

The Impact of Environmental Uncertainty on the Relationship between Internal Control and CSR—Based on Economic Statistics under Big Data

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Abstract—In this study, we provide empirical evidence that internal control is associated with corporate social responsibility (CSR) performance. Using various measures and economic statistics under big data over the period from 2010 to 2020, the results suggest that internal control contributes to an increase in corporate social responsibility. Furthermore, environmental uncertainty plays a negative and moderate role in internal control and CSR performance, which means high level of the environment uncertainty can reduce the positive influence of the internal control on the CSR engagement of the certain company. In order to ensure sustainable development, this paper provides theoretical and practical implications that can be used by regulators and firms.

Keywords- Corporate social responsibility; Internal control; Environmental uncertainty

1. Introduction

Companies around the world are taking part in corporate social responsibility (CSR) as the topic of it attracts the attention of the whole society (Alam et al., 2019) [1]. It is a strategic decision for enterprises to engage in corporate social responsibility (Sheldon, 1924) [2]. A company's corporate social responsibility (CSR) entails both its legal and moral responsibility to its shareholders, employees, and community. An excellent enterprise is not only concern about its economic goals, but also focus on its non-economic goals, figuring out how to give back to society (Guo and Shen, 2019) [3]. And taking social responsibility is also a wise choice for the enterprises themselves (Spiller, 2000) [4], which can bring reputation and recognition from to realize its sustainable development. China has become increasingly powerful in promoting CSR engagement in recent years. During the process of reform and opening up, Chinese companies have become more aware of CSR and the environment is improving.

The Chinese market is experiencing a big change process of CSR report and there will be many topics to be explored. This study's sample of the Chinese market is therefore meaningful and significant.

2. Literature Review

2.1 Corporate Social Responsibility

When it comes to long-term development, CSR performance is a necessary element. In recent decades, literature and media have given considerable attention to various aspects of corporate social responsibility. These can be concluded into four aspects: the first is about the motivation and mechanism of voluntary and mandatory disclosure of CSR report. The second is about how the nature of the company influence the CSR performance. According to Boubakri et al. (2019) [5], on average, private firms demonstrate higher levels of CSR than public companies. The third aspect is about the financial performance and CSR performance. There is a considerable amount of literature focus on this, for instance, energy firm performance was positively correlated with CSR performance according to Shahbaz et al. (2020) [6]. The last aspect is about the dynamic principle of internal and external environment, including institutional environment and social environment to stimulate corporate CSR behavior. For example, how the governance and managerial skill (Chen et al. 2019) [7] influence CSR performance. As for social environment, many literatures have talked about the effect of media coverage (Byun and Jong-Min, 2018) [8] on CSR performance. Despite this, there is a limited amount of literature that examines both firm's internal and external environment factors and their relationship to their corporate social responsibility performance, which is what this paper aims to address.

2.2 Internal Control and CSR Performance

As well as ensuring that the company's assets are protected, an internal control system ensures that the information disclosed is accurate and true (Guo and Shen, 2019) [3]. In essence, internal controls ensure business efficiency, financial integrity, and compliance with the law and regulations, as well as reduce conflict of interest caused by unbalanced governance (Li, et al., 2018) [9]. However, in the past internal control mainly focused on the internal stakeholders, and often neglected the common interests of people outside the company. The benefit of internal control is limited in the internal stakeholders resulting the confliction between internal and external stakeholders. But in 2010, Chinese government incorporated CSR into internal control and strengthened the link between it and internal control.

2.3 Environmental Uncertainty

Increasing economic globalization has created an environment of increasing uncertainty for businesses. Chinese companies are facing environmental uncertainty that has adversely affected their sustainable development. On the one hand, environmental uncertainty will affect an enterprise's managers' assessment and prediction of internal control environmental factors and external environmental factors (Dai, 2010) [10], increasing the cost of management's adaptation to environmental changes, thereby affecting internal control goal's setting. on the other hand, when environmental uncertainty is high, market demand is also changing rapidly, but rigid internal control may restrict the company's ability to cope with the rapidly changing market (Jensen, 1993) [11], resulting in internal control that cannot be effectively implemented. In this way, environmental uncertainty can limit the positive role of internal control, thereby limiting the ability of management to assess the project's quality. Therefore, internal control becomes less effective at promoting corporate social responsibility.

3. Hypothesis Development

3.1 Internal Control and CSR Performance

Literature on CSR activities has emphasized their strategic role and the benefits that result from them. Even with ownership and control separated, agency problems can hinder maximizing shareholder value through CSR activities. A conflict exists between managers and shareholders based on the agency theory, so managers' decision may be used for their own interests not the stakeholders' interests, which do harm to the corporate social responsibility. Managerial behaviour can be restricted through internal control. In addition to curbing managers' irresponsible self-interested behaviour, internal control reduces their opportunism through its supervisory function. It can also motivate managers to perform better by boosting their self-discipline (Dong and Ma, 2019) [12]. Therefore, this article proposes the following hypothesis:

Hypothesis 1: CSR engagement is positively correlated with internal control.

