



A STATISTICAL STUDY ON THE FACTORS INFLUENCING CSR DISCLOSURE OF LISTED COMPANIES IN CHINA

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Abstract

In this paper, methods of correlation and multiple linear regression are applied to empirically analyze Corporate Social Responsibility (CSR) Disclosure in China. The research sample is taken from the Corporate Social Responsibility reports issued in 2010, it consists of 100 listed companies of China's Shenzhen Stock Exchange (SZSE) 100 Index. The results show that influence from other stakeholders except shareholders termed asset-debt ratio (ADR), company size (LNASSET) and ownership structure (STATE) are three most important factors influencing CSR disclosure in China, while financial

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performance (ROA), proportion of the first largest shareholder (PER), industry attributes (INDUS), and regional variations (REG) are not important factors.

1. Introduction

The so-called “Corporate Social Responsibility” (CSR) is a social obligation of a corporate’s positive impact through its activities on environment, consumers, employees, communities and all other members of the public society besides pursuing profits for shareholders, which includes obeying commercial morality, promoting production safety and occupational health, protecting workers’ legitimate rights, saving natural resources and donating for community and charity [7]. In recent years, many developed countries have strengthened the idea of CSR by legislation and correspondently these developed countries have a rich experience in theoretical and practical developments [4]. Although research on CSR disclosure in the developed nations is abundant, it is lacking in the developing countries. Research on CSR disclosure started relatively late in China. Recently scholars in this field have made a big progress, for example, Li [5] selected six companies as a study sample and identified main issues in CSR disclosure, Chen and Ma [2] described the status of CSR disclosure of the listed companies in China and set up an index called “social responsibility contribution” to evaluate social contribution of a company, Shen [6] selected the C4 petrified plastic industry as a study sample and verified that four factors: corporate size, company profitability, financial lever and financing needs are the factors influencing CSR disclosure. But their researches focus either on descriptively analyzing the condition or simply describing the motivation, contents, characteristics and patterns, i.e., there have not had a comprehensive study on deciding which factors influence CSR disclosure significantly, particularly from the statistical point of view.

2. The Contents of CSR Disclosure for the Listed Companies in China

Referring to an Annual Evaluation Report published by Ernst and Ernst

[3] and the Social Responsibility of the Guidelines promulgated by Shenzhen Stock Exchange, CSR is divided into 5 first-grade indexes and 18 second-grade indexes for assessment, considering the reality of China. These indexes are listed in Table 1.

Table 1. CSR disclosure indexes

First-grade indexes	Second-grade indexes
Shareholders and creditors	Equal justice to all shareholders and the creditors; to protect the interest of creditor or bank
Employees	Salary bonus and welfare; health and safety of employees; training and education of employees; diversity and equal opportunity
Customers and suppliers	Anti-unfair competition; product quality and its security; management of suppliers relationship; protection for the consumers
Environment and energy	Pollution control; energy saving; recycle and refuse waste material; environmentally friendly product
Community and public welfare	Interests in the community; medical care, education and public safety; interests of vulnerable groups; cash and services contribute

3. Research Hypotheses

Based on the development status of social responsibility in China and past research literatures, seven factors are considered as the ones which influence CSR disclosure of the listed companies, including corporate size, financial performance, ownership structure, proportion of the first largest shareholder, industry attributes, regional variations and influence from other stakeholders except shareholders. Seven hypotheses are presented as follows related to these factors:

- **Hypothesis 1.** The larger the size of the corporate, the higher the quality of the CSR disclosure.
- **Hypothesis 2.** The better financial performance, the more the quantity of the CSR disclosure.
- **Hypothesis 3.** State-owned listed companies should disclose more information on social responsibility than other types of ownerships.
- **Hypothesis 4.** The higher proportion of the first largest shareholder, the lower the quality of the CSR disclosure.
- **Hypothesis 5.** The listed companies in heavily polluting industries (metallurgy, chemical industry, petrochemical and coal industry, etc.) intend to disclose more CSR.
- **Hypothesis 6.** The listed companies in developed areas do better in disclosing CSR than those in undeveloped areas.
- **Hypothesis 7.** The listed companies with a high asset-debt ratio provide more information on social responsibility. Asset-debt ratio is a comprehensive index which reflects the benefit of other stakeholders including employees, creditors, consumers, citizenship, etc. except shareholders.

