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## Analysis on the correlation between corporate social responsibility cost and enterprise value based on stakeholder theory

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### ABSTRACT

According to stakeholder theory, corporate social responsibility cost is classified into responsibility cost of shareholders, employees, consumers and business partners, environment and public welfare. This paper investigated the correlation between corporate social responsibility cost and enterprise value. Meanwhile, it took food processing and manufacturing enterprises as the object of empirical investigation, constructing correlation model of social responsibility cost and enterprise value by the method of ordinary least squares. It is noteworthy that the model gives full consideration to hysteresis of corporate social responsibility cost and makes an empirical test of correlation between corporate social responsibility cost and enterprise value, based on which proposals and suggestions about standardizing and improvement of fulfillment as well as information disclosure of corporate social responsibility were presented.

### KEYWORDS

Corporate social responsibility cost; Enterprise value; Correlation; Food processing and manufacturing enterprises; Stakeholders.



## INTRODUCTION

With the deepening research on corporate social responsibility (CSR), how to define the correlation between corporate social responsibility cost (CSRC) and enterprise value has been paid more and more attention. Within the study on correlation between the two, domestic and foreign scholars have made painstaking efforts, correspondingly making this field constitutes a rich harvest.

The empirical study abroad began in 1970s. According to Moskowitz has found that there is a positive correlation between CSR and corporate performance, as investors favor the better CSR performance one<sup>[1]</sup>. Vance has suggested that CSR performance has not a corresponding return in stock market, because of a large amount of CSRC, which is detrimental to enterprise value<sup>[2]</sup>. Aupperle Carroll A and Hatfield argued that CSRC will bring the corresponding rewards, the joint effect offset each other makes no correlation between CSRC and financial performance<sup>[3]</sup>. Domestic studies are relatively late. While Li Zheng drew the opposite conclusion based on research samples of 521 listed companies in Shanghai Stock Exchange in 2003<sup>[4]</sup>. Chen Yu-qing and Ma Li-li made sampling analysis on the current situation of CSR accounting information disclosure of listed companies in Shanghai and Shenzhen stock market, and construct the social responsibility index system, finding no correlation between the CSR contribution and enterprise value. However, there is a significant difference among different industries<sup>[5]</sup>.

To sum up, we can find that domestic and foreign scholars have different views without a unified conclusion on the correlation between CSRC and enterprise value. Excepting difference of emphasis and data sources, this paper thinks that, to a certain extent, it is due to the ignorance of hysteresis of CSRC. Different from daily operation cost, each category of CSRC has its different object, compensation period. Accordingly, their feedbacks on enterprise value differ. These characteristics determine that we can't judge the correlation between CSRC and enterprise value with all current data in dichotomy thinking.

This paper discusses correlation between the two through the sample of food and manufacturing enterprises in China, as there are a number of enterprises and related groups involved on the supply chain and the potentially deep linkage effects. Moreover, in recent years, an endless stream of food safety problem emerges, their CSR has gained widely attention. For the framework of the study, the categories of CSRC is redefined based on stakeholder theory, considering hysteresis of CSRC and constructed correlation model of different categories of CSRC in non synchronization and enterprise value in food processing and manufacturing enterprise, then analyzed the impact of the different categories of CSRC during different period on enterprise value at specific time point to avoid being anxious to achieve quick success on CSR investment behavior to improve CSR level.

## ANALYSIS ON CORRELATION BETWEEN CSRC AND ENTERPRISE VALUE

### Summary of CSRC

In recent years, CSR has gained increasing attention. As the new branch of cost classification and the result of CSR, CSRC has been concerned widely, with CSR behavior as its object. The characteristics of CSRC are as follows.

(1) Unconstitutionality. As CSR behaviors have not a clear object, for example, establishment of quality supremacy philosophy, which can not only benefit consumer, but can benefit the vertical upstream suppliers and horizontal competition environment optimization, and even can be transformed into public welfare;

(2) Public belonging property. In a manner, this characteristic makes the benefits resulted in CSRC can not be internalized, such as company's endeavors for optimizing environment of fair competition, which will benefits itself and its competitors;

(3) Hysteresis. The characteristic refers to the current CSRC may not to get instant results. Firstly, CSRC usually does not gain the performance of direct investment of CSR behavior object, it may also weaken the performance by the mutual influence with other objects; secondly, due to a wide range of CSRC objects, which always can not results in expected performance in a short run. CSRC has a compensation period.

This paper classified CSRC according to specific object of CSR behavior. CSRC is divided into shareholder responsibility cost, employee responsibility cost, consumers and business partners responsibility cost, environmental responsibility and public welfare responsibility cost.

