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A Study on Relation of CSR and Corporate Efficiency Based on DEA Method

ABSTRACT Many studies have examined the relationship of financial performance of firms and CSR, but little consensus has emerged up to date. This study investigates the relationship through a set of Shenzhen stock exchange from the perspective of costs and benefits. We turn attention to efficiency examines another dimension of performance following the Vilanova (2009) competitiveness model link to CSR. Based on DEA method, this study evaluates corporate efficiency of Chinese listed firms, and then adapts the content analysis method to measure corporate social performance in China. The authors discover that there is a positive co-relationship between CSR and corporate efficiency. Thus, we can say that CSR is helpful to improve corporate efficiency. Also, an established CSR factors such as firm size, ownership structure, previous financial performance, classification of industries, service types, philanthropy behaviors, and board monitoring are set. Therefore, listed firms should increase investment on CSR in order to help them consummate corporate governance structure and improve their financial performance in these ways.

KEYWORDS DEA; Corporate efficiency; CSR; Relationship

INTRODUCTION

Since 30 years ago, the reform and open policy has been carried out. As a result, the Chinese economy experiences fast development, while Chinese people's life has been improved a lot. However, as economic growth, scandals, e.g. fake goods, tax criminals, wasting resource, environment pollution and harm laborers' authorities, emerged. Some of the behaviors are not regulated by laws and regulations, while others have been explored by media and public (Zheng, 2006; Luo, 2006; Lübcke, Ruth, & Yim, 2007). These behaviors are all morally bad, even some of them are illegal which violate customers' benefits, and also affect the social image of firms. As we are in the stage of "voting by feet" all the time, all the stakeholders, e.g. employees, customers, suppliers, communities, have rights to say "no" to firms ^[1]. This implies that firms would be abandoned in case they are irresponsible to the society ^[2]. In other words, firms who ignore CSR issues may face serious challenges, because CSR attracts more and more interests by government, firm, society, and public people (Lübcke et al., 2007; Qi Jun, 2007; Zheng & Chen, 2006; CSRC, 2001; SZSE, 2006; SSE, 2008).

As it is known that a firm is a for-profit organization, which concerns maximum economic benefits. Firms perform CSR need to input humanity, goods, and sometimes even much money. Thus, firms need to consider if the implementation of CSR can bring benefits. In other words, firms should consider whether the implementation of CSR contribute to improve their financial performance, build brand image to be good corporate citizen at low costs (Bondy, Matten, & Moon, 2004; Logsdon & Wood, 2005; Husted & Allen, 2006). Some argue that CSR practices may increase costs without sufficient offsetting benefits, hurt corporate financial performance. Others argue that CSR practices sufficiently benefit corporate financial performance and good for corporate governance which contribute to maximizing shareholder wealth. Clarifying our understanding of CSR benefits is

very important.

The purpose of this study is to examine the relationship between corporate efficiency and CSR as well as some useful CSR factors are considered. Based on DEA method, this study evaluates corporate efficiency of Chinese listed firms in Shenzhen stock exchange, and then adapts the content analysis method to measure corporate social performance. We examine the factors and how CSR is related to corporate efficiency in Chinese listed firms. Our study significantly differs from and adds to prior CSR studies in the following ways. First, we focus on corporate efficiency, another dimension of firm performance, instead of financial performance measures. Also, since the accounting measures of financial performance cannot reflect a firm's long term performance, and usually controlled by human, alternatively we use DEA method to measure performance efficiency which regards CSR activities as a firm's material inputs, and uses these criteria to evaluate a co-relationship exist between the implementation of CSR and corporate efficiency. Second, in response to the mixed empirical evidence and the estimation problems found in the prior studies, we discover some factors like ownership structure, previous financial performance, classification of industries, service types, and philanthropy behaviors which affect CSR activities. It would help listed firms improve their corporate governance and performance through CSR.

Our results indicate that the average level of corporate efficiency and CSR is not high in Chinese listed firms at present. Second but most important, there is a positive relationship between corporate efficiency and CSR. The significance of this not only concerns new theoretical support if corporate should initiate CSR, how corporate initiate CSR, and also factors like ownership structure, previous financial performance, classification of industries, service types, and philanthropy behaviors which affect CSR. Besides, by using the sample of Chinese data, this study is good for corresponding strategy of governance management sector initiate CSR practices in emerging markets.

The remainder of our article is organized as follows. The next section provides a brief overview of the literature and the hypothesis development. The data and estimation methods are described in section three, and results are reported in section four. Conclusions are made in the final part of the article.