4. Data Analysis and Tests of Hypotheses

4.1. Sample selection and data source

The research sample is taken from Corporate Social Responsibility reports issued in 2010 of the 100 listed companies which are the companies of SZSE 100 Index. These companies occupy core assets of the high quality, possess sustainable growth and are a very strong representative in China. CSR reports and financial data can be obtained from www.szse.cn and www.cninfo.com.cn. The basic sample data are manually gathered and calculated from CSR reports and annual financial reports of relevant listed

companies. Microsoft Office Excel 2003 and R for Windows are used in data processing and analysis.

4.2. Descriptive statistical analysis of dependent variables

The index method was recommended by Booth et al. [1] as a more accurate method in the research of CSR disclosure. According to this method, if a listed company descriptively discloses one of the above 18 second-grade indexes, it gets one point for each disclosure; if a listed company quantitatively discloses one of the above 18 second-grade indexes, for example, the emission of pollutant, or the number of donations, it gets two points for each disclosure; if a listed company does not disclose on the base of classification, it gets 0 point. Therefore, the maximum points for a listed company are 36 points and minimum points are 0 point. The weight of each index is considered as one in the paper in order to avoid the subjectivity from manmade allocation. Finally, CSR Disclosure Index (CSRDI), which is used to reflect the magnitude of CSR disclosure, is obtained by the Delphi method.

Based on the evaluation of each index of eighteen indexes for the sample companies, the total points of 5 first-grade indexes and 18 second-grade indexes could be calculated. The results are shown in Table 2 and Table 3.

Table 2. Descriptive statistical analysis of the 5 first-grade indexes

Items	Points	Weight	Points percentage	Amount of disclosure company
Shareholders and creditors	87	200	43.5	84
Employees	78	200	39	86
Customers and suppliers	65	200	32.5	65
Environment and energy	69	200	34.5	90
Community and public welfare	80	200	40	98

Table 3. Descriptive statistical analysis of the 18 second-grade indexes

Items	Points	Weight	Points percentage	Amount of disclosure company
Equal justice to all shareholders and the creditors	87	200	43.5	84
To protect the interest of creditor or bank	84	200	42	84
Salary bonus and welfare	70	200	35	68
Health and safety of employees	89	200	44.5	86
Training and education of employees	90	200	55	85
Diversity and equal opportunity	54	200	27	51
Anti-unfair competition	67	200	33.5	67
Product quality and its security	67	200	33.5	65
Management of suppliers relationship	82	200	41	79
Protection for the consumers	50	200	25	48
Pollution control	115	200	57.5	79
Energy saving	105	200	50.5	84
Recycle and refuse waste material	47	200	23.5	36
Environmentally friendly product	23	200	11.5	15
Interests in the community	44	200	22	43
Medical care, education and public safety	52	200	26	47
Interests of vulnerable groups	43	200	21.5	37
Cash and services contribute	169	200	84.5	96

Note. Weight = 100×2 ; points percentage = $(\text{points} \div \text{weight}) \times 100\%$; amount of disclosure company is calculated by authors.

Table 2 shows that the index “Shareholders and creditors” has the highest points percentage 43.5%, which indicates that the benefit of shareholders and creditors is a focus of concern, therefore the benefit of shareholders and creditors is sufficiently disclosed in the CSR reports; and that the index

“Customers and suppliers” has the lowest points percentage 32.5%, which indicates that the benefit of customers and suppliers is paid less attention by the companies.

Table 3 shows that the indexes “Cash and services contribute”, “Pollution control” and “Energy saving” have the first three highest points percentage (84.5%, 57.5%, 50.5%), which imply that the companies would rather disclose “good news”; whereas the index “Environmentally friendly product” has the lowest points percentage (11.5%), which indicates that the companies would prefer not to disclose “bad news”.

4.3. Descriptive statistical analysis of explanatory variables

The largest logarithm of asset size (LNASSET) is 25.5, whose CSRDI is 14; and the smallest logarithm of asset size is 19.28, whose CSRDI is 9. The highest ROA is 44.89%, whose CSRDI is 12; the lowest ROA is 0.16%, whose CSRDI is 8. The proportion of the first largest shareholder (PER) is 74.15%, whose CSRDI is 11; the proportion of the lowest shareholder is 6.47%, whose CSRDI is 16. The highest asset-debt ratio (ADR) is 82.37%, whose CSRDI is 17; the lowest asset-debt ratio is 3.78%, whose CSRDI is 9. Details are shown in Table 4 and Table 5.

