-variable model to a multivariate analysis through the research of many scholars. For example, 66 sample companies were selected by Altman (1968) and divided into 33 bankruptcy groups and 33 non-bankruptcy groups. He selected 22 variables and divided them into five standard ratio categories such as liquidity and profitability, and proposed Five-variable Z-Score model. In the case of mediation effects, this model is used more in financial risk quantification. Subsequently, the ZETA model was constructed based on this model (Altman et al., 1977). The study selected 53 bankrupt companies and 58 non-bankrupt companies. The sample was evenly divided into manufacturers and retailers, and the variables were increased from the previous five to seven. The second generation model was formed as a credit risk rating model to evaluate the probability of bankruptcy. However, the multivariate linear model requires the financial indicators to obey a normal distribution, so this imposes some limitations on the use of the model. The research of Ohlson(1980) shows that the release time of financial statements of some companies may be delayed, and the investment risk of investors is increased.

Conditional Logistic analysis method is used to construct a prediction model for the probability of bankruptcy of the company, so as to obtain four a statistically significant risk factor. Beckmann et al. (2006) introduced that the early warning system is limited by the exchange rate, but the impact is small and unstable. At the same time, they also emphasized that the early warning system has a strong predictive ability, which can help managers prevent financial crises through its predictive ability. The risk rating model suitable for small businesses is adopted by S-M Lin (2012), which is based on the method of financial ratios to predict company bankruptcy, by investigating the combination of bankrupt financial distress levels to understand default groups outside bankrupt companies. It also discusses the impact of the four default definitions on the choice of predictors and the accuracy of the prediction model. Non-financial indicator data is used by Li (2014) to improve the accuracy of forecasting. He believes that it is not reliable enough to use financial indicators to verify the financial early warning model, and proposes that the financial early warning model can better help companies identify financial crises. Kim (2014) used the research methods of SVM, NN and DT ensemble model to predict and analyze the financial distress of the hotel industry, which provided an important reference value for the academic community to analyze financial distress prediction. Some scholars such as Xu et al. (Xu and Shao, 2017; A and Zhao, 2018; Deng and Xu, 2018; Du and Xu, 2013; Yuan et al., 2010) used the Logistic regression model to carry out early warning analysis on the financial status of listed companies from different angles, and drew corresponding conclusions and suggestions. Gao (2015) established a multivariate probability ratio regression model, and then carried out an early warning analysis of the financial crisis of listed companies. The study found that the financial risk of enterprises can be comprehensively measured by the Probit regression model, and then pointed out that enterprise managers and investors should pay attention to indicators such as current ratio, total asset growth rate, asset return rate, etc. The research on the financial crisis prediction model of listed companies constructed by three BP improved algorithms of the additional momentum method, the conjugate gradient method and the L-M optimization method shows that the introduction of non-financial indicators can greatly improve the accuracy of financial risk prediction (Li et al., 2019).

In the aspect of enterprise financial risk analysis, Xu and Wang (2008) introduced the principal component analysis method to build the model based on the existing theories and methods of studying financial risk, and verified the scientificity and rationality of their method. In recent years, in terms of financial risk analysis of listed companies, there are many Z-value method, F-score method, principal component analysis method and factor analysis (Deng and Hou, 2021; Chen et al., 2021; Qi and Cai, 2018; Gao et al., 2019; Lu and Wang, 2019; Xiong and Zhang, 2019; Pan and Zeng, 2015; Wang and Wang, 2016; Cao, 2014; Xiang, 2014). The financial indicators involved in the Z-score model are required to obey a normal distribution, and there are only a few financial indicators involved. However, there are many factors that actually affect financial risk, including some non-financial indicators. The Z-value method is used more in quantifying financial risks using mediation effects and

adjustment effects. The principal component analysis method is a data dimensionality reduction method that converts the original multiple indicators into a few uncorrelated comprehensive indicators. Compared with the Z-value method, it involves more and more comprehensive indicators. The test results of KMO and Bartlett principal component analysis can be performed when the KMO is greater than 0.5 and the Sig value in Bartlett is less than 0.05. The F-score value is an improved model based on the traditional financial risk early warning model Logit model, adding variables to measure earnings management, and adding non-financial indicators such as market prices. Pan (2015) conducted a principal component analysis on the financial risks of my country's manufacturing industry based on one year's financial data; Wang (2016) used the principal component analysis method, combined with the financial data of A shares in my country's Shanghai and Shenzhen stock markets from 2007 to 2015. The financial risks of my country's new energy industry have been comprehensively analyzed, which can enable companies to take risk prevention measures in advance. We can find that the principal component analysis method is similar to the factor analysis method. In factor analysis, it is necessary to assume that the common factors are not correlated, and the rotation technique is used to make the factors better explained, but dimensionality reduction converts many indicators into a few key factors, which sacrifices the original data (2019).