THEORETICAL BACKGROUND AND HYPOTHESIS

Long time ago, though scholars research on the issue of relationship between corporate social performance and corporate financial performance, little consistent result has been reached. (see Table 1) Margolis and Walsh (2003) reviewed 127 studies which empirically examined the links between corporate social performance and financial performance and found mixed results. In all, there are two opinions about researches on the relationship between corporate social performance and corporate financial performance: one theorizes a positive relationship (Russo, PA Fouts, 1997; McWilliams et al., 2000; Margolis & Walsh, 2003; Porter & Kramer, 2006; Branco & Rodrigues, 2006), which believe CSR is a good way to improve

corporate financial performance and corporate governance (Godfrey, 2005). Another view thinks there's only one responsibility for corporate which is "use its resources taking activities to make profit legally" (Friedman, 1977, 1978). Therefore, CSR inputs will waste capitals and other resources in the production process which may affect profits indirectly (Vance, 1975; Waddock & Graves, 1997; Zheng Li, 2006). These firms suffer disadvantages in competition when compare to non-CSR firms.

Insert Table 1 about here

According to Vilanova et al. (2009) model (see Figure 1), the relationship between CSR and five performance dimensions of competitiveness that include (1) financial performance, (2) quality, (3) efficiency and productivity, (4) innovation, and (5) image. Foreign research focuses mainly on relationship between CSR and financial performance until now. For example, CSR and ROA, CSR and ROE, CSR and sales return rate. Besides, there are few empirical studies on CSR and corporate financial performance in China. The most classic study is conducted by Zheng Li (2006), who considered the whole factors of CSR to firms and regarded CSR implementation resulting less corporate value. Qijun Jiang (2007) uses the production function to study if good reputation helps CSR implementation. After model analyses, it is found the relationship between corporate social responsibility and corporate financial performance is different in short and long term. All the results improve that the nature of the relationship between CSR and multiple dimensions of performance including financial performance is still somewhat unclear (McWilliams and Siegel, 2001, Porter and Kramer, 2006, Harrison and Freeman, 1999, Smith, 2003).

Insert Figure 1 about here

Because efficiency is another key dimension of competitiveness in addition to financial performance (Vilanova et al., 2009), we use this new dimension to study their relationship. We define efficiency as a measure of productivity per unit of cost. This definition is consistent with the concept of economic efficiency which refers to the production of outputs (i.e., productivity) from a given quantity (i.e., cost) of inputs (Sullivan & Sheffrin, 2003) ^[3]. The worldwide economic crisis is challenging a host of our conceptions and theories of corporate performance. Efficiency has become an increasingly important dimension of performance. Controlling costs and improving cost efficiencies become increasingly critical in current global economic environment. Can CSR activities be used to improve corporate efficiencies?

The relationship between CSR and corporate efficiency is decided by costs and benefits when firms practicing CSR. Firms are reluctant to perform CSR if the costs they pay are much more than the profits. Otherwise, firms would like to perform CSR. Chinese firms often think that CSR implementation is not worthy, since the implementation of CSR will increase costs (Zheng Li, 2006). However, it is important to keep in mind that the economic advantages of firms are consistent with

social advantages. Firms make money and make wealth for society by following laws and paying taxes. From this aspect, CSR may bring long term benefits (Qijun Jiang, 2007). In fact, firms may lose the source of creating more profits if they don't initiate CSR (Ruixin Su et al., 2010). After the supposed social responsibility has been performed, firms are propitious to make steadier and long term profits (Lübcke et al., 2007). Therefore, firms should not only protect shareholders' advantages, pursue the maximum financial profits, but also create social advantages through paying taxes, provide economic resources, protect environment, offer jobs, and guarantee legal authorization and charity (Zheng, 2006).

We extend prior work by empirically examining the hypothesized positive relationship between CSR and corporate efficiency. Although CSR may increase firms' costs, benefits in the long run can cover the costs. Thus, we can suppose CSR and corporate efficiency is positive correlated.

H1: the relationship between CSR and corporate efficiency is positive.

METHOD

Sample and Data Sources

Our initial sample includes all the listed firms of Shenzhen stock exchange by 2008, totally 748 firms are found. There are 684 firms which are chosen as research sample, excluding firms with uncompleted annual reports, CSR reports, or financial data. The sample includes A share listed firms as well as A and B share firms. The efficiency data of the listed firms mainly comes from Chinese listed firms financial database and Chinese listed firms financial data analysis database of GTA Information Technology; The corporate governance data comes from wind database from Shanghai Wind Information Ltd.; The content of listed firms initiating CSR mainly from manual collected and coordinate of their websites, annual reports and CSR reports of 2008. To guarantee a consistent base of coded data, the data analysis on the annual reports, CSR reports, and firms' websites for all the firms was carried out by only one single person and was checked and verified by others.