Table 4. Descriptive statistical analysis of continuous explanatory variables

	LNASSET	ROA	PER	ADR
Minimum	19.28	0.16	6.47	3.78
Maximum	25.50	44.89	74.15	82.37
Mean	22.40	9.41	36.17	47.51
Std. deviation	1.312	6.648	15.10	19.52

Table 5. Descriptive statistical analysis of discrete explanatory variables

	Value	Amount of companies	Proportion
STATE	1	28	28%
	0	72	72%
INDUS	1	46	46%
	0	54	54%
REG	1	62	62%
	0	38	38%

4.4. Correlation analysis

Relationship between every explanatory variable and CSRDI is tested based on Pearson correlation coefficient. The definition of the 7 explanatory variables is given in Table 7. Table 6 shows the results. The correlation coefficients between CSRDI and corporate size (INASSAT), asset-debt ratio (ADR) and ownership structure (STATE) are the three largest ones, i.e., 0.436, 0.395, 0.246, respectively. It shows that these three factors are the most important ones influencing CSRDI.

Table 6. Pearson correlation coefficient

	CSRDI	REG	INDUS	ROA	PER	STATE	ADR	INASSAT
CSRDI	1	–	–	–	–	–	–	–
REG	–.159	1	–	–	–	–	–	–
INDUS	.056	–.187	1	–	–	–	–	–
ROA	–.159	–.138	.129	1	–	–	–	–
PER	.070	–.078	.255	–.071	1	–	–	–
STATE	.246	–.292	.363	–.047	.476	1	–	–
ADR	.395	.048	.042	–.508	.082	.030	1	–
INASSAT	.436	–.202	.114	–.245	.188	.236	.526	1

4.5. Multiple regression model

In accordance to the previously stated research hypotheses, a multiple regression model is set up as follows in order to carry out a statistical

regression analysis and identify key factors which influence CSRDI of listed companies. In this model, CSRDI is considered as a dependent variable, and the seven explanatory variables defined in Table 7 are considered as predictors,

$$CSRDI_i = \beta_0 + \beta_1 LNASSET_i + \beta_2 ROA_i + \beta_3 STATE_i + \beta_4 PER_i + \beta_5 INDUS_i + \beta_6 REG_i + \beta_7 ADR_i + \varepsilon_i,$$

where β_k are regression coefficients, ε_i is random error, following the standard normal distribution $N(0, \sigma^2)$; the index i represents i th corporate.

Table 7. Explanatory variables

Variables	Meaning of variables	Expected direction of correlation with CSRDI
LNASSET	corporate size, natural logarithm of total asset	+
ROA	financial performance, return on total asset in the last year	+
STATE	ownership structure, dummy variables, if the corporate is state-owned, its value is 1; otherwise its value is 0	+
PER	proportion of the first largest shareholder	–
INDUS	industry attributes, dummy variables, if the corporate attributes in the heavily polluting industries, its value is 1; otherwise its value is 0	+
REG	regional variations, dummy variables, if the corporate attributes in the developed area, its value is 1; otherwise its value is 0	+
ADR	influence from other stakeholders except shareholders, asset-debt ratio represents the influence	+

4.6. Results of multiple regression analysis

Firstly, a simple linear regression model is fitted using one univariate predictor each time. The scatter-plots and fitted least squares regression lines are shown in Figures 1-2, for continuous predictors (ROA, PER, ADR, LNASSET) and discrete predictors (REG, INDUS, STATE), respectively. Two figures suggest a linear relationship between CRSDI and these predictors.

