

The Governance Effect or Entrenchment Effect? Social Responsibility and Earnings Management in Chemical Industry

Bin Wang^{a,b}

^aSchool of Business, Hohai University, Nanjing 211100, China

^bSchool of Economics and Management, Nanyang Normal University, Nanyang 473061, China

wangbin15h@126.com

Chemical industry is the industrial foundation of our country. The corporate social responsibility and earnings management are the hot topics in the field of chemical industry and accounting. This paper takes the A-share listed companies in the chemical industry disclosing social responsibility reports in Shanghai and Shenzhen stock markets in China during 2009-2015 as samples, and uses the statistical regression method to carry out empirical analysis on the effects of corporate social responsibility on earnings management. The results show that the social responsibility of the listed companies in China's chemical industry plays a governance effect on real earnings management.

1. Introduction

In the context of low-carbon economy, corporate social responsibility has been a heated topic in the world and it has become a development trend for enterprises to assume social responsibilities (Bakan, 2004). In recent years, a number of accounting scandals have made earnings management a hotspot in the accounting research. Recently, a paradox has emerged in the studies of earnings management and corporate social responsibility: Corporate social responsibility in chemical industry is to suppress earnings management or cover up earnings management (Lyon et al., 2013)? Chemical industry belongs to the basic raw material production industry in China, and there is a current situation of low efficiency of resource consumption, serious environmental pollution and frequent safety accidents. The corporate social responsibility in the chemical industry is the most important of all the industries in our country. The above paradox is particularly prominent in the listed companies of chemical industry, so we have important practical significance to study the impact of corporate social responsibility on earnings management in chemical industry.

2. Theoretical Analysis and Research Hypotheses

Regarding the relationship between corporate social responsibility and earnings management in the chemical industry, the academic community has always had different views.

According to the moral theory, political theory and integration theory about corporate social responsibility, the awareness of corporate social responsibility makes enterprises to follow higher ethical standards in their business operations, thereby restricting earnings management and maintaining the transparency of financial reporting. Therefore, there is a negative correlation between corporate social responsibility and earnings management in the chemical industry. Many researches at home and abroad have confirmed the correctness of the relationship (Laksmana and Yang, 2009; Kim et al., 2012; Zhong and Fan, 2011; Liu and Li, 2011; Deng et al., 2013; liu et al., 2014; Zhu et al., 2014; Liu and Huang, 2015). Therefore, the following hypothesis is proposed in this paper:

H1: The corporate social responsibility in the chemical industry has a governance effect on the earnings management. According to agency theory, earnings management is considered to be an agency cost making investors make non-optimal investment decisions. CSR activities (such as donations) bring no cash inflow but only additional spending to the company, which will reduce its earnings and damage the interests of

shareholders. To cover up the damages that CSR activities bring to the interests of shareholders, managers in the chemical industry may conduct earnings management. Empirical studies conducted by some scholars at home and abroad have concluded that corporate social responsibility is positively correlated with earnings management in the chemical industry (Prior et al., 2008; Gargouri et al., 2010; Wan and Liu, 2014; Tang and Li, 2015). Therefore, the following hypothesis is proposed in this paper: H2: The corporate social responsibility in the chemical industry has an entrenchment effect on the earnings management.

3. Research Methods

3.1 Samples and data collection

This paper takes the A-share listed companies in the chemical industry that disclosed social responsibility information disclosure reports in Shanghai and Shenzhen stock markets from 2009 to 2015 as the research samples and screen them according to the following criteria: (1) excluding financial and insurance listed companies; (2) excluding companies with significantly abnormal variable values; (3) excluding ST and * ST companies; (4) excluding companies whose financial data are unavailable; (5) excluding industries with fewer than 10 enterprises. After screening, a total of 2134 observations over 7 years are obtained. Corporate social responsibility data are sourced from the Rankins CSR Ratings (RKS) MCT database and other variables are from the WIND financial database and the CSMAR database. Analysis tools are EXCEL2013 and Stata14 software.