Social Responsibility Evaluate

Wood (1991) described CSR as the "configuration of the principles of social responsibility, processes and social responsiveness, and policies, programs and observables outcomes as they relate to the firm's societal relationship". There are almost two widely used methods evaluating CSR, one is the reputation index, the other is content analysis. Reputation index refers to survey, usually testing among businessmen, employees, students and publics. After giving a score to every objective, the total score of all indexes is the reputation score of the firm who initiates CSR. This method recognizes information through websites, annual reports, sustainable reports, newspapers and magazines. Because firm size, existing years, the distances to public media, the experiences of objectives are all different, thus, different researchers may get different explanations of CSR activities (Abbott & Monsen, 1979). Also, the amount of sample firms is often small because of the range of survey (Abbott & Monsen, 1979).

On the contrary, content analysis is often used for large sample research. It is an

analysis based on the amount of words, sentences, pages or CSR categorization which evaluates CSR implementation through corporate files and reports. It is considered the more intensity of disclosure is, the high implementation quality of social responsibility is. The advantage of content analysis is once the small categorization of CSR activities has been chosen, the remaining part is rather external. However, the progress of choosing is subjective. This study adapts content analysis method evaluating a firm's CSR implementation quality with information from websites, annual reports, and social responsibility reports.

According to Maignan and Ralston (2002), three separate CSR categories can be distinguished: (1) motives for CSR activities, (2) managerial CSR processes, and (3) stakeholder issues. The motives for the implementation of CSR were coded and classified into three different categories: (1) value-driven, (2) performance-driven, and (3) stakeholder-driven. CSR processes consist of programs or activities as following: (1) philanthropy programs, (2) sponsorships, (3) volunteerism, (4) implementation of code of ethics, (5) quality programs, (6) health and safety programs, and (7) management of environmental impacts. Considering Clarkson's (1995) stakeholder classification and the analysis from Maignan and Ralston (2002), six groups of stakeholders are distinguishable for this research: (1) community, (2) customers, (3) employees, (4) shareholders, (5) suppliers, and (6) government. Table 2 provides an overview of the analyzed CSR categories (3 motives, 7 processes, and 12 stakeholder issues). It needs to be known that these twenty two processes are not mutual exclusive and overlaps may occur.

 Insert Table 2 about here

Based on the categorization above, this study adapts the indexing method to evaluate the extent of social performance of listed firms initiating CSR who communicate CSR activities in their websites, annual reports and social responsibility reports. It means if listed firms describe one of the above 22 categorization of CSR activities in their websites, annual reports and kinds of social responsibility reports, it deserves one point; In case there is a disclosure of CSR event or data, the firm can get one more point. This resulted in a total possible points ranging from 0 to 44, indicating the overall CSR score.

Corporate Efficiency Evaluate

We use DEA (Data Envelop Analysis) method measuring corporate efficiency. DEA is a systematic analysis method developed by A. Charnes and W. W. Cooper (1978) based on "Comparatively efficiency evaluate" concept. The DEA model has been a useful tool in many subjects. As Cooper et al. (2000) described DEA performance efficiency measure is a better, more comprehensive performance measure than other traditional performance measures.

Suppose there are "n" firms which have same "m" inputs and "s" outputs. We call the "i" firm as DEU_i . To every DEU_i , the input variables and output variables can be described. (see Table 3)

 Insert Table 3 about here

If we describe the inputs and outputs variables of DEU_i as:

$$\begin{aligned} x_i &= (x_{1i}, x_{2i}, \dots, x_{mi})' \\ y_i &= (y_{1i}, y_{2i}, \dots, y_{si})' \end{aligned} \quad (1)$$

And use $X = [x_1, x_2, \dots, x_m]$ for the multi indexes inputs matrix while $Y = [y_1, y_2, \dots, y_s]$ for the multi indexes outputs matrix.

Then, we suppose $u = [u_1, u_2, \dots, u_m]$ and $v = [v_1, v_2, \dots, v_s]$ to be the weighted variables of inputs and outputs, the total inputs (I_i) and total outputs (O_i) can be written as:

$$\begin{aligned} I_i &= u_1 x_{1i} + u_2 x_{2i} + \dots + u_m x_{mi} = x_i' u \\ O_i &= v_1 y_{1i} + v_2 y_{2i} + \dots + v_s y_{si} = y_i' v \end{aligned} \quad (2)$$

It is obvious that the less total inputs, the much total outputs. The DEA model use the division of total outputs and total inputs when measuring the comparative efficiency of DEU_i :

$$E_i = \frac{O_i}{I_i} = \frac{y_i' v}{x_i' u} \quad (3)$$

E_i means the comparative efficiency of DEU_i including two weighted sectors u and v , which can be decided as $u_i > 0, v_i > 0$. Then to every DEU_i , we get to solve Equation (4):

$$\begin{aligned} &\max \frac{y_i' v}{x_i' u} \\ &s.t. \frac{y_i' v}{x_i' u} \leq 1, 1 \leq i \leq n, u \geq 0, v \geq 0 \end{aligned} \quad (4)$$

