Chapter 44
Relationship Between Social Responsibility and Economic Benefits of Liquor Industry

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Abstract From an aspect of the present state of the liquor industry, we firstly determined the research questions of social responsibility and economic benefits of liquor industry. Secondly we designed the research train, further clarified which on the basis of the theoretical review and literature. We developed the multi-angle, multi-level study through theoretical research and selection of economic benefits indicator. Establishment of social responsibility evaluation index system, multiple linear regression analysis based on principal components regression, and case studies proposed also. Then finally, we made conclusions and proposed suggestions on the basis of the study.

Keywords Liquor industry · Social responsibility · Economic benefit · Principal components regression

44.1 Introduction

With the high developing speed of Chinese economy, Chinese enterprises have got great achievements on business. However, the unilateral pursuit of economic interests has resulted in a great deal of social problems. Such as some companies damaged the legal rights of the employees, violated the consumer's rights and many entities are lack of good faith. Be defaulted maliciously, be bankrupt in order to avoid liabilities and disclose fake information etc. is the examples in such context.

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China's liquor industry is definitely the best in the world in terms of scale, the product output and the number of enterprises. Liquor industry, with independent intellectual property rights, is characterized as unique and competitive industry. As China's unique traditional kinds of wine with a long history, liquor formed its own wine culture and occupied an irreplaceable position in the minds of consumers. The economic benefits it creates, second only to the tobacco industry in the food industry, take part a significant financial contribution for national financial resources. As an industry with profound culture, an urgent problem currently is that how to deal with the relationship between social responsibility and economic benefits.

The research conclusion towards relationship of corporate social responsibility and economic benefits (mainly for corporate performance) are different. There are three main types of views: positive correlation, negative correlation and uncorrelated theory. Representative scholars on the positive correlation are Bragdon and Marlin [4], Bowman and Haire [3], Parket and EilBert [10], Heinze [8] and Sturdivant and Ginter [11] and so on. These scholars used accounting indicators to measure corporate performance and noted that corporate social responsibility can improve the performance of enterprises. A representative on the negative correlation is Vance [12]. He believes that fulfilling corporate social responsibility will reduce corporate performance. Because fulfilling social responsibility leads to a corresponding cost. Relatively to other enterprises which do not fulfill social responsibility. It makes a company at a competitive disadvantage and leads to decline in corporate performance. The main representatives on uncorrelated theory are Alexander and Buchholz [2], and Abbott and Monsen [1], they do not think there is a correlation between fulfilling corporate social responsibility and its performance.

44.2 Problem Description

Correlation means batch correlation between things. In the nature as well as the economic sphere, there are a large number of relevant phenomena, such as water ice and temperature, inflation and money supply related, etc. So, is there a correlation between social responsibility and economic benefits of liquor industry?

As for an industry, its social responsibility depends on social responsibility of all enterprises in the industry. In this study we regard corporate economic benefits and social responsibility in liquor industry as variables. Assume that corporate economic benefits is a function of corporate social responsibility, expressed as $Y = f(X)$. Build evaluation index system. And analyze the correlation between economic benefits and social responsibility. As shown in Fig. 44.1.

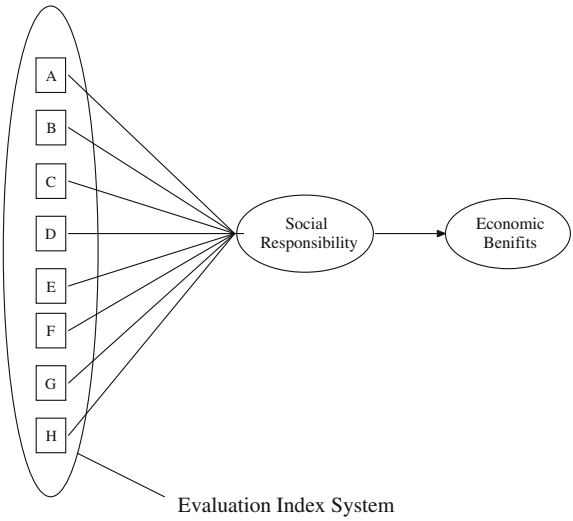

Fig. 44.1 Theoretical model

44.3 Methods

44.3.1 Establishment of Index System

1. Economic Measure

Economic benefits mean social labor savings by foreign exchange of goods and labor. From the definition of economic benefits, we know that it is a comparison of the operating results with the labor cost, or simply the relationship between income and expenses. That is, any expression of the relationship between the income and the expenses belongs to the category of economic benefits.