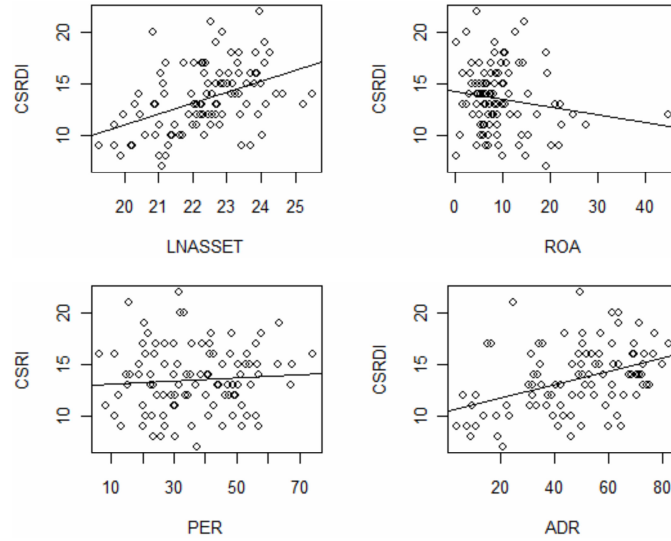


Figure 1. Relationship between CSRDI and every continuous explanatory variable. The circled points are observed CSRDI, the solid line is the fitted simple linear regression line.

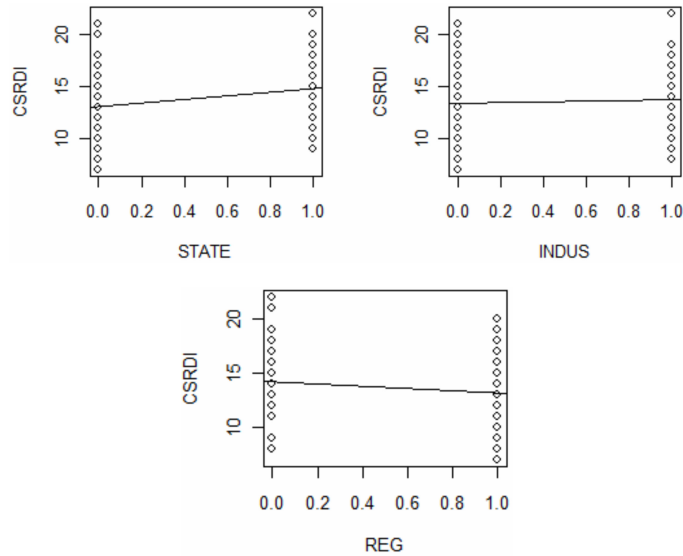


Figure 2. Relationship between CSRDI and every discrete explanatory variable. The circled points are observed CSRDI, the solid line is the fitted simple linear regression line.

Secondly, a multiple linear regression model to judge which factor affects CSRDI the most is adopted by using the above seven explanatory variables. R software is used to fit the model and test the hypotheses. Tables 8(a, b) show the details.

Table 8(a). Results of multiple regression analysis

Model	Estimated regression coefficients		<i>t</i> -statistic	<i>p</i> -value
	<i>B</i>	Std. error		
Intercept	−1.697	5.666	−.30	.765
REG	−.432	.623	−.69	.490
INDUS	−.406	.617	−.66	.512
ROA	.028	.050	.55	.586
PER	−.020	.021	−.93	.354
STATE	1.604	.772	2.08	.040
ADR	.048	.019	2.51	.014
LNASSAT	0.599	.266	2.25	.027

Table 8(b). Results of multiple regression analysis

Model	<i>R</i>	<i>R</i> square	Adjusted <i>R</i> square	Std. error of the estimate
1	.52	.275	.220	2.8

Predictors. (Constant), REG, INDUS, ROA, PER, STATE, LAR, INASSET

Residual plots are used to check the model assumptions required for linear regression models. Figure 3 shows the normal probability plot and the residual plot of the standardized residuals against the fitted values. It indicates that: (1) Standardized residuals are approximately normally distributed, as the sample quantile points are near the solid line. (2) Standardized residuals show no systematic patterns in relation to the fitted values, indicating the assumption of a constant variance of error is valid.