Because DEA produces relative efficiency scores, a firm's DEA score should only be calculated within an industry of similar firms, it is very difficult to choose the input and output variables, especially the research object is the whole listed firms of Shenzhen Stock Exchange. However, if all the firms can be viewed as a unit who pursues maximum profits, firms initiating CSR can also be thought as their behaviors, then we can find the common characteristics of firms. Since the essence of a firm is to use limited resources and get maximum outputs. It is thought that the inputs of firms initiating CSR can also be viewed as material inputs which may affect firm efficiency performance. Therefore, we include three conventional input

variables (total fixed asset, operating costs, total amount of operating expenses, management expenses and financial expenses) and two conventional output variables (total operating revenue and net profit) in our DEA analysis (Zhang, 2008).

Model Specification

Apparently, CSR activities made by firms are not random. On the basis of their specific characteristics, firms choose how to perform CSR. Some characteristics can be observed, while others can not. The unobservable characteristics will affect the extent of CSR of list firms simultaneously. Therefore, the ordinary least squares estimation offers both biased and inconsistent estimates. A “correction” must be made to prevent parameter estimates from being biased. For example, Zheng Li (2006) used two stages least square method to study the relationship of corporate value and CSR. Specifically, we adapt simultaneous equations model to avoid the correlative of variable CSR_SCORE and error item which may cause endogenous variable problems.

Based at the above hypothesis, the following model is set up to study how CSR affect corporate efficiency:

$$DEA_SCORE_{it} = \beta_0 + \beta_1 CSR_SCORE_{it} + \beta_2 TA_{it} + \beta_3 R_GUOYOU_{it} + \beta_4 SHRHF3_{it} \quad (5)$$

$$CSR_SCORE_{it} = \beta_0 + \beta_1 TA_{it} + \beta_2 R_GUOYOU_{it} + \beta_3 LY_ROE_{it-1} + \beta_4 B2C + \beta_5 ZHONGWU + \beta_6 DONATION_{it} + \beta_7 R_INDDIRECTOR_{it} + \beta_8 DUALITY_{it} \quad (6)$$

Equation (5) is the DEA model. The dependent variable DEA_SCORE is corporate efficiency measured above. According to previous studies about factors affect corporate efficiency, firm size (TA), ratio of state-owned shares (R_GUOYOU), equity concentration ratio of first three major shareholders (SHRHFD3) are used in our model (Zhao, 2007; Xu and Wang, 1999; Bai, 2005). Equation (6) is the factors of CSR model. In our model, the extent social performance of listed firms implement CSR always affected by firm size, ratio of state-owned shares, last year’s ROE, B2C, ZHONGWU, and some agency variables et al, (Aupperle, Carroll, & Hatfield, 1985; Ullmann, 1985; Mcguire, Sundgren, Schneewels, 1988; Aupperle, Pham, 1989; Waddock, Graves, 1997; Zheng Li, 2006).

We use eight control variables to capture the factors which may affect CSR. The first control variable is firm size (TA), measured as the logarithm of total asset. Prior studies have used firm size as a measure of firm visibility and firm resources and documented a positive relationship between firm size and CSR (Brammer & Millington, 2005).

Another one is ratio of state-owned shares (R_GUOYOU), measured as total percentage of state-owned shares and institutional shares in first ten major shareholders in 2008. Generally speaking, ratio of state-owned shares is negative to CSR (Xu & Wang, 1999; Xiao Chen, Dong Jiang, 2000).

Another one is last year’s ROE (LY_ROE), measured as return on equity of last year. It is thought the performance of last year affect CSR inputs of next year directly (Bragdon & Marlin, 1972; Bowman & Haire, 1975; Spicer, 1978; KH Chen, & RW Metcalf, 1980).

B2C is a dummy variable indicating whether the firm belongs to business to customer service type. We believe the service type related to firm behaviors as well as affect CSR since firms often concern the demand of customers to a large extent. As a B2B firm, its clients are corporations while as a B2C firm, its clients are individuals. Prior studies found B2B firms did better than B2C firms when initiating CSR ^[4]. It proves that B2B firms concern their partners more and focus on customers less.

ZHONGWU is a special industry dummy variable indicating whether the firm belongs to high contaminated industries ^[5]. We expected an affected firm to be associated with high contaminated industries (Zheng Li, 2006).

Another control variable is donation amount (DONATION), measured as the logarithm of donation amount in “5.12” Wenchuan earthquake in 2008. It is a useful index which reflects the charity attitude of different firms (Ran Zhang, 2010).