3.2 Environmental Uncertainty, Internal Control and CSR Performance

It is not only internal management that affects an enterprise's development, but also changes in the external environment. There is a potential change in the relationship between CSR performance and internal performance when enterprises confront fierce environmental uncertainty. Thus, this article takes environmental uncertainty into consideration as a factor that affects the above-hypothesized positive relation between internal control and CSR performance. As Dai (2010) [10] stated that environmental uncertainty may affect managers' assessment and prediction of internal control environmental factors and external environmental factors, affecting internal control goal's setting. Besides, rigid and institutionalized internal control system may restrict the company's ability to cope with the rapidly changing market (Jensen, 1993) [11], resulting in internal control that cannot be effectively implemented. Two reasons can explain why internal controls may not be effective when environmental uncertainty is high. The first is that the internal goal of the enterprise cannot be set perfectly because of poor assessment of the managers. The second reason is that managers can not adjust implementation of internal control timely to adapt to the environment. Due to these two factors, environmental uncertainty may weaken the role of internal control in promoting corporate social responsibility. Based on the above logic, the following hypothesis is proposed in this article:

Hypothesis 2: The positive association between internal control and CSR engagement is less pronounced in firms facing a high environmental uncertainty.

4. Research Methodology

4.1 Empirical models

Model 1 linked the CSR performance of the enterprises to their internal control level (ICI), while controlling for other company characteristics. Below is the mathematical equation for Model 1:

$$\begin{aligned}
CSR_{i,t} = & \beta_0 + \beta_1 ICI_{i,t} + \beta_2 Lev_{i,t} + \beta_3 Age_{i,t} + \beta_4 Roe_{i,t} \\
& + \beta_5 Size_{i,t} + \beta_6 Growth_{i,t} + \beta_7 Fixratio_{i,t} + \beta_8 Cashflow_{i,t} \\
& + \beta_9 PE_{i,t} + \beta_{10} \Sigma Industry + \beta_{11} \Sigma Year + \varepsilon_{i,t} \quad (1)
\end{aligned}$$

Secondly, in order to examine whether environmental uncertainty modifies the relationship of internal control and CSR engagement, this article derived the following economic statistics model 2 based on hypothesis H2:

$$\begin{aligned}
CSR_{i,t} = & \beta_0 + \beta_1 ICI_{i,t} + \beta_2 EU_{i,t} + \beta_3 EU_{i,t} \times ICI_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Age_{i,t} \\
& + \beta_6 Roe_{i,t} + \beta_7 Size_{i,t} + \beta_8 Growth_{i,t} + \beta_9 Fixratio_{i,t} + \beta_{10} Cashflow_{i,t} \\
& + \beta_{11} PE_{i,t} + \beta_{12} \Sigma Industry + \beta_{13} \Sigma Year + \varepsilon_{i,t} \quad (2)
\end{aligned}$$

4.2 Sample and Variables

The data used in this analysis is from Chinese A-share companies listed between 2010 and 2020 on the Shanghai and Shenzhen exchanges. In this paper, the following companies were excluded: (1) financials, (2) ST companies, (3) firms with negative net assets, and (4) firms without complete data. In total, 24641 firm-years were collected from the data requirements .

Financial data were obtained primarily from CSMAR database, and internal control index data were obtained from DIB's database. A sample of CSR score data was obtained from the Hexun database, which has been used and validated in previous empirical studies. In order to keep empirical results from being impacted by extreme values, a maximum and minimum 1% of all continuous variables was used to winorize them.

In general, based on Tosi et al. (1973) [13], sales revenue standard deviation represents the degree of uncertainty in the environment. Ghosh and Olsen (2009) [14] adjusted for industry by using five-year standard deviation of sales revenue. In this article, environmental uncertainty (EU) is calculated by dividing each company's unadjusted environmental uncertainty by its industry's environmental uncertainty.

A number of control variables were used in this study for factors that are known to affect internal control efficiency (Defond et al., 2015; Piotroski et al., 2015) [15-16]). As shown in Table 1, the variables have been defined.

5. Results and Discussion

5.1 Descriptive statistics

A descriptive statistic is provided for each variable in Table 2. These 24641 firm-years data will be tested using economic statistics models. CSR performance varied widely between different Chinese companies, as evidenced by the significant standard deviation. ICI scores averaged 6.105 in our database of firms. According to the statistical analysis of sample company data, standard value of environmental uncertainty is 1.448 with a minimization of 0.009 and a maximization of 23.224, indicating the significant difference of various companies.

5.2 Regression results

5.2.1 The effect of internal control on CSR performance

The first part of this paper examines how internal control affects CSR performance using economic statistics model 1 as a basis. Following the control of other factors that affect CSR performance, as shown in Table 3, equation 1 shows the results of the major regressions. Positive and significant coefficients of internal control are found in both columns at a level less than 1%, implying that high internal control level of the firms can promote the CSR performance of the firms. Using columns (2) as an example, the coefficient implies that every score internal level of firms increases their CSR score by 1.766. As shown in Table 3, internal control increases firm CSR performance, which is consistent with Hypothesis 1.