3.2 Variable Measurement

3.2.1 Corporate Social Responsibility (CSR)

Rankins CSR Ratings (RKS) is an authoritative third-party rating agency for corporate social responsibility in China. It independently developed the first social responsibility reporting evaluation tool in China and its ratings indirectly measure the performance and disclosure of corporate social responsibilities reflected in the corporate social responsibility report. Due to the independency, professionalism, authority and openness of the RKS rating, RKS has been widely accepted and applied by scholars in related research. This rating system has referred to the latest international authoritative social responsibility standard ISO26000. Considering the industry differences, it has set up an industry indicator - I value and classifies listed companies into 22 categories according to the CSR industry classification standards.

3.2.2 Degree of earnings management

This paper measures the degree of earnings management in an enterprise from two aspects - accrual-based earnings management and real activity earnings management.

(1) Accrual-based earnings management model

The most commonly used model in research is the modified Jones model (Wu and Wang, 2007). This paper also uses this model to measure the degree of accrual-based earnings management. The calculation process is as follows:

$$TAC_t = E_t - CFO_t \quad (1)$$

Where, TAC_t is the total accruals of the company in the year t, E_t is the net profit of the company in the year t, and CFO_t is the net cash flow of the company from operating activities in the year t. Make regression analysis of model (2) by industry and year and the residual calculated by Model (2) is exactly a manipulable value (AM).

$$\frac{TAC_t}{A_{t-1}} = \alpha_0 \frac{1}{A_{t-1}} + \alpha_1 \frac{\Delta SALES_t - \Delta AR_t}{A_{t-1}} + \alpha_2 \frac{PPE_t}{A_{t-1}} + \varepsilon_t \quad (2)$$

Where, A_{t-1} is the total assets of the company at the end of the year (t-1); $\Delta SALES_t$ is the increase in the sales revenue of the company in the year t; PPE_t is the total fixed assets of the company at the end of the year t; and ΔAR_t is the increase in accounts receivable of the company in the year t.

The greater this value is, the higher the degree of accrual earnings management will be.

(2) Real earnings management model

The measurement of real earnings management mainly refers to the practices of the scholars (Li, 2011), which is to measure the company's real earnings management activities from three aspects - sales control, production control and discretionary cost control. And use Model (3)-(7) to carry out calculation by industry and year. The specific calculation steps are as follows:

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{S_t}{A_{t-1}} + \beta_2 \frac{\Delta S_t}{A_{t-1}} + \varepsilon_t \quad (3)$$

Where, CFO_t refers to the company's net cash flow from its business activities at year t ; A_{t-1} is the company's total assets at the end of the year $t-1$; S_t is the company's operation revenue at the year of t ; and ΔS_t is the accrual of operation revenue at the year of t .

The cost of the product mainly consists of the cost of product sales plus the change in the inventory that year.

$$\frac{COGS_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{S_t}{A_{t-1}} + \varepsilon_t \quad (4)$$

$$\frac{\Delta NAV_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{\Delta S_t}{A_{t-1}} + \beta_2 \frac{\Delta S_{t-1}}{A_{t-1}} + \varepsilon_t \quad (5)$$

$$\frac{PROD_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{S_t}{A_{t-1}} + \beta_2 \frac{\Delta S_t}{A_{t-1}} + \beta_3 \frac{\Delta S_{t-1}}{A_{t-1}} + \varepsilon_t \quad (6)$$

Where, $PROD_t$ is the company's actual production cost at the year of t ; $COGS_t$ is the cost of goods sales (operation cost) of the company at the year of t ; ΔNAV_t is the inventory change of the company at the year of t .

$$\frac{DISEXP_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{S_{t-1}}{A_{t-1}} + \varepsilon_t \quad (7)$$

Where, $DISEXP_t$ is the company's actual discretionary expenditure at the year of t , i.e. the sum of operating expenses and administration expenses. The discretionary expenditure here is replaced with the sum of sales cost and administration expenses.

The residual calculated by Model (3), (6) and (7) is exactly a manipulable value, which is respectively used as the abnormal manipulation measure index for the sales control, production control and discretionary expenditure. In theory, the residual is a random entry of regression equation, whose mean value should be zero. If its value is significantly different from zero, there is an abnormal manipulation.