In summary, scholars at home and abroad have made some achievements in financial risk management. Among them, the mathematical statistics method has been paid great attention in the evaluation of enterprise financial risk, which makes the management of financial risk more scientific and accurate, which makes the management of financial risks more scientific and precise. Based on the existing literature, we assess the financial risk of the liquor industry by means of principal component analysis.

### 3. Study Design

#### 3.1. Sample Selection

Because the financial information of listed companies is relatively complete and public, and the data sources are more convenient and reliable, this paper selects the listed companies in the liquor industry in the A shares of Shanghai and Shenzhen from 2011 to 2020. At present, there are 20 listed companies whose main business is liquor, including Moutai, Wuliangye, Yanghe shares, Luzhou Laojiao, Gujing tribute wine, Fenjiu, Yingjia Gongjiu, Kouzijiao, Jinshiyuan, Laobaigan, Jinseed, Elite, Highland barley wine, Shede Wine Industry, Shuijingfang, Jiugujiu, Huangtai Liquor, Shunxin Agriculture, Weiwei, and Jinhuijiu. Of these, Shunxin Agriculture and Weiwei, are included in the analysis mainly because the brands of liquor they produce are more well-known or representative of the region, such as Niulangshan Erguotou and Guizhou Alcohol. Companies with less than 10 years of data observations were excluded, including Jinshiyuan, Jinhuijiu, Kouzijiao and Yingjia Gongjiu; Weiwei was excluded because it was ST; 15 companies' annual observations were finally obtained. Therefore, a total of 15 listed liquor companies were selected as the sample in this paper (see Table 1).

Table 1. Sample companies studied in this paper

code	company name	code	company name
002646	Highland barley wine	600809	Shanxi Fenjiu
002304	Yanghe shares	600779	Shuijingfang
000995	Huangtai Winery	600702	Shede Wine Industry
000860	Shunxin Agriculture	600559	Laobaigan
000858	Wuliangye	600519	Kweichow Moutai
000799	Alcoholic drink	600199	Golden seed wine
000596	Gujing tribute wine	600197	Elite
000568	Luzhou Laojiao		

### 3.2. Selection of Indicators

The annual reports from 2011-2020 were used as the data source to evaluate the financial risk of listed liquor companies in the past 10 years, and the sample data were taken from the CSMAR and the relevant financial reports made public by listed companies. Referring to Pan(2016), 16 financial indicators in four areas of solvency, operating capacity, profitability and development capacity were finally selected to evaluate the financial risk of listed liquor companies (see

Table 2), and the financial indicators were calculated with reference to the methods of Xu (2008), Qi (2018), Lu (2019), Pan (2015) and Wang (2016). It should be noted that in the financial data of Kweichow Moutai, the data in the accounts receivable column for 2016 and later is empty. In the item notes of the consolidated financial statements about the disclosure of accounts receivable, RMB 3243804.43 is used instead to calculate Kweichow Moutai Accounts receivable turnover ratio from 2016 to 2020.