Table 1 Description of Main Variables

Variable	Symbol	Formula	Source
CSR performance	CSR	Hexun CSR	Hexun
Internal control	ICI	Ln (DIB internal control index value)	DIB
Environmental uncertainty	EU	(Standard deviation of residual sales income in the past five years/average sales income in five years)/Industry median	Author's own calculations
Financial Leverage	Lev	Total liabilities/total assets	CSMAR
Return on equity	Roe	Net profit/balance of shareholders' equity	CSMAR
Firm Size	Size	Ln (total assets)	CSMAR
Age of Listed Company	Age	Listing year number of listed company	Author's own calculations
Growth rate of total assets	Growth	Net fixed assets / total assets	CSMAR
Ratio of Fixed Assets	Fixratio	Value of fixed asset/value of total assets	CSMAR
Operating activities' share of net cash flow	Cashflow	Net cash flow/net profit from operating activities	CSMAR
Price Earning Ratio	PE	Price per share/ Earning per share	CSMAR

Table 2 Descriptive Statistics of Main Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
CSR	24,641	23.625	15.745	-18.450	90.870
ICI	24,641	6.105	1.516	0.000	6.904
EU	24,641	1.448	1.566	0.009	23.224
Assurance	24,641	0.009	0.092	0.000	1.000
Age	24,641	2.844	0.373	0.000	4.143
Roe	24,641	0.030	0.755	-48.316	108.366
Lev	24,641	0.420	1.165	-0.195	178.345
Growth	24,641	0.391	12.652	-1.000	1649.350
Fixratio	24,641	0.159	0.157	0.000	0.971
Cashflow	24,641	1.867	88.326	-4960.861	11259.58
Pe	24,641	116.194	2536.420	0.302	420284.640
Size	24,641	0.544	0.728	0.000	0.301

Table 3 The effect of internal control on CSR performance

	(1)	(2)
VARIABLES	CSR	CSR
ICI	2.644***	1.766***
	(43.98)	(18.76)
Age		-2.543***
		(-9.59)
Roe		5.136***
		(9.28)
Lev		3.670***
		(9.85)
Growth		0.001
		(0.20)
Fixratio		-4.314***
		(-7.10)
Cashflow		-0.002*

		(-1.87)
Pe		-0.000***
		(-3.01)
Size		0.000***
		(11.15)
Constant	7.373***	21.317***
	(19.50)	(20.87)
Observations	24,641	24,641
R-squared	0.061	0.032
Industry FE	YES	YES
Year FE	YES	YES
Adj-R2	0.0606	0.0317

Note: ***, **, * respectively represent significance levels at the 1%, 5%, and 10% levels, with T values in parentheses.

5.2.2 Moderating effect of environmental on internal control and CSR performance

As shown in Table 4, the coefficient β_3 of variable ICI*EU in columns (1)-(2) is -0.196 and -0.165, respectively, negative and significant, indicating that there is a weaker relationship between internal control and CSR engagement when environmental uncertainty is high. According to Hypothesis 2, there is a stronger positive relationship between internal control levels and CSR engagement for firms facing a lower level of environmental uncertainty than for those facing a higher level of uncertainty. Uncertainty in the environment negatively affects the relationship between internal control level and CSR performance.

Table 4 Moderating effect of environmental uncertainty on internal control and CSR

	(1)	(2)
VARIABLES	CSR	CSR
ICI	2.922***	1.990***
	(31.77)	(14.03)
EU	0.333**	0.439*
	(2.16)	(1.69)
ICI*EU	-0.196***	-0.165***
	(-7.34)	(-3.93)
Age		-3.684***
		(-9.93)

Roe		0.114
		(0.84)
Lev		1.968***
		(4.64)
Growth		-0.007
		(-0.62)
Fixratio		-3.014***
		(-4.38)
Cashflow		-0.004**
		(-2.04)
Pe		-0.000***
		(-2.63)
Size		0.000***
		(10.04)
Constant	6.423***	24.677***
	(11.13)	(16.83)
Observations	23,300	18,580
R-squared	0.061	0.032
Industry FE	YES	YES
Year FE	YES	YES
Adj-R2	0.0711	0.0328

Note: * * *, * *, * respectively represent significance levels at the 1%, 5%, and 10% levels, with T values in parentheses.

6. Conclusions

Empirically, this paper uses OLS regression model based on big data to test the moderation effect of environmental uncertainty, and the significant and negative result suggests that environmental uncertainty can weaken the positive effect of internal control on CSR performance. This means enterprises should further strengthen the internal control system and ensure the internal controls associated with CSR engagement are operating effectively when facing environmental uncertainty by setting a flexible object or adjusting implementation according to circumstances.

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