### Summary of enterprise value

As the most representative evaluation indicator of enterprise performance, enterprise value has many consideration dimensions, ranging from the traditionally single financial performance to multidimensional perspectives<sup>[6,7]</sup>. It contains two levels: one is the capitalization and equivalent value of enterprise future earnings, referring to the overall value; the other one is the added value of all business activities. Measure indicators are as follows: ① Discounted cash flow method, namely, the intrinsic value of enterprise is the equivalent value of cash flow obtained; ② Stock market value method, namely, it evaluate enterprise value by the average share price on the day or after of a period of time that the financial report is released; ③ Economic value added (EVA),  $EVA = \text{operating profit} - \text{debt and equity cost}$ ; ④ Tobin's Q value method, which is a ratio of the market value of enterprise assets reset-to-asset reset value ratio. In this paper, we chose Tobin's Q to measure enterprise value.

### Hypotheses of CSRC

The purpose of this paper is to study the correlation between CSRC and enterprise value which can be transformed into the correlation between each classified CSRC category and enterprise value, namely the effect of each classified CSRC category on enterprise value.

As the main beneficiaries of enterprise value, shareholders can be viewed as economic responsibility. It is a direct expression of enterprise value on economic benefit., based on which this paper considers that shareholder responsibility cost has a high correlation with enterprise value. Therefore, the model use current shareholder cost data to explain enterprise value;

Different from shareholder responsibility cost, public welfare responsibility cost does not clear and direct stakeholder. Nowadays social responsibility cost is mainly the social public welfare behavior (charity donations) in China, while the public and the news media intervention makes the enterprise value feedback cycle greatly shortened. Consequently, the model uses current social responsibility cost data to explain enterprise value;

Environment responsibility cost usually includes the external natural and ecological environmental governance inputs as well as environmental protection investment in food production and processing. Because the disclosure of environmental issues and accountability efforts and public attention to environmental protection products and service increased greatly, making impact (positive and negative impacts) of business behaviors on the environment shortens cycle reaction to the enterprise value. Therefore, this paper intends to study the effect of lagged one period environmental responsibility cost on enterprise value ;

The CSRC for direct bearers (employees) of enterprise value and the main alienator (consumers) of enterprise value and business partners is ongoing. Nevertheless, the feedback cycle of employees is achieved by the input of human resource; consumers' feedback cycle on enterprise value is achieved through the product experience, reputation accumulation and so on. This feedback is continuous but delay. Therefore, this paper tries to investigate the influence of two period lagged employee responsibility cost and consumer and business partners responsibility cost on enterprise value.

## EMPIRICAL ANALYSIS ON CORRELATION BETWEEN CSRC AND ENTERPRISE VALUE

### Design on study variables

#### Selection of CSRC variables and controlled variable

According to the stakeholder theory, in accordance with the data given by Hexun website about CSR evaluation for stakeholders, the selection of CSRC variables and control variables are as follows:

(1) Shareholder responsibility cost. It mainly reflected in profit ability, equity return ability and so on, the main indicators include Rate of return on common stockholders' equity, main business profit rate, asset ratio and so on, according to which the single comprehensive score of shareholders responsibility cost can be calculated;

(2) Employee responsibility cost. Its single comprehensive score is calculated by employee salaries, training investment, employee safety input and care condolences;

(3) Consumers and business partners responsibility cost. Its single comprehensive score is calculated by product quality, after-sales service and the integrity of reciprocity (supplier fair competition and anti commercial bribery training);

(4) Environmental responsibility cost. Its single comprehensive score is calculated by environmental management system certification, environmental protection investment amount, discharge type and energy saving type scores compiled;

(5) Public welfare responsibility cost. Its single comprehensive score is calculated by the income tax ratio of total profit and donation amount of scores compiled.

Enterprise value is influenced by internal and external factors, of which enterprise scale is the greatest factor. Therefore, this paper selects the natural logarithm of total assets as controlled variable to control other variables' influence on dependent variable.

#### Variable of enterprise value

In this paper, Tobin's Q is adopted to measure the enterprise value, due to replacement cost of assets is difficult to estimate in Chinese, usually using enterprise's assets and liabilities book value.

$$\text{Tobin's Q} = \frac{\text{sharehold ing market val ue at the end of the year} + \text{liabilitie s book value at the end of the year}}{\text{assets book value at the end of the year}}$$

To sum up, variable system and its symbol is as shown in TABLE 1.

**TABLE 1 : Variable types and symbols**

Variable types	Variables	Variable symbol
Dependent variable	Tobin's Q	Q
	Shareholder responsibility cost	SHC
	Employee responsibility cost	EMC
	Consumers and business partners responsibility cost	CUC
Explanatory variables	Environmental responsibility cost	ENC
	Public welfare responsibility cost	SOC
Controlled variable	Natural logarithm of asset	LNA

**Construction of correlation between CSRC and enterprise value model**

**Data selection and processing**

This study takes 31 food production and manufacturing companies in Shanghai and Shenzhen A shares in 2012(rejecting not complete samples) as the sample. Tobin’s Q is calculated according to the formula given above (shareholding market value, assets and liabilities book value at the end of the year released by Sina website). CSRC variables data is obtained by Hexun website about CSR evaluation for stakeholders. Controlled variable data is gained by natural logarithm of total asset of food processing and manufacturing enterprises released by Sina website.