Referring to the practices of Cohen et al. (2008) and Kim et al. (2012), a general index is constructed to measure the company's real earnings management degree:

$$RM_{i,t} = AB_PROD - AB_CFO - AB_DISEXP \quad (8)$$

The greater this value is, the higher the degree of real earnings management will be.

3.2.3 Control variables

According to relevant research, this paper considers control variables such as company size, corporate value, financial risk, operational risk, financial resource, growth, P&L status, Audit cost, Audit opinion, equity financing, controller type, independent directors, audit committee, Equity concentration, institutional ownership, executive compensation, management shareholding, financial restatement, year, industry.

3.3 Establishment of the empirical model

In order to test the foregoing hypotheses, by reference to the studies conducted by Kim (2012) and Wan (2014), this paper constructs the following model:

$$\begin{aligned} AM_{i,t} = & \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 RM_{i,t} + \alpha_3 Size_{i,t} + \alpha_4 ROA_{i,t-1} + \alpha_5 Debt_{i,t} + \alpha_6 B_risk_{i,t} + \alpha_7 F_resources_{i,t} + \alpha_8 Growth_{i,t} \\ & + \alpha_9 earn_{i,t} + \alpha_{10} bigA_{i,t} + \alpha_{11} Re\ p_{i,t} + \alpha_{12} E_financing_{i,t} + \alpha_{13} controller_{i,t} + \alpha_{14} r_Indepe_{i,t} + \alpha_{15} T_O_{i,t} + \alpha_{16} Audc_{i,t} \\ & + \alpha_{17} H_1_{i,t} + \alpha_{18} H_5_{i,t} + \alpha_{19} Ins_{i,t} + \alpha_{20} E_com_{i,t-1} + \alpha_{21} ESR_{i,t} + \alpha_{22} restatement_{i,t} + \sum Year + \sum Industry + \alpha_{23} \varepsilon_{i,t} \end{aligned} \quad (9)$$

$$\begin{aligned} RM_{i,t} = & \beta_0 + \beta_1 CSR_{i,t} + \beta_2 AM_{i,t} + \beta_3 Size_{i,t} + \beta_4 ROA_{i,t-1} + \beta_5 Debt_{i,t} + \beta_6 B_risk_{i,t} + \beta_7 F_resources_{i,t} + \beta_8 Growth_{i,t} \\ & + \beta_9 earn_{i,t} + \beta_{10} bigA_{i,t} + \beta_{11} Re\ p_{i,t} + \beta_{12} E_financing_{i,t} + \beta_{13} controller_{i,t} + \beta_{14} r_Indepe_{i,t} + \beta_{15} T_O_{i,t} + \beta_{16} Audc_{i,t} \\ & + \beta_{17} H_1_{i,t} + \beta_{18} H_5_{i,t} + \beta_{19} Ins_{i,t} + \beta_{20} E_com_{i,t-1} + \beta_{21} ESR_{i,t} + \beta_{22} restatement_{i,t} + \sum Year + \sum Industry + \beta_{23} \varepsilon_{i,t} \end{aligned} \quad (10)$$

In the above models, $RM_{i,t}$ is replaced by AB_PROD , AB_CFO , AB_DISEXP and RM , respectively. To reduce the effect of heteroscedasticity, the OLS robustness regression is adopted as the regression method. To

reduce the impact of autocorrelation, according to Peterson's research suggestion, this paper does clustering treatment according to the company to reduce the biased error of OLS multiple regression analysis. In order to reduce the endogeneity of variables, according to the economic law, the author uses the data of two variables - profitability and executive compensation in the prior period in the model.

4. Empirical Analysis

4.1 Descriptive statistics of variables

First, the author performs descriptive statistical analysis of each variable in the model, with the results shown in Table 1. As can be seen, the average rating of CSR is 38.11, indicating that the overall CSR performance of the sample companies is poor; the maximum rating is 87.95 and the minimum rating is 13.33, indicating there are great gaps in the CSR. The average rating of AM is 0.08, which indicates that the overall level of AM in sample companies is relatively low; the maximum rating is 1.94 and the minimum rating is 0.0001, indicating that there are great differences. The average rating of RM is -0.04, which indicates that the sample companies have a relatively low level of RM; the maximum rating is 8.2 and the minimum is -2.69, which indicates that there are also great differences. The differences are also very large between the minimum and maximum values of the control variables. In order to reduce the impacts of abnormal values on empirical results, this paper Winsorizes all continuous variables by 1% up and down.