On one hand, it is an important problem that how to assess economic benefits of production units accurately. Currently, there are different understandings of economic benefits. Mostly we use profits or profit indicators to measure economic benefits of enterprises.

On the other hand, there are two kinds of economic benefits evaluation indicators, i.e. accounting indicators and market indicators. The values of accounting indicators are mainly from the financial statements audited by certified public accountants. Market indicators are displayed based on the capital market trading. In Chinese capital market, both regulatory mechanism and the degree of rational investors are imperfect, to some extent. Using market indicators is not comprehensive. So this paper adopts an accounting indicator: operating profit.

2. Measure of Social Responsibility

Corporate Social Responsibility originates in the late 19th century, and corporate social responsibility theory and stakeholder theory gradually converge in the

Table 44.1 Social responsibility evaluation index system

Social responsibility index	Bonus share allocation ratio of profits
	Asset-liability ratio
	Taxes paid
	R&D spending
	Credit scores
	Wages and benefits expenses
	Donations
	Brand value

1990s. The earliest scholars of stakeholder theory is Carroll [6] and Clarkson [7]. According to Clarkson's definition of stakeholder and Carol's classification of corporate four social responsibility [5], this paper defines Corporate Social Responsibility as: Enterprises for the purpose of sustainable development, in the pursuit of profit maximization, at the same time, also undertake economic, legal, ethics and voluntary responsibility of shareholders including shareholders, creditors, employees, customers, business partners, governments, communities, and environment and so on.

In the actual management practices, corporate social responsibility is immeasurable potential variables. We need to use observable subdivision indicators to describe these potential variables, thereby gaining available statistical data. Based on the concept of CSR, this paper designs the indicator system, in combination with the actual situation of Chinese liquor enterprises. Following a quantitative and comprehensive, available, and meaningful principle, the indicator system is shown in Table 44.1.

44.3.2 Multiple Linear Regression Analysis

Regard economic benefits indicator as dependent variable and social responsibility indicators as independent variables. And establish a multiple linear regression model to calculate the parameter estimates of the regression equation, i.e. an estimate of Y. Then obtain the effects of the regression equation, i.e. the effect of correlation between Y and X. General model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8,$$

Y represents operating profit, X_i represents social responsibility indicator.

44.3.3 Principal Component Regression

Principal component regression, put forward by Massy [9], is a kind of biased estimation method of dealing with the multicollinearity. It originated in the principal component analysis. And its core idea is to make multiple indicators into a few

comprehensive indexes without changing the index system. These comprehensive indicators are main components. Treat them as new independent variables, and then use the OLS method to estimate parameters in the model. Finally, transform the principal components into original independent variables.

Identify eight main components of the independent variable group, and select the previous k principal components that contains the most information of original variable group. Establish a regression equation between Y and the previous k principal components. And then transform the k principal components into the original independent variables to obtain the expression on Y and X.

44.4 Case Study

44.4.1 Data Collection

Select 13 listed companies in liquor industry as research samples. To ensure the objectivity and impartiality of the data, we need to base on annual reports of listed companies. Annual reports of enterprises are results of CPA's audit, so they have some validity and authority. Take the effects of extreme values on the statistical results into account. We eliminate ST and PT companies with poor business performance. Based on corporate annual reports and social responsibility reports, we collected data about listed companies in liquor industry. As shown in Table 44.2.

44.4.2 Multiple Linear Regression Analysis

44.4.2.1 Correlation Analysis

Use Eviews to get the correlation coefficient matrix, as shown in Table 44.3. There exists correlation between economic benefits indicator and social responsibility indicators. Except with a weak correlation with asset-liability ratio, correlation with other independent variables is strong. So it is reasonable to establish a linear regression model between dependent variable and independent variables.