In addition to the factors above, CSR may also be restricted by more effective board monitoring. We include two variables to capture the quality of board monitoring. First, prior studies have found that CSR is negatively related to the percentage of independent directors because boards with more independent members are more difficult to be controlled by the management and controlling shareholders (Brown et al., 2006). We therefore create a variable R_INDDIRECTOR to measure the percentage of independent directors in board of a listed firm. The other board characteristic variable is a dummy variable indicating whether the position of CEO and chairman are occupied by the same person (DUALITY). Traditional agency theory views conflicts as a barrier to effective monitoring of CEO because it potentially creates conflicts of interest in which a CEO also serves as his or her own monitor (Fama & Jensen, 1983).

Our model has two advantages over models in previous related studies. First, some studies used OLS which don't consider self-selection problem and always lead to biased estimates (e.g. Aupperle, Carroll, & Hatfield, 1985). Second, in contrast to Zheng Li (2006), our model allows variables to have asymmetric effects on corporate efficiency and CSR activities. The meaning of variables can be seen in table 4.

Insert Table 4 about here

RESULTS

Summary Statistics

Table 5 shows descriptive statistics of main variables. As we can see, the average DEA_SCORE of Chinese listed firms is not high. It is only 0.4844. There are 65 listed firms scored 1, e.g. Shenfazhan, the lowest is S*ST Chaohua scored 0 with its CSR score 5. The average CSR_SCORE is 9.7565, includes the highest score 36 from Taigangbuxiu, and the lowest S*ST Chenggong scored 0. The highest TA is Shenfazhan with its CSR scored 23, and the lowest is S*ST Xingmei scored

4.The highest R_GUOYOU is ST Yanhu which is 97% with CSR scored 10, and the lowest are 328 listed firms like Shenfazhan which are 0%. The highest SHRHFD3 is Yukaifa which is 0.6751 with its CSR scored 10, and the lowest is Huaiyougufen which is 0.0085 with its CSR scored 10. The highest LY_ROE is S*ST Shenghua which is 7.5521 with its CSR scored 12, and the lowest is S*ST Juyou which is -15.1441 with its CSR scored 4. When it comes to DONATION, the most is Wanke which donated 102.2 million while its CSR scored 34, and there are 448 listed firms who did not donate.

Insert Table 5 about here

Correlation Analysis

Table 6 reports the Person correlation matrix for main variables used. Among the independent variables, no correlations exceed 0.45, which suggests that our models are unlikely to suffer from problems due to multicollinearity.

In general, the results indicate that DEA_SCORE is positively correlated with CSR_SCORE, TA, LY_ROE, R_GUOYOU, SHRHFD3. Of particular interest to this study, DEA_SCORE is significantly ($p < 0.01$) positively correlated with CSR_SCORE in our sample. The significant correlation between DEA_SCORE and CSR_SCORE suggests that corporate efficiency is positively associated with CSR and provides initial evidence supporting our hypothesis.

Insert Table 6 about here

Regression Analysis

We run the regression model in Equation (5) and Equation (6) to additionally test our hypothesis of a positive relationship between corporate efficiency and CSR. The results of various variables can be seen in Table 7. The test of VIF of Equation (5) shows there is not any multicollinearity problem among independent variables. Then, the CSR_SCORE's coefficient, β_1 , is positive and significant to DEA_SCORE as expected with the coefficient 0.0312 and P value is 0.0026. This result suggests that there is a positive association between corporate efficiency and CSR supporting our hypothesis. Additional evidence reveals that DEA_SCORE is also significantly positively associated with firm size (TA) and ratio of state-owned shares (R_GUOYOU).

Based on the variance inflation factors (VIFs), multicollinearity is also not an issue in the Equation (6) regression model. Equation (6) demonstrates additional evidence about how some factors affect CSR. It reveals that CSR_SCORE is also significantly positively associated with TA, LY_ROE, DONATION, and ZHONGWU. Opposite, B2C and DUALITY are negative to CSR_SCORE (all significant under 5% level). There's only two control variables R_GUOYOU and R_INDDIRECTOR which are not significant. Our results are almost same with prior studies except for the last two control variables R_GUOYOU and R_INDDIRECTOR which are both significant according to Lattemann et al. (2009). That is because the differences existing among political, culture, and society.

Specifically, the average ratio of state-owned shares in Chinese listed firms is much higher than foreign companies while the ratio of independent directors in board is lower.

Insert Table 7 about here

Robust Test

We also use accounting indexes ROE and ROA to examine the relationship between CSR and corporate financial performance which are often used in classic studies measuring dimension of performance of competitiveness in robust section, and the results are same. (see table 8) It proves that our results can be trusted.