**Model construction**

The screening data were analyzed by EVIEWS6. O in ordinary least squares (OLS) method. According to listed companies CSRC as explanatory variables, natural logarithm of total assets as the controlled variable, Tobin’s Q as the dependent variable,

Because of characteristics of CSRC and hypothesis analysis given above, not automatically leading to standard linear regression relationships between CSRC and enterprise value. Therefore, this paper chose the current data of SHC and SOC, one period lagged ENC and two period lagged EMC and CUC to make regression analysis. Set of explanatory variables *SHC*、*EMC(-2)*、*CUC(-2)*、*ENC(-1)*、*SOC* respectively denote a function representing each cost category of CSRC, then Q,explanatory variables and controlled variable can be set up linear regression equation as follows:

$$Q = \beta_0 + \beta_1 SHC + \beta_2 EMC(-2) + \beta_3 CUC(-2) + \beta_4 ENC(-1) + \beta_5 SOC + \beta_6 LNA + u_t \tag{1}$$

In the Eq. 1,  $\beta_0, \dots, \beta_6$  are coefficients,  $u_t$  is random distraction. Regression analysis of the sample data in 2012 is as shown in TABLE 2.

According to TABLE 2, the regression equation can be gained:

**TABLE 2 : Results of regression analysis**

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	12.364966	3.831374	3.22729	0.0039
SHC	1.03E-11	1.38E-12	7.471037	0.0000
EMC(-2)	0.288749	0.118357	2.439647	0.0232
CUC(-2)	-0.127313	0.057395	2.218172	0.0372
ENC(-1)	-0.053176	0.024524	2.168311	0.0412
SOC	4.00E-05	1.23E-05	3.246249	0.0037
LNA	-0.854522	0.311995	2.738900	0.0120
R-squared	0.808388	Mean dependent var	2.846345	
Adjusted R-squared	0.756130	S.D.dependent var	1.866558	
S.E.of regression	0.921766	AKaike info criterion	2.881454	
Sum squared resid	18.69235	Schwarz criterion	3.211491	
Log likelihood	-34.78108	Hannan-Quinn criter	2.984817	
F-statistic	15.46921	Durbin-Watson stat	2.372481	
Prob(F-statistic)	0.000001			

**Model tests**

**F-test and T-test**

F-test is usually adopted to test model in general.  $F=15.47 > F_{0.05}(6,24) = 2.51$ , showing that there is a significant correlation between CSRC and enterprise value.

While T test is adopted to a significant test of the explanatory variables. In TABLE 2,  $|t_i| > t_{0.025}(25) = 2.06$ , showing that it passes the test. As the correlation coefficient matrix and the Klein rules shows, there is no serious multi-collinearity between variables. Moreover, the results is well verified by experiments results.

**Heteroscedasticity test**

This paper adopts White test to test on heteroscedasticity, comparing  $TR^2$  and  $\chi^2(g)$ , where T denotes the auxiliary regression sample size, R2 is the coefficient of determination in auxiliary regression based OLS estimation. Degrees of

freedom  $g = \frac{(k+1)(k+2)}{2} - 1$ , k is the number of variables. If  $TR^2 < \chi_{\alpha}^2(g)$ , showing that the model does not exist the same variance; conversely, showing that the model in the presence of heteroskedasticity. Test results are shown in TABLE 3.

**TABLE 3 : White test**

<b>F-statistic</b>	<b>4.356979</b>	<b>Prob.F(27, 1)</b>	<b>0.3643</b>
Obs*R-squared (TR <sup>2</sup> )	28.75556	Prob.Chi-Squared (27)	0.3729
Scaled explained SS	10.36374	Prob.Chi-Squared (27)	0.9984

**TR2=28.76 <  $\chi_{0.05}^2(27) = 40.11$ , showing that the model does not exist heteroskedasticity.**

**Autocorrelation test**

The most common way to autocorrelation test is LM test, by which statistic  $LM = TR^2$  is constructed to determine the size of LM and  $\chi_{\alpha}^2(n)$ , n is the number of autoregressive orders. If  $LM = TR^2 < \chi_{\alpha}^2(n)$ , showing that the model does not exist autocorrelation; conversely, model in the presence of autocorrelation. Test results are shown in TABLE 4.