Table 2. Selection of financial indicators

Indicator type	variable	Indicator name	Indicator calculation method
solvency	X1	current ratio	Current Assets/Current Liabilities
	X2	quick ratio	(Current Assets - Inventory)/Current Liabilities
	X3	cash ratio	Closing balance of cash and cash equivalents/current liabilities
	X4	Assets and liabilities	Total Liabilities/Total Assets
Operating capacity	X5	Accounts Receivable Turnover	Operating Income/Average Occupied Accounts Receivable
	X6	Inventory turnover	Operating cost/average inventory occupancy
	X7	current asset turnover	Operating Income/Average Occupation of Current Assets
	X8	total asset turnover	Operating Income/Total Average Assets
Profitability	X9	return on assets	(Total Profit + Finance Expenses)/Total Average Assets
	X10	Roe	Net profit/average balance of shareholders' equity
	X11	Operating gross profit margin	(operating income - operating costs)/operating income
	X12	Operating net profit margin	Net profit/operating income
development ability	X13	capital accumulation rate	(Total owner's equity at the end of the current period-total owner's equity at the beginning of the current period)/total owner's equity at the beginning of the current period
	X14	total asset growth rate	(Total assets at the end of the current period - total assets at the beginning of the current period)/Total assets at the beginning of the current period
	X15	Net profit growth rate	(Amount of net profit for the current year - amount of net profit for the same period of the previous year) / amount of net profit for the same period of the previous year
	X16	Total operating income growth rate	(Total operating income for the current period of the year - total operating income for the same period of the previous year)/Total operating income for the same period of the previous year

### 3.3. Model Construction and Empirical Analysis

#### 3.3.1. Principal Component Analysis Model

The basic idea of principal component analysis is: through the covariance matrix of the original variables or the internal structural relationship of the correlation matrix, use the linear combination of the original variables to synthesize several comprehensive indicators, and transform the generated comprehensive indicators. The general steps of the principal component analysis method are as follows: the first step is to

select the initial analysis variables according to the research problem, and the selected financial data is standardized; the second step, according to the standardized financial indicators, the covariance matrix is the correlation coefficient matrix; the third step, find the eigenvalues and the corresponding unit eigenvectors; the fourth step, determine the number of principal components according to the total variance interpretation, and obtain the expression of the principal components  $F_i = \omega_{i1}X_1 + \omega_{i2}X_2 + \dots + \omega_{in}X_n$ ; the fifth step is to calculate the comprehensive score according to the variance percentage of the principal components, and the

expression is  $F = \alpha_1 F_1 + \alpha_2 F_2 + \dots + \alpha_n F_n$ ; the sixth step is to analyze the research problem and discuss the research in depth by combining the principal components.

### 3.3.2. Empirical Analysis

According to the financial data of 15 listed liquor companies from 2011 to 2020, using SPSS statistical software

to carry out descriptive statistics, the results are shown in Table 3. Then perform KMO and Bartlett test, the result KMO is 0.552 greater than 0.5, and the Bartlett sphericity test is less than 0.05, then principal component analysis can be performed. In the common factor variance, some data are greater than 0.5, indicating that the variable can be expressed.

**Table 3.** Descriptive statistics

	number of cases	Min.	max.	ave.	stdev
X1	150	.27	8.03	2.4459	1.21168
X2	150	.07	6.52	1.5300	1.09068
X3	150	.00	6.31	1.0386	.97515
X4	150	.11	1.80	.3814	.22021
X5	150	5.89	30209.36	1591.3133	4769.30204
X6	150	.13	2.91	.8148	.50014
X7	150	.22	1.72	.8494	.30183
X8	150	.09	1.18	.5865	.21698
X9	150	-.32	.46	.1404	.13010
X10	150	-2.56	2.23	.1578	.33253
X11	150	.19	.93	.6439	.15550
X12	150	-3.75	.69	.1193	.44517
X13	150	-19.77	2.46	.0200	1.65995
X14	150	-.34	1.54	.1457	.22241
X15	150	-124.22	10.25	-.6682	10.26648
X16	150	-.96	2.89	.1462	.38181
Number of valid cases (in columns)	150				

**Table 4.** KMO and Bartlett's test

KMO Sampling Suitability Quantity.	.552
Bartlett's sphericity test	approximate chi-square degrees of freedom salience
	2361.253 120 0.000

Table 5 shows the results of the total variance interpretation, from which it can be seen that the initial eigenvalues of the first eight components accumulate to 93.158%, with the contribution of the later eigenvalues becoming smaller and smaller. In this paper, the first five components whose total eigenvalues are greater than 1 are selected as principal components, and their eigenvalues are 4.860, 3.076, 1.927, 1.825, and 1.105, respectively. In addition, from the perspective of the cumulative contribution of the total variance, the cumulative contribution of the first five principal components was 79.960%, which was close to 80%.