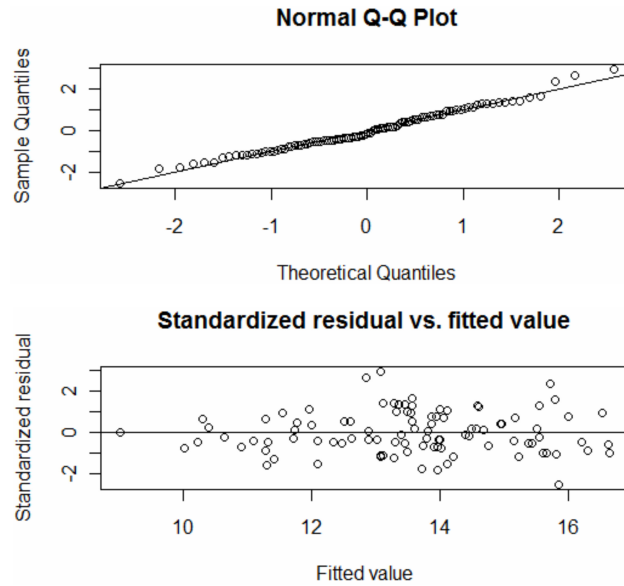


Figure 3. Normal probability plot and residual plot.

4.7. Significance tests of the regression model

For the globe test of the importance of seven predictors, Table 9 shows that F value is 4.981 and its significance probability is 0.000, which is far less than five percent. Therefore, the regression model is considered statistically significant, and seven predictors together are important in predicting CSRDI.

Table 9. Analysis of variance

Model	Sum of squares	df	Mean square	F	Sig.
Regression	270	7	38.57	4.981	.000006 ^b
Residual	711	92	7.728		
Total	981	99			

Predictors. (Constant), REG, INDUS, ROA, PER, STATE, ADR, LNASSET

4.8. Significance tests of the regression coefficients

Table 8 shows that the predictors which meet the level of significance at 5% are asset-debt ratio (ADR) (0.014), corporate size (LNASSET) (0.027)

and ownership structure (STATE) (0.040), which indicate that these three predictors have a significant influence on the dependent variable (CSRDI), after adjusting for the effects of the other four predictors.

5. Conclusions

By using correlation analysis and multiple regression analysis, we have empirically analyzed the factors influencing CSR disclosure of listed companies in China. We make some conclusions as follows:

(1) The other stakeholders except shareholders are the first important factor affecting all aspects of CSR disclosure. Development of listed companies cannot be dismissed from the various stakeholders as employees, creditors, citizenship, etc. besides shareholders. For the purpose of protecting the safety of creditors' principal and interest, the security of employees' salary bonus and welfare, and the safety of social environment, listed companies are often required to disclose various relevant social information. The main reason is to be constantly perfecting the relevant laws and regulations, which will bring the improvement on the information asymmetry and benefit ordinary employees or small shareholders in a vulnerable position.

(2) The corporate size is the second important factor affecting all aspects of CSR disclosure. The bigger the corporate size, the better quality of CSR disclosure, which shows that the companies with big size pay more attention to their social image and would like to accept and participate in actively the social responsibility. In order to obtain sustainable development and avoid being punished by society and government, the companies with big size are willing to disclose and also have an obligation to disclose the information of society responsibility.

(3) The ownership structure is the third important factor affecting all aspects of CSR disclosure. State-owned companies have a natural fondness for their social responsibilities because of their state-owned nature. The listed companies closely related to national security and national economy play an

important role in social responsibility such as supporting the local economic development, protecting employees' rights and interests, reducing environmental pollution and returning the society.

(4) The other four explanatory variables including regional variations, financial performance, proportion of the first largest shareholder and industry attributes, have little influence on CSR disclosure. In China, there is no significant difference in CSR disclosure between the companies in developed areas and undeveloped areas because the standards required by the Securities and Exchange Commission for the listed companies to disclose CSR are very high, regardless of their geographical location. Financial performance does not correspond to previously setup hypothesis. The possible reasons are that the companies with better financial performance do very little in implementation of social responsibilities to reduce social responsibility cost; whereas the companies with worse financial performance tend to disclose more CSR information to avoid the share price fall and to regain investor confidence. Proportion of the first largest shareholder is not reflected in CSR disclosure, which shows that listed companies are not affected by the first largest shareholder when disclosing their social responsibilities because most listed companies have carried out active exploration in areas such as establishing and perfecting corporate governance structure, rationalizing internal relationship, strengthening enterprise management, conducting effective supervision. In the regression analysis, industry attributes do not show significance in CSR disclosure, i.e., the quality of CSR disclosure is not related to whether the company belonged to the heavily polluting industries.

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