Insert Table 8 about here

CONCLUSION

This study investigates the relationship through a set of Chinese listed firms of Shenzhen Stock Exchange in view of costs and benefits which regard corporate efficiency as another key dimension of competitiveness in addition to financial performance. Based on DEA method, this study evaluates corporate efficiency of Chinese listed firms, and then adapts the content analysis method to measure CSR levels in China. The authors concentrate on the relationship between CSR and corporate efficiency. Also, an established CSR factors such as firm size, ownership structure, previous financial performance, classification of industries, service types, philanthropy behaviors, and board monitoring are set. The results shows that: (1) The average level of corporate efficiency and CSR in Chinese listed firms are not high; (2) the regression results show the two issues are positive which means CSR is good for listed firms improve their efficiency; (3) Also, it has been tested that the determining factors of CSR such as firm size, ROE of last year, donation amount, and whether belongs to high contaminated industry or not are all positive and significant to CSR. Opposite, whether firms belong to B2C and CEO duality are negative to CSR. Besides, ratio of state-owned shares and ratio of independent directors in board are both insignificant to CSR in China.

This study not only has implications to research area, but also has important meaning to corporations and government: firms initiating CSR will improve their efficiency under management of government, and also will bring large benefits to society. This will surely confirm the decision and confidence that government should communicate and expand CSR. High contaminated industries is positive to CSR also proves that government behaviors cannot be ignored. CSR somehow needs government's power in China. Chinese listed firms who initiate CSR are at the primary stage at present. Although average efficiency is not high, CSR would improve corporate efficiency indeed. Therefore, listed firms should keep reforming on effective corporate governance: (1) firms should increase CSR inputs, improve

the recognition of CSR, and set up CSR longitude system as soon as possible; (2) firms should enlarge their firm size, improve ownership structure, reduce ratio of state-owned shares, including change the situation of “one share dominant” phenomena; (3) firms should keep on improving the insiders controlling system, enlarging ratio of independent directors in board, and also avoiding the bad effect because of CEO duality. It would help Chinese listed firms improved in corporate governance after these strategies.

This study is limited in that it focuses mainly on Chinese listed firms, and in that it used self-reported information. This may lead to firms initiate CSR only communicate information good for their main stakeholders, but omit other aspects of CSR information, even ignore them because listed firms would face the pressure from shareholders, customers, suppliers, communities, supervisors and society. If it only keeps an eye on listed firms measuring information from their publication, the whole situation may not be appraised totally. In the future, it is going to enlarge the sample to small firms, especially private firms initiating CSR, and also use survey to get first hand files to guarantee data source if possible.

NOTES

- [1] e.g. Wanke donation event in “5.12” Wenchuan earthquake in 2008, [Online] Available at: <http://house.people.com.cn/GB/7347539.html>, May 12, 2010.
- [2] e.g. Sanlu infant milk powder event in 2008, [Online] Available at: <http://zh.wikipedia.org/zh-cn/2008>, May 12, 2010.
- [3] This definition of efficiency is also consistent with Merriam-Webster’s Online Dictionary definition which defines efficiency as “a comparison of production with cost” (<http://www.merriamwebster.com/dictionary/efficiency>). This definition of efficiency is also consistent with Data Envelopment Analysis (DEA), a nonparametric technique used in this paper that produces measures of performance efficiency by using the ratio of outputs produced to the cost of inputs (Charnes et al., 1978, Cooper et al., 2000).
- [4] “Study of Sustainability Reporting in China”, Business Review, 2007, [online] Available at: <http://www.syntao.com/Sustain/DatumShow.asp?DatumId=33>, May 12, 2010.
- [5] According to National Bureau of Environmental Protection (2005), high contaminated industries include 13 industries such as metallurgy, chemical, petrochemical, coal, power plant, construction materials, paper-making, brewing, pharmaceutical, fermentation, textile, leather manufacture and mining.

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TABLE 1
Relationship Between CSP and CFP

Author	Social Variable	Performance Variable	Control variables	sample	result
Alexander & Buchholz, 1978	Reputation index	Shareholder return 1970-1974	beta	40	No relation
Aupperle, Carroll, & Hatfield, 1985	Survey	Short term ROA (one year) and long term ROA (five years)	none	241	No relation
Griffin & Mahon, 1997	Reputation index	ROE, ROA	size	7	Social variable attributes different results
McWilliams & Siegel, 2000	KLD	Accounting return	size, risk, industry, R&D, ads intensity	524	No R&D, Positive
Russo, PA Fouts, 1997	Environment rating	ROA	size, firm growth rate, industry growth rate, industry intensity,	243	Positive

Author	Method	Variables	Findings	Sample Size	Conclusion
Ruf, Bernadette M., 2001	AHP KLD	ROE, ROS, Sale growth	ads intensity, size, industry	180	Short positive, No relation long term
Vance, 1975	Reputation index	Stock price	none	45	Negative
Waddock & Graves, 1997	KLD	ROE, ROA, ROS	size, risk, industry	649	Negative
Zheng Li, 2006	Content analysis	Tobin Q	rate, industry	521	Negative