The results of the component matrix analysis are listed in Table 6. From Table 6, it can be seen that for the first principal component, the correlation coefficients of quick ratio, cash ratio, return on assets and net operating margin have larger absolute values, which mainly reflect the company's solvency and profitability; for the second principal component, the financial indicators with larger coefficients include current asset turnover ratio and total asset turnover ratio, which mainly reflect the company's operating ability; the third principal component has the strongest representation of return on net assets; the fourth principal component has the strongest representation of inventory; and the fifth principal component has the strongest representation of net profit.

The principal component model for financial risk evaluation is represented by  $F_i$  and the scores of each principal component are calculated as follows:

$$F_i = \omega_{i1}X_1 + \omega_{i2}X_2 + \dots + \omega_{in}X_n \quad (1)$$

Of these,  $\omega_{ij} = \frac{\theta_j}{\sqrt{\tau_i}}$ , denotes the weight of each variable in the principal component;  $\theta_j$  denotes the coefficient corresponding to each variable in the component matrix,  $\sqrt{\tau_i}$  denotes the open root value of the corresponding eigenvalue of the  $i$ -th principal component. For example, the coefficient of X1 in F1 is calculated: the X1 component 1 data in Table 6, divided by the open root value of the initial eigenvalue of component 1 in Table 5. Then we get the following principal component expression:

$$F1=0.3438X1+0.3657X2+0.3518X3-0.3551X4+0.1670X5+0.0742X6+0.0343X7+0.1250X8+0.3646X9+0.1002X10+0.2964X11+0.3322X12+0.1885X13+0.2174X14+0.1461X15+0.0533X16 \quad (2)$$

$$F2=-0.2874X1-0.2220X2-0.2172X3+0.1149X4-0.1229X5+0.2735X6+0.5122X7+0.4796X8+0.2111X9+0.0203X10-0.0424X11+0.1686X12+0.1396X13+0.2304X14+0.0438X15+0.2753X16 \quad (3)$$

$$F3=-0.0549X1-0.0267X2-0.0187X3+0.1344X4+0.0675X5-0.0323X6+0.0487X7+0.0821X8+0.0916X9+0.6839X10+0.858X11-0.1797X12-0.3875X13+0.0366X14+0.4925X15-0.2310X16 \quad (4)$$

$$F4=0.2428X1+0.2670X2+0.2495X3-0.0234X4-0.3309X5+0.5428X6+0.1374X7+0.1751X8-0.1741X9+0.0270X10-0.4163X11-0.1743X12-0.0414X13-$$

$$0.0420X_{14}-0.0841X_{15}-0.3285X_{16} \quad (5)$$

$$F_5=0.0015X_1+0.1845X_2+0.2753X_3+0.3953X_4+0.3388X_5+0.0745X_6-0.0325X_7+0.0338X_8+0.0674X_9+0.0103X_{10}-0.0052X_{11}-0.2413X_{12}-0.3722X_{13}+0.3663X_{14}-0.4134X_{15}+0.3238X_{16} \quad (6)$$

The composite score was calculated from the percentage variance of the principal components in Table 5 and is expressed as F:

$$F = \alpha_1 F_1 + \alpha_2 F_2 + \dots + \alpha_n F_n \quad (7)$$

In equation (7),  $\alpha_i$  denotes the weight of the percentage of

variance of the  $i$ th principal component.  $\alpha_1 = 30.378\%/79.96\% = 0.3799$ ;  $\alpha_2 = 19.222\%/79.96\% = 0.2404$ ;  $\alpha_3 = 12.047\%/79.96\% = 0.1507$ ;  $\alpha_4 = 11.407\%/79.96\% = 0.1427$ ;  $\alpha_5 = 6.907\%/79.96\% = 0.0864$ . This leads to the following expression for F.

$$F=0.3799F_1+0.2404F_2+0.1507F_3+0.1427F_4+0.0864F_5 \quad (8)$$

In equation (8), the larger F1, F2, F3 and F4 coefficients are in a dominant position, while the smaller F5 coefficients are in a subordinate position.