44.4.2.2 The Diagnosis of Multicollinearity

There are many ways on reconnaissance of multicollinearity. We use pair wise correlation coefficients between dependent variables and independent variables to investigate. As shown in tab3, some correlation coefficients between Y and X are high. So there exists Multicollinearity. To avoid the regression parameter estimation problem and other problems, do principal component regression of independent variables.

Table 44.2 Original data table

	Operating profit (yuan)	Bonus share allocation ratio of profits (%)	Asset-liability ratio (%)	Taxes paid (yuan)	R&D spending (yuan)	Credit scores	Wages and benefits expenses (yuan)	Donations (yuan)	Brand value (billion yuan)
Kweichow Moutai	18,830,739,817.65	26.89	21.21	10,170,840,319.22	632307654.00	87.4	2,953,919,072.54	139750000	748.05
Wuliangye	13,702,135,270.70	18.77	30.34	9,072,901,623.78	568,952,900	72.6	2,539,978,448.13	19420000	712.78
LuzhouLaoJiao	6,089,363,956.27	16.14	37.26	3,582,818,501.59	70,203,055.80	68.2	237,184,243.57	11680604	281.46
Swellfun	509,985,959.13	5.52	28.50	627,310,939.59	3,741,638.51	63.2	192,676,231.74	344,200.00	76.68
Gujinggong	953,901,678.97	7.74	36.41	1,556,750,391.03	174,362,000	80	722,698,221.19	100,000.00	208.99
YangheBrewery	8,188,760,899.97	24.65	37.82	5,517,291,895.28	45090700	79	701,417,518.30	25604600	321.72
Jiuguijiu	642,845,713.46	3.94	25.64	690,376,783.67	27,094,948.07	72	131,024,061.70	1,631,000.00	66.76
Tuopai hede	496,036,515.39	7.31	32.48	388,795,399.78	8,086,637.67	34	211,381,740.45	1,500,000.00	44.75
Shanxi Fenjiu	2,015,144,420.82	16.86	40.70	2,726,612,089.38	10,755,089.58	75	632,552,808.12	0.00	166.15
Golden Seed Winery	749,824,573.97	10.91	25.74	695,113,004.69	3,161,010.05	78.6	190,066,095.46	603,000.00	89.06
Laobaigan Liqour	147,766,482.43	20.40	63.12	329,764,711.71	2,521,638.26	36.80	141,424,988.92	0.00	48.32
Green barley wine	380,074,045.51	9.66	7.25	489,876,076.02	8,380,025.03	50	100,378,309.92	3,000,000.00	55.21

Table 44.3 The correlation coefficient matrix (keep three decimal places)

	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Y	1.000								
X_1	0.754	1.000							
X_2	−0.224	0.146	1.000						
X_3	0.987	0.760	−0.189	1.000					
X_4	0.905	0.537	−0.245	0.900	1.000				
X_5	0.542	0.356	−0.354	0.582	0.474	1.000			
X_6	0.931	0.627	−0.218	0.939	0.980	0.516	1.000		
X_7	0.850	0.643	−0.278	0.778	0.768	0.453	0.794	1.000	
X_8	0.975	0.694	−0.205	0.986	0.951	0.580	0.964	0.763	1.000

Table 44.4 Principal component analysis for independent variables

Number	Value	Difference	Proportion	Cumulative value	Cumulative proportion
1	5.458966	4.260813	0.6824	5.458966	0.6824
2	1.198153	0.589923	0.1498	6.657119	0.8321
3	0.608230	0.178879	0.0760	7.265349	0.9082
4	0.429350	0.186690	0.0537	7.694699	0.9618
5	0.242660	0.197533	0.0303	7.937360	0.9922
6	0.045127	0.028409	0.0056	7.982487	0.9978
7	0.016718	0.015924	0.0021	7.999205	0.9999
8	0.000795	–	0.0001	8.000000	1.0000

44.4.3 Principal Component Regression

Do principal component analysis of eight independent variables. Obtain eigenvalues, contribution rates and the cumulative contribution rates. As shown in Table 44.4.