Table 1: Descriptive statistics of key variables

Variable	Obs	Mean	Std. Dev.	Min	Max
AM	2134	0.08	0.08	0.0001	1.94
RM	2134	-0.04	0.33	-2.69	8.2
AB_PROD	2134	-0.05	0.19	-1.72	6.59
AB_CFO	2134	-0.05	0.19	-8.91	1.87
AB_DISEXP	2134	0.05	0.09	-0.28	2.65
CSR	2134	38.11	11.97	13.33	87.95

4.2 Correlation test

Table 2 lists the test results of the correlation between corporate social responsibility and earnings management. As can be seen, CSR performance is significantly negatively correlated with both accrual-based earnings management and real earnings management at the significance level of 1%, indicating that the better the CSR performance is, the lower the degree of earnings management in the company will be, which preliminarily supports hypothesis 1. This is also demonstrated by CSR and the three RM indicators.

Table 2: Pearson correlation analysis of key variables

	AM	RM	AB_PROD	AB_CFO	AB_DISEXP	CSR
AM	1					
RM	0.2487*	1				
AB_PROD	0.1454*	0.8774*	1			
AB_CFO	-0.3427*	-0.6695*	-0.3012*	1		
AB_DISEXP	0.1381*	-0.3095*	-0.3903*	-0.3467	1	
CSR	-0.1176*	-0.1183*	-0.1118*	0.0544*	0.0715*	1

* p < 0.01

4.3 Regression analysis on the effects of corporate social responsibility on earnings management

As shown in Table 3, the estimated coefficient of CSR is significantly negative in the regression of CSR with RM and AB_CFO. The estimated coefficient of CSR is significantly positive in the regression with AB_DISEXP. In the regression with AM and AB_PROD, this coefficient of CSR is negative but not significant. The results show that the better the CSR performance is, the lower the degree of real earnings management will be, supporting Hypothesis 1, indicating that CSR in the chemical industry has a governance effect on the earnings management. The regression results also show that the performance of CSR by a company in the chemical industry controls RM more effectively than AM.

Table 3: Regression results of the effects of corporate social responsibility on earnings management