Table 5. Total variance explained

Element	initial eigenvalues			Extract the load sum of squares		
	total	percent variance	accumulation %	total	percent variance	accumulation %
1	4.860	30.378	30.378	4.860	30.378	30.378
2	3.076	19.222	49.600	3.076	19.222	49.600
3	1.927	12.047	61.647	1.927	12.047	61.647
4	1.825	11.407	73.053	1.825	11.407	73.053
5	1.105	6.907	79.960	1.105	6.907	79.960
6	.862	5.386	85.346			
7	.689	4.304	89.651			
8	.561	3.507	93.158			
9	.327	2.041	95.199			
10	.259	1.621	96.820			
11	.239	1.493	98.313			
12	.109	.679	98.992			
13	.058	.365	99.356			
14	.051	.317	99.674			
15	.039	.241	99.915			
16	.014	.085	100.000			

Extraction method: principal component analysis.

Table 6. Composition matrix a

	Element				
	1	2	3	4	5
X1	.758	-.504	-.076	.328	.002
X2	.806	-.389	-.037	.361	.194
X3	.776	-.381	-.026	.337	.289
X4	-.783	.202	.187	-.032	.416
X5	.368	-.215	.094	-.447	.356
X6	.164	.480	-.045	.733	.078
X7	.076	.898	.068	.186	-.034
X8	.276	.841	.114	.237	.035
X9	.804	.370	.127	-.235	.071
X10	.221	.036	.949	.036	.011
X11	.653	-.074	.119	-.562	-.005
X12	.732	.296	-.249	-.236	-.254
X13	.415	.245	-.538	-.056	-.391
X14	.479	.404	.051	-.057	.385
X15	.322	.077	.684	-.114	-.435
X16	.118	.483	-.321	-.444	.340

### 3.4. Assessment Results

Based on the sample data, the comprehensive score F value of each listed company at different times can be calculated through SPSS calculation variables, rank them from largest to smallest. Referring to the literature of Xu (2008) and Pan

(2015), the financial risk of the company is divided into five risk level ratings of safe, low risk, general risk, high risk and very high risk according to the quartiles of 20%, 40%, 60% and 80%, and the higher its comprehensive score indicates the lower the financial risk of the company and vice versa (see Table 7).

**Table 7.** Comprehensive financial risk rating bands

Comprehensive evaluation score	financial risk level
$F \geq 25.5$	Safety
$25.5 > F \geq 9.52$	low risk
$9.52 > F \geq 4.07$	general risk
$4.07 > F \geq 2.13$	high risk
$F < 2.13$	very high risk

In the comprehensive evaluation of the financial risks of the 15 companies in the past 10 years, it can be found that Kweichow Moutai has the leading comprehensive score and ranks high, with relatively safe financial risks. Luzhou Laojiao's financial risks were in the general situation of the industry in the first three years, and the comprehensive score gradually increased from 2014, which is still relatively safe. Yanghe shares are similar to Luzhou Laojiao, with less risks in the first three years, and relatively safe financial risks in the following years. The comprehensive score of Laobaigan is relatively scattered. For example, in 2014 and 2015, the scores were 2.6 and 3.01, in 2016 and 2017, the scores were 162.87 and 180.93, and the scores in the following years were also very small, indicating that the financial risk of Laobaigan was extremely unstable. The majority of the remaining companies have varying degrees of risk, with 80% of Shede's risk being very high and Huangtai's risk being very small. The comprehensive score ranking of Huangtai Liquor Industry is basically at the end, indicating that it has the greatest financial risk in the liquor industry.

### 3.5. Analysis and Discussion

In-depth research into the financial risk of companies was carried out by comparing four aspects of the liquor industry: solvency, operating capacity, profitability and development capacity from 2011 to 2020.

#### (1) Solvency

From the solvency indicators, it can be seen that the current ratio, quick ratio and cash ratio of Wuliangye and Highland barley wine are generally large, in most cases even exceeding Moutai's. But the flow ratio and quick ratio are not the bigger the better. The more liquid the current assets are, the worse their yield may be. Huangtai Liquor's gearing ratio is the highest in the entire industry. Too much or too little debt is not good for the company. Too much means high risk and too little means that the company fails to make full use of its financial leverage, or that too many liquid assets are idle, which may lead to underinvestment.