In the scree plot, as shown in Fig. 44.2, there is an obvious inflection point. The scree plot shows the proportion of eigenvalues of extracted principal components accounting for. Principal components before the inflection point reflect most of information. The curve after the inflection point is relatively smooth, and it means that it reflects relatively small proportion of information. The inflection point is between the second and third principal component, so just extract the first two main components.

Variable loading plot (Fig. 44.3) shows variable loading factor of corresponding principal components and how to synthesize principal components in accordance with original independent variables. The Table 44.4 and Fig. 44.3 show that contribution of the first principal component was 68.2 %, which loads mainly on X_1 and X_3. So the first principal components mainly reflect the share out bonus of distributable profit ratio and asset-liability ratio influence on economic benefits. Thus, name it as the return to shareholders factor. The second principal component contribution rate is 15.0 %. It loads higher on indicators such as X_8. So it mainly reflects the enterprise credit score, donating the impact on the economic benefits, and so on. Thus name it as macro factor contribution to society.

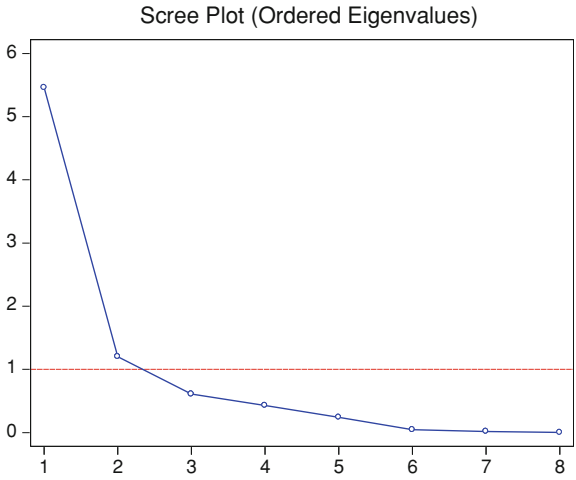

Fig. 44.2 Scree plot

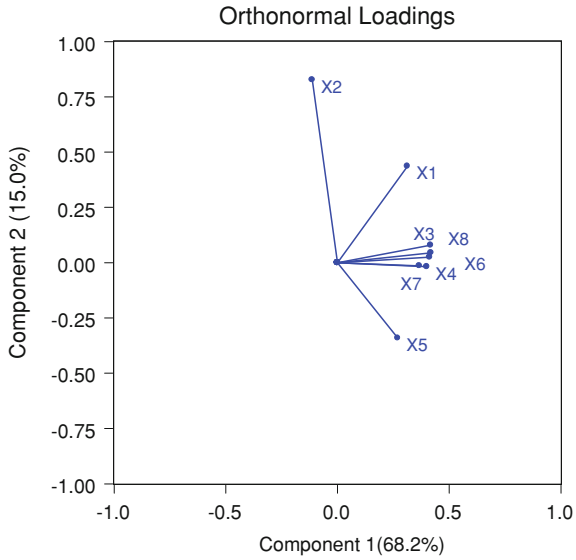

Fig. 44.3 Variable loading plot

As Table 44.4 shows, the first two principal components cumulative contribution rate is 83.21 %. The eigenvectors corresponding to the first two eigenvalues are shown in Table 44.5.

We can get the expression of the principal component:

$$\begin{cases} F_1 = 0.313524X_1 - 0.1133X_2 + 0.418057X_3 + 0.400339X_4 \\ \quad +0.270663X_5 + 0.412882X_6 + 0.366831X_7 + 0.41896X_8 \\ F_2 = 0.43645X_1 + 0.826487X_2 + 0.079136X_3 - 0.01835X_4 \\ \quad -0.34211X_5 + 0.025024X_6 - 0.01427X_{10} + 0.04431X_8. \end{cases} \tag{44.1}$$

Table 44.5 Coefficient matrix expression of principal components

Variable	PC 1	PC 2
X_1	0.313524	0.436450
X_2	−0.113299	0.826487
X_3	0.418057	0.079136
X_4	0.400339	−0.018351
X_5	0.270663	−0.342109
X_6	0.412882	0.025024
X_7	0.366831	−0.014269
X_8	0.418960	0.044310