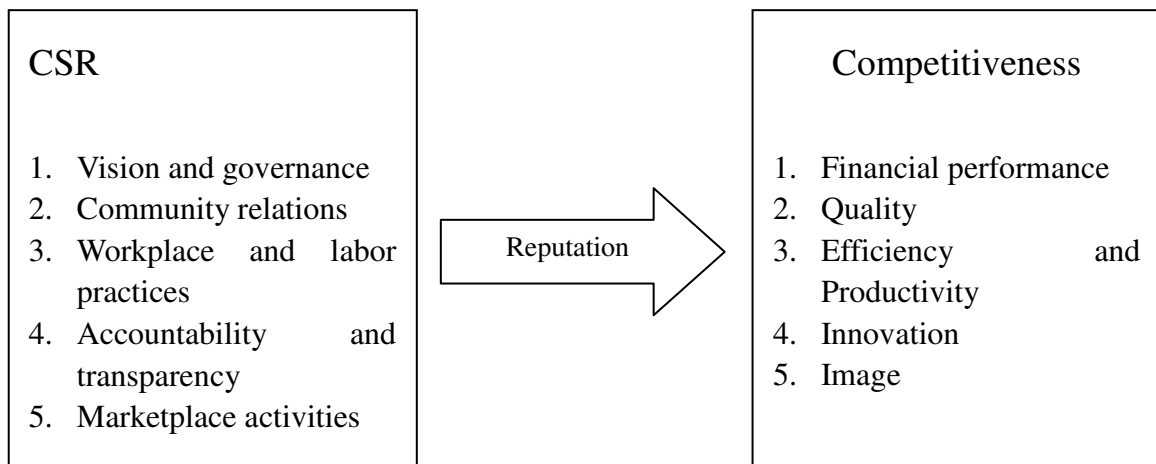


Figure 1
Modified CSR and Competitiveness Framework

TABLE 2
22 Items of CSR Issues

Cate	Measureme	Description
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nt

Item

Motives for CSR

Value-driven	CSR is presented as being part of the company's culture, or as an expression of its core values.
Performance-driven	CSR is introduced as a part of the firm's economic mission, as an instrument to improve its financial performance and competitive posture.
Stakeholder-driven	CSR is presented as a response to the pressures and scrutiny of one or more stakeholder groups.

Content of CSR

Philanthropy programs	Presents a formalized philanthropy program made of a clear mission and application procedures to allocate donations and grants.
Sponsorships	Introduces sponsorships as a type of responsibility initiative aimed at providing assistance either financial or in-kind to a cause or charity.
Volunteerism	Presents programs that allow employees to work for a good cause during paid working hours.
Code of ethics	Discusses the content and/or implementation of a code of ethics or conduct.
Quality programs	Describes a formal product/ service quality program as a form of responsibility initiative.
Health and safety Programs	Introduces a formal health and safety programs aimed at one or more stakeholder groups as a form of responsibility initiative.
Environment	Activities aimed at diminishing the negative impact of productive

	nt	activities on the natural environment.
	Management	
		Relationship between CSR and stakeholders
Shar		Expresses its commitment to the involvement of stakeholders in
eholde		corporate governance and/ or to the proper information of
rs		shareholders.
Co		
mmun		Discusses its support of organizations, activities, actors, and
ity	Culture	objects linked to the national culture.
		Presents its support of activities aimed at improving educational
	Education.	opportunities and the quality of the education received by
		populations outside the firm.
		Expresses its dedication to improving the quality of life and
	Quality of	wellbeing of the communities in which the firm operates, or of
	life	society as a whole.
		Displays concern for the safety of the persons in the communities
	Safety	surrounding its productive operations.
	Protection	
	of the	Shows concern for the preservation of the natural environment
	environment	either in general or in the communities.
Em	Equal	Expresses its commitment to giving the same chances in
ployee	opportunity	recruitment and promotion to all employees regardless of race,
		gender, age, or handicap.
	Health and	Expresses its concern for protecting the safety of employees in
	safety	the workplace along with their overall health level.
Cust	Product/ser	Presents the achievement of high product/ service quality as a
omer	vice quality	part of its commitment to social responsibility.

Safety	Displays concern for the safety of its customers in relation with its production activities or products/ services.
Suppliers	Expresses its dedication to giving equal opportunities to suppliers in terms of gender, race, and size and/ or to assuring suppliers' safety.
Government	Pay taxes on duty, create working positions and contribute to the economic development in district.