#### (2) Operating capacity

Laobaigan's accounts receivable turnover rate fluctuated greatly. In 2014 and 2015, it was 71.36 times and 79.66 times respectively. In 2016 and 2017, it was 6199.25 times and 6888.88 times respectively. This is because Laobaigan was forced to stock up. Laobaigan has increased its cost of sales ratio from 2018-2020, rising from 26.91% in 2018 to 28.42% in 2020, which is larger in the peer group cost of sales ratio comparison. It can also be seen from the accounts receivable, which were only RMB370,000 in 2017, while by 2018-2020, they are RMB25.18 million, RMB41.58 million and RMB49.61 million respectively. It shows that Laobaigan has increased its accounts receivable in order to gain profit and focus on marketing. The adverse effect of credit sales to Laobaigan is that the huge amount of accounts receivable has a great impact on the company in case it cannot be collected,

which increases the financial risk of Laobaigan.

#### (3) Profitability

The difference in gross margin compared to peers is not significant, indicating that Huangtai Liquor has few problems with cost control, but Huangtai Liquor's return on assets, return on net assets and net operating margin are often negative, indicating its poor core competitiveness. Huangtai's regional layout is mainly in Gansu and sales are not very good. The growth rate of sales revenue of Kweichow Moutai is far greater than the growth rate of cost of sales, and its gross profit margin has been maintained at around 90%. However, the operating income of Huangtai Liquor is unstable, and the cost of sales has increased by 2.37 year-on-year in 2016. The gross profit margin in 2016 was only 19%, so its profitability was weak, which in turn led to the high financial risk of Huangtai Liquor. The return on assets, return on net assets and net operating margin of Highland barley wine were negative in 2017 and 2020. The financial report shows that the ending balance of Highland barley wine's inventory was RMB967 million at the end of 2020, an increase of RMB300 million from the end of 2016. Therefore, the pressure of the enterprise to destock is increasing day by day, and the poor sales have brought a greater impact on the profitability of Highland barley wine, thereby increasing its financial risk. Although the solvency of Highland barley wine is strong, its profitability and development ability are weak. It is not very safe to comprehensively analyze the financial risks of highland barley wine. In addition, Golden Seed Wine and Shuijingfang also have negative profitability indicators, but Shuijingfang's poor profitability is reflected in 2013-2014. Compared with its accounts receivable turnover rate in the past two years, they are 7.14 times and 5.89 times respectively. Compared with more than one hundred accounts receivable turnover rate from 2011 to 2012, the total operating income of Shuijingfang in 2013 and 2014 was 485.75 million yuan and 364.87 million yuan respectively. The total operating income of Shuijingfang in 2013 and 2014 was 485.75 million yuan and 364.87 million yuan respectively, compared with 1,636.19 million yuan in 2012. From 2012 to 2014, the operating costs were 313.9 million yuan, 146.05 million yuan, and 116.44 million yuan respectively, and the sales expenses gradually decreased in the past three years, indicating that the high cost is the main factor affecting its profitability.

#### (4) Development capacity

The development capacity of Huangtai, Qingqingkejiu and Golden seed wine is also often negative. Golden seed wine is mainly sold in the Anhui region, and the competitiveness of its liquor business is weak. Moreover, since 2016, the net cash flow from operating activities of Golden Seed Wine has been negative. The cost rate of its main business has been increasing year by year, and the growth rate of main business income is often negative. It shows that if the company does not focus on reducing costs and expanding profit margins, the future development of Golden Seed Wine will face major

problems.

Overall, Moutai and Wuliangye are in a leading position in the liquor industry, with strong business competitiveness, sufficient capital flow and high brand value. Kweichow Moutai has a unique account receivable situation because of its special technological level and core competitiveness. In the financial data of Kweichow Moutai, the data in the accounts receivable column for 2016 and later is empty. The study shows that Moutai's bargaining power is strong, in a strong position, strong collection capacity, financial risk is small.

## 4. Conclusions and Recommendations

### 4.1. Research Conclusions

In this paper, the financial risk evaluation model was constructed using principal component analysis to analyze the financial risks of listed companies in the liquor industry in China's Shanghai and Shenzhen markets from 2011 to 2020 as the research object. From the comprehensive financial risk evaluation model obtained in this paper, it can be concluded that the first, second, third and fourth principal components have a significant impact on the risk evaluation. Especially the first principal component, which reflects the solvency of companies in the liquor industry such as cash flow or the realization of current assets, as well as the profitability of the company's use of all assets to obtain income, which has a great impact on the company's financial risk. Thus, companies maintaining good short-term solvency and improving their own profitability can well reduce the financial risk of listed liquor companies.