**TABLE 4 : Autocorrelation test**

<b>F-statistic</b>	<b>0.743711</b>	<b>Prob.F(2,20)</b>	<b>0.4480</b>
Obs*R-squared (TR <sup>2</sup> )	2.007466	Prob.Chi-Squared(2)	0.3665

TABLE 4 indicates that  $\chi_{0.05}^2(1) = 3.84$ ,  $LM = TR^2 = 1.49 < 3.84$ , showing that the equation does not exist in the first-order autocorrelation; the same inspection method for two order autoregressive:  $\chi_{0.05}^2(2) = 5.99$ ,  $LM = TR^2 = 2.01 < 5.99$ , indicating that the model does not exist two order autocorrelation.

Therefore, a regression equation can be gained:

$$\hat{Q} = 12.36 + 1.03 * 10^{-11} SHC + 0.29 EMC(-2) - 0.13 CUC(-2) - 0.05 ENC(-1) + 4.00 * 10^{-5} SOC - 0.85 LNA \tag{2}$$

(3.23) (7.47) (2.44) (-2.22) (-2.17) (3.25) (-2.74)

$R^2 = 0.81$   $DW = 2.37$   $T = 31$

**ANALYSIS ON THE RESULTS AND COUNTERMEASURE**

**Empirical analysis on the results**

Through the analysis of the model regression results, the following conclusions can be obtained:

(1) As every single variable coefficient is non zero, it indicates that there is a significant correlation between the five categories and enterprise value, which is consistent with the original intention;

(2) Based on the above conclusions, we find both positive and negative correlation coefficients exist in food processing and and manufacturing enterprises. According to empirical evidence by existing studies and most scholars have suggested that there is a positive correlation between CSRC and enterprise value. Superficially, there is a conflict between the results of this study and existing studies. However, due to characteristics of CSRC, there is not a simple positive or negative correlation between CSRC and enterprise value, within which negative correlation can be explained by these characteristics above of CSRC.

(3) The influence of variables on explanatory variable can be arrived at from TABLE 2.

TABLE 2 indicates shareholder responsibility cost is positively related to enterprise value, namely increased shareholder responsibility cost will increase current enterprise value; two period lagged employee responsibility cost is positively related to enterprise value, that is employee responsibility will increase enterprise value two years later; two period lagged consumer and business partner responsibility cost is negatively related to enterprise value, showing that consumer and business partner responsibility cost at least two years did not get compensation, which has not yet formed a positive feedback on enterprise value. There is a negative correlation between one period lagged consumers and business partners responsibility cost and enterprise value, namely current environmental liability cost is not compensated for at least one year mostly due to hysteresis of CSRC. Moreover, due to the longer time span and payback period of environmental protection cost, environmental protection will reduce enterprise value, but will increase future enterprise value; for the current public welfare responsibility cost, it shows that the investment in social welfare will increase current enterprise value.

## Countermeasures of CSR

### To develop CSR information disclosure system

As already mentioned above, some data out of statements balance sheet and some qualitative indexes are not disclosed both in financial statements and CSR reports of some listed companies. To a certain extent, it reflects current disclosure system of CSR information is not perfect in China. The pattern and carrier of publication is not inconsistency, leading directly to the different focuses of information disclosure, which is subjectivity and poor comparability. Therefore, it is essential to establish a standardized CSR reporting disclosure system to develop uniform standards, satisfying requirements for stakeholders to provide the basis of CSR evaluation.

### To strengthen the legislation work and social responsibility

The model results indicates that not all of CSR behaviors are positively correlated to enterprise value in the short term, such as consumer and business partner responsibility cost. Lack of the interest driving, it is likely for some enterprises to lead to short-sighted shrink or escape CSR<sup>[8]</sup>. It is fatal for food processing and manufacturing enterprises to ignoring CSR of consumers and business partners. Therefore, relevant departments should strengthen the legislation work and formulate relevant laws to urge enterprises to fulfill CSR and to promote even the whole society sustainable development.

### To enhance the guidance and inspiration of enterprises' CSR behaviors

The model shows that there is a negative correlation between public welfare responsibility cost and enterprise value. It is likely for enterprise to misunderstand that its CSRC will not benefit enterprise value increment without properly explain and guide. Therefore, in addition to coercive measures to urge food processing and manufacturing enterprises to fulfill their social responsibility, appropriate and targeted incentive also should be adopted. In the specific implementation process, can take the government subsidies, tax incentives and public opinion propaganda way can be taken.

## CONCLUSIONS

Scholars have reached different conclusions on correlation between CSRC and enterprise value. Excepting difference of emphasis and data sources, this paper pointed out that there is another important factor is not fully considered -- hysteresis of CSRC. In addition, this paper divided the object category of CSRC according to stakeholders theory. Thus the correlation study has been transformed to the influence of each stakeholder CSRC investment on enterprise value, and analyzes the cause and puts forward the countermeasures to improve CSR consciousness and avoid the short-sighted behaviors, providing theoretical support for improving whole CSR level correspondingly.

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