TABLE 3
Input and Output Variables

	DMU1	DMU2	...	DMUn
Input 1:X1	x11	x12	...	x1n
Input 2:X2	x21	x22	...	x2n
...
Input m: Xm	xm1	xm2	...	xmn
Output 1:Y1	y11	y12	...	y1n
Output 2:Y2	y21	y22	...	y2n
...
Output s: Ys	ys1	ys2	...	ysn

TABLE 4
Meaning of Variables

Name	Code	Description
Corporate efficiency score	DEA_SCO RE	Measured as above
CSR score	CSR_SCO RE	Measured as above
Firm Size	TA	Measured as the logarithm of total asset

Ratio of State-Owned Shares Equity Concentration Ratio	R_GUOY OU	Measured as total percentage of state-owned shares and institutional shares in first ten major shareholders
Return on Equity	LY_ROE	Measured as return on equity of last year
B2C Service Type Or Not High Contaminated Industry Or Not	B2C	If belongs to B2C service type, choose 1, or 0
Donation Amount	DONATIO N	Donation amount in Wenchuan earthquake in 2008
CEO Duality	DUALITY	If CEO and chairman are occupied by the same person, choose 1, or 0
Ratio of Independent Directors	R_INDDI RECTOR	Measured as the ratio of independent directors in board

TABLE 5
Descriptive Statistics

	DEA	CSR_		R_GUOY	SHRHF	LY_R	DONATI
	_	SCO	TA	OU	D3	OE	ON
Mean	0.484	9.756	21.20	0.2113	0.1607	0.0719	110.2326

	4	5	34				
	0.446	8.000	21.08				
Median	0	0	79	0.1421	0.1308	0.0922	0.0000
Maximum	1.000	36.00	26.88				10220.00
	0	00	54	0.9700	0.6751	7.5521	00
Minimum	0.000	0.000	10.84			-15.14	
	0	0	22	0.0000	0.0085	41	0.0000
Std. Dev.	0.267	6.153	1.326				
	5	2	6	0.2296	0.1162	0.8716	468.7890
Skewness	0.426	1.536	-0.67			-8.179	
	4	1	74	0.6540	1.1869	9	15.5314
Kurtosis	2.276	5.224	10.33			159.47	
	5	0	55	2.1805	4.4225	19	317.4688

TABLE 6
Correlation Matrix

	CSR_SC ORE	DEA_S CORE	DONA TION	LY_RO E	R_GU OYOU	SHRHF D3
CSR_SC ORE	1					
DEA_S CORE	0.1929	1				
DONAT ION	0.3183	0.1495	1			
LY_RO E	0.0761	0.0622	0.0187	1		
R_GUO YOU	0.0961	0.0403	-0.0245	0.0528	1	

SHRHF

D3	0.0616	0.0479	-0.0034	0.0163	0.4440	1
TA	0.5529	0.1167	0.2706	0.0962	0.2577	0.1596

TABLE 7
Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Equation (5)				
CSR_SCORE	0.0312***	0.0103	3.0177	0.0026
TA	0.0598**	0.0287	2.0800	0.0377
R_GUOYOU	-0.0375*	0.0565	-1.6645	0.0506
SHRHFD3	0.0836	0.1062	0.7866	0.4317
Equation (6)				
TA	2.3904***	0.1590	15.0320	0.0000
R_GUOYOU	-0.9203	0.8775	-1.0488	0.2944
LY_ROE	0.1760**	0.2203	1.7985	0.0424
B2C	-0.1175**	0.4622	-2.2542	0.0494
ZHONGWU	0.0420**	0.4270	2.0985	0.0391
DONATION	0.0023***	0.0004	5.5095	0.0000
R_INDDIRECTOR	0.5398	3.7026	0.1458	0.8841
DUALITY	-0.0490**	0.4500	-2.0981	0.0219
R-squared	-0.1630	Mean dependent var		0.4821
Adjusted R-squared	-0.1699	S.D. dependent var		0.2677
S.E. of regression	0.2896	Sum squared resid		56.9276
F-statistic	4.4182	Durbin-Watson stat		1.5151
Prob(F-statistic)	0.0016			

*p < .1 (two-tailed); **p < .05 (two-tailed); ***p < .01 (two-tailed)

TABLE 8
Robust Test Results

Model Specifications	ROE Model		ROA Model		DEA Model	
Variable	Coef	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
CSR_SCORE	0.5984**	2.3944	0.9215**	2.2211	0.0312***	3.0177
TA	1.8393**	2.3093	3.8105***	4.5504	0.0598**	2.0800
R_GUOYOU	0.1931	0.1486	-0.5737**	-1.7971	-0.0375*	-1.6645
SHRHFD3	-0.1348	-0.0564		-0.3519		0.7866
R-squared	-0.2403		0.0639		-0.1630	
Adjusted R-squared	-0.2479		0.0584		-0.1699	
S.E. of regression	6.4364		72.2951		0.2896	
F-statistic	1.6054		17.8677		4.4182	
Prob(F-statistic)	0.1712		0.0000		0.0016	
N	657		684		684	

*p < .1 (two-tailed); **p < .05 (two-tailed); ***p < .01 (two-tailed)