	(1)	(2)	(3)	(4)	(5)
	AM	RM	AB_PROD	AB_CFO	AB_DISEXP
Constant	0.229*** (6.26)	0.908*** (5.95)	0.489*** (5.57)	-0.413*** (-12.35)	-0.01 (-0.17)
CSR	-0.0001 (-0.87)	-0.0008 (-1.74)	-0.0004 (-1.24)	-0.0001 (-1.69)	0.0007*** (3.35)
AM		0.003 (0.03)	-0.092 (-1.51)	-0.173*** (-5.51)	0.016 (0.59)
RM	0.0003 (0.03)				
Size	-0.004** (-2.36)	-0.02*** (-2.94)	-0.01*** (-2.86)	0.015*** (11.65)	-0.006** (-2.38)
ROAt-1	0.003*** (8.23)	-0.009*** (-6.77)	-0.006*** (-8.52)	0.001*** (4.28)	0.001*** (2.76)
Debt	-0.0001 (-0.90)	-0.0008** (-2.24)	-0.0002 (-1.09)	0.0002*** (3.13)	0.0002* (1.80)
B_risk	0.002 (0.80)	0.086*** (4.25)	-0.025** (-2.17)	-0.121*** (-27.15)	0.014* (1.78)
F_resources	-0.503*** (-16)	-2.006*** (-22.62)	-0.752*** (-15.19)	1.089*** (48.74)	0.084*** (2.94)
Growth	0.0004*** (8.08)	-0.0004** (-2.50)	-0.0006*** (-5.97)	-0.001*** (-9.85)	0.0002*** (4.19)
earn	-0.004 (-1.07)	-0.011 (-1.03)	-0.002 (-0.30)	0.007*** (2.60)	0.003 (0.80)
big_4	-0.005 (-1.51)	0.006 (0.36)	0.004 (0.45)	-0.006** (-2.51)	0.004 (0.54)
Rep	-0.0006 (-0.05)	0.0253 (1.14)	0.0153 (1.04)	-0.0065 (-1.37)	-0.0058 (-0.63)
E_financing	-0.0002 (-0.06)	0.003 (0.30)	0.004 (0.63)	0.002 (1.12)	0.0002 (0.03)
controller	-0.002 (-0.75)	0.006 (0.45)	0.004 (0.46)	0.005* (1.94)	-0.007 (-1.32)
r_Indepe	-0.0002 (-0.82)	-0.0006 (-0.62)	-0.0004 (-0.90)	-0.001** (-1.99)	0.0003 (0.74)
T_O	0.006 (1.46)	-0.031** (-2.04)	-0.018** (-2.11)	0.006*** (2.94)	0.003 (0.51)
Aud_c	0.004 (1.00)	-0.002 (-0.19)	-0.0003 (-0.03)	0.001 (0.50)	-0.0006 (-0.14)
H_1	-0.0001 (-0.51)	-0.0002 (-0.33)	-0.00004 (-0.15)	0.0003*** (2.98)	-0.0002 (-0.89)
H_5	0.0002** (2.07)	0.0004 (0.75)	0.00008 (0.28)	-0.001*** (-4.16)	0.0002 (0.85)
Ins	0.00006 (1.07)	-0.0007** (-2.41)	-0.0004** (-2.38)	0.00007 (1.13)	0.0002** (2.17)
E_comt-1	-0.005* (-1.73)	-0.024** (-2.48)	-0.012** (-2.30)	0.005*** (3.22)	0.009** (2.18)
ESR	0.0002 (1.03)	-0.0001 (-0.04)	0.0002 (0.28)	-0.0001 (-0.50)	0.0004 (1.04)
restatement	-0.007** (-2.45)	0.005 (0.40)	0.002 (0.29)	0.0003 (0.11)	-0.004 (-0.89)
R-squared	0.372	0.642	0.552	0.896	0.473
N	1363	1363	1363	1363	1363

t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

From the regression results of the control variables, it can be seen that larger companies who have higher financial risks, more financial resources, give more compensation for executives and have their financials restated tend to have lower degree of AM; companies with higher profitability, faster growth and more concentrated equity ownership tend to have higher degree of AM. Companies with larger sizes, higher profitability, more financial resources, faster growth, one person taking the office of both Chairman and GM, higher institutional ownership, more concentrated equity ownership and more compensation for executives, the degree of RM will be lower; the higher the financial risks are, the higher the degree of RM will be. The results once again prove that in companies with better CSR performance, RM is better controlled.

4.4 Robustness test

In order to make the research results more convincing, this paper carries out robustness test on two aspects: First of all, considering that there is no accurate and consistent method for the measurement of CSR in researches both at home and abroad, in order to reduce the impacts of variable measurement on research conclusions, this paper uses social contribution per share (Shen, 2011) to test the robustness of the CSR measurement. The regression results are consistent with the previous ones. Due to space limitation, the empirical results are not reported in detail here.

Secondly, considering the limitation of the cross-sectional OLS regression method, this paper uses the fixed effect model based on panel data and the two-stage least squares regression method to repeat the above operations, and the regression results are consistent with the previous ones. Due to space limitation, the empirical results are not also reported in detail here.

5. Conclusions

In order to explore the mechanism of earnings management control in the chemical industry, this paper starts from the root cause of earnings management, takes social responsibilities, which can reduce the moral risk of the company in the chemical industry, as a perspective, studies the effects of social responsibility on corporate earnings management under the current environment in China based on the earning management methods. Through research, it is found that: social responsibility has good controlling effects on corporate real earnings management behaviors, and that good social responsibility performance can reduce the company's overall earnings management level. However, compared with accrual-based earnings management, social responsibility has more significant effect in controlling the real activity earnings management. This serves as useful reference for regulators to better improve the earning quality of the listed companies in the chemical industry in China.

On a final note, the model established in this paper is static, which may have some limitations. Future studies will focus on establishing a dynamic model to address this problem.

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