### 4.2. Suggestion for Reducing the Financial Risk of Listed White Wine Companies

Based on the in-depth analysis and discussion of the research results, we make the following recommendations to reduce the financial risks of listed white wine companies.

(1) In terms of solvency, the current ratio, quick ratio and cash ratio of Wuliangye and Highland barley wine are on the high side. These companies should make full use of their assets and reasonably use financial leverage to further enhance the effectiveness and efficiency of asset operations while safeguarding the company's capital turnover. At the same time, for companies with insufficient cash flow, such as Gujing tribute wine, Shunxin Agriculture, Huangtai Liquor and Yanghe, which have low cash ratios, companies should retain a certain amount of cash flow to prepare for emergencies and reduce inventory backlog.

(2) In terms of operating capacity, companies facing poor sales can try to increase sales expenses and give full play to advertising to expand sales. But if companies that have implemented credit sales and other methods, such as Laobaigan in 2016 and 2017, should focus on the risk of recovery of the company's accounts receivable and notes receivable. Companies with poor cost control, such as Huangtai Liquor, can improve their financial budgeting mechanisms, so that limited funds can be used wisely to make more profit for the company. In addition, finance staff can participate in the analysis of the company's operations and transmit financial indicators such as inventory turnover and accounts receivable turnover to management in a timely manner. In the face of possible inventory backlog, accounts receivable and other debt problems may have a greater risk to take timely measures. As the saying goes, "grain is the meat

of wine, water is the blood of wine". For example, the water source of Moutai comes from Chishui, the water source of Luzhou Laojiao comes from the heart of the Yangtze River, and the soil they rely on is also different. Different geographical conditions have created different types of water. In the process of brewing, liquor enterprises should focus on sustainable development, improve the scale effect, and protect the environment, such as feeding the remaining lees to livestock and making fish bait to improve the utilization rate.

(3) In terms of profitability, for most companies, controlling their costs, making their products more competitive, and increasing the production of quality wine to boost sales will help them improve their profitability. In the case of Huangtai's poor profitability, it has also tried to increase its sales and management expenses to boost sales, but the effect is not obvious. So perhaps Huangtai needs to focus more on the quality of its products, improve its processes, expand the scale of production of quality wine, and thus improve its core competitiveness. For companies such as Wuliangye and Qingqing Barley Wine with large current ratios, quick ratios and relatively large cash, they can invest in suitable company projects and expand their own industries to make full use of idle funds to improve the company's competitiveness. The gross profit margin of Shunxin Agriculture is at a lower level in the whole industry, and its financial risk is relatively high, but in terms of its business capacity indicators, it is not too bad, so Shunxin Agriculture can think about how to increase profits. Because the business scope contains food crops, cash crops, meat processing, etc. Relative to the liquor industry, which has a relatively high gross profit margin, it is normal for its gross profit margin to be relatively low. However, enterprises can consider how to increase their bargaining power and thus increase their revenue to improve their gross margins.

(4) In terms of development capacity, in the analysis of sample companies, the main market for Highland barley wine is in Qinghai; the market for Elite is in Xinjiang; Wuliangye, Luzhou Laojiao, Shuijingfang and Wuliangye have wide business capacity and generally have good sales in China. Therefore, if the company's main market in a local area, such as Shede Wine, Qinghai Barley Wine, Elite, Laobaigan and other companies in a regional layout can enhance the influence of corporate brands, consider the expansion to the country. Such as Kweichow Moutai, Wuliangye, Luzhou Laojiao and other layout of the domestic market, they can take advantage of policy support to actively expand overseas markets and consider infiltrating overseas markets under the general policy of "One Belt, One Road" and global economic integration, establish a good image of Made in China, and promote the integration of Chinese standards with international standards. This will further expand overseas sales. In addition, we should cultivate and introduce diversified talents through multiple channels, establish the mindset of "talents strengthening enterprises". To improve the level of enterprise management and innovation, we can learn from mutually beneficial and win-win models such as "school-enterprise cooperation" to carry out professional talent training strategies, reduce the cost and time of talent training, enhance competitive advantages, and then promote the development and progress of enterprises.

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