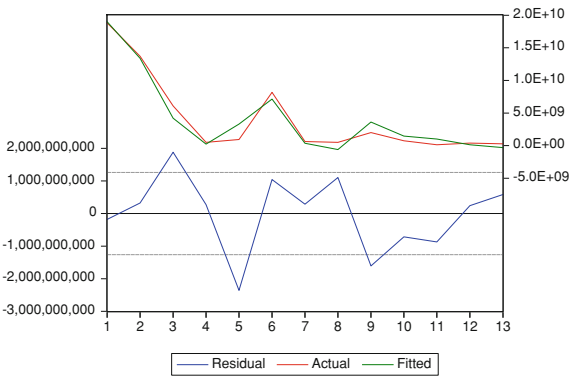

Fig. 44.4 Make a comparison chart of the actual value and the fitted values

44.4.3.1 Multiple Linear Regression Model Based on Principal Components Estimate

According to the results of regression analysis, do regression analysis for y with the two principal components. It follows from Table 44.5 that

1. The regression equation is: $Y = 4.08 \times 10^9 + 5.68 \times 10^9 F_1 + 3.95 \times 10^8 F_2$.
2. It can be seen that the equation was good. The adjusted coefficient of determination is 0.956233 and instructions liquor business operating profit appears from these changes can have a 86.2916 % of the two principal components explained.

Replace F_1 and F_2 with the linear combination of X_i, and we can get the regression equation of Y and X:

$$\begin{aligned} Y = {} & 4.08 \times 10^9 + 1.95 \times 10^9 X_1 - 3.17 \times 10^8 X_2 + 2.41 \times 10^9 X_3 \\ & + 2.27 \times 10^9 X_4 + 1.40 \times 10^8 X_5 + 2.36 \times 10^9 X_6 + 2.08 \times 10^9 X_7 \\ & + 2.40 \times 10^9 X_8 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8. \end{aligned}$$

Make a comparison chart of the actual value and the fitted values. The Fig. 44.4 shows that the model fits in well.

44.5 Policies and Proposals

Based on the above analysis of the relationship between economic benefits and social responsibility, policy recommendations are as follows:

1. Improve the basic framework associated with liquor industry social responsibility. We suggest that the market parties jointly improve the basic framework related to social responsibility, including further regulating social responsibility reports, preparing social responsibility indicators and so on. Standardized evaluation system helps to evaluate the performance of liquor industry social responsibility. And promote the sustainable development of society.
2. Establish incentive mechanisms corresponding to social responsibility evaluation system. The goal of any evaluation system is to encourage companies to perform related duties, and corporate social responsibility evaluation system is no exception. We can evaluate the fulfillment of corporate social responsibility in liquor industry. So as to evaluate the liquor industry's social responsibility.
3. Change liquor enterprises' understanding of social responsibility, and promote the fulfillment of social responsibility effectively. Corporate social responsibility should be integrated into development strategies. Fulfill the responsibilities to individual shareholders, creditors, suppliers, employees, consumers, the environment, government, and others from the strategic point of view. For example, liquor enterprises should create a good working environment for employees. Improve employee benefits so as to improve the enthusiasm and creativity of employees and create more value for their businesses.
4. Strengthen policy's formulation and guide enterprises to fulfill their social responsibilities effectively. Government should develop appropriate policies to guide liquor enterprises to pay more attention to the interests of employees, suppliers, customers and other stakeholders. Encourage enterprises to focus on environmental protection and energy saving in the production process. Only by developing policies and regulations, can we fulfill the liquor industry's social responsibility effectively.

44.6 Conclusions

The main purpose of this paper is to study the relationship between economic benefit and social responsibility in liquor industry. This plays a positive role in Chinese liquor corporate promoting social responsibility. Conclusions of this paper are as follows:

As for the concept of social responsibility, scholars have not reached a consensus. This paper defines social responsibility from the perspective of stakeholders theory. As for liquor industry, corporate social responsibility has a positive impact on economic benefits. Similarly, the economic benefits have a good role in fulfilling social

responsibility. There is a positive correlation between the two. And they promote each other.

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