

The Impact of Institutional Ownership on Corporates' Environmental Responsibility: Empirical Evidence from Coastal Public Companies in China

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ABSTRACT

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The environmental problems in coastal areas of China are attracting more and more attention, and how to control and guide coastal enterprises to fulfill environmental responsibilities have become an urgent issue to be solved. Institutional ownership, as an external supervisory force, can play a restrictive role in the production of enterprises. Therefore, this paper includes the data of China's coastal public companies from 2010 to 2016 to study the relationship between institutional ownership and corporate environmental responsibility (CER). The results show that institutional ownership, as an external restraint force, can promote enterprises to actively fulfill CER, which is more significant in state-owned enterprises. Further research also finds that different types of institutional ownership have heterogeneous roles in restraining enterprises from fulfilling environmental responsibilities. The conclusions of this study can provide theoretical support for enterprises to adjust equity structure and enhance the performance of environmental responsibility by introducing external ownership. Based on these findings, government may also formulate corresponding policies and promote the implementation of environmental responsibility.

ADDITIONAL INDEX WORDS: *Institutional ownership, environmental responsibility, coastal areas.*

INTRODUCTION

In recent years, environmental problems such as water pollution and PM2.5 have increased public awareness for environmental protection (Obraczka *et al.*, 2017). According to the Global Environmental Performance Index 2018 issued jointly by Yale University, Columbia University and the World Economic Forum, China ranks fourth from bottom in air quality, reflecting the deterioration of the environment bringing by rapid economic growth. China has become one of the countries with the most serious environmental pollution problems in the world. Meanwhile, according to China Corporate Social Responsibility Report 2017, more than 80% of environmental pollutants are produced by enterprises. Therefore, as the main producer of environmental pollution, enterprises have an undeniable responsibility for pollution control. As the economic center of China, Eastern coastal region is facing increasingly serious environment problems (Feng and Ji, 2018). The contradiction between economic development and environmental protection is prominent. It is urgent to encourage and supervise coastal enterprises to increase investment in environmental protection and actively fulfill their environmental responsibilities. Scholars

have focused on the relationship between CER and corporate financial performance, whereas so far no consistent conclusion has been reached (Amit and Schoemaker, 1993; Huang *et al.*, 2019). With the continuous progress of research, some scholars gradually shifted their focus to the pre-factors of corporate environmental responsibility. More specifically, the impact of stakeholder pressure on the performance of CER has attracted more research attention.

Institutional ownership has become an indispensable force in the world. With the springing up of the CER movement, institutional ownership is gradually aware of the importance of CER in production and operation. When pay attention to the information of company, institutional ownership will not only take the conventional financial indicators into account, but also consider how enterprises deal with social and environmental issues (Maug, 1998). Currently, related research on this aspect mainly focuses on the quality of corporate information disclosure from institutional ownership. Brickley, Lease and Smith (1988) believed that institutional ownership had more resources and experience to supervise corporate executives, and they are able to force executives to disclose high-quality information as well as undertake environmental responsibility. Some researchers hold a different point of view. For instance, Li and Zhang (2010) found that in order to obtain higher interests, instead of supervising the executives of companies to improve the quality of information disclosure, sometimes institutional ownership deliberately conceal some long-term investors so that

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they can play a role in reducing the corporate governance mechanism of positive earnings management. Therefore, researchers are still arguing about whether institutional ownership, as an important participant in the capital market, can function as an external supervision mechanism to guide enterprises to undertake environmental responsibility.

Based on the data of China's coastal public companies from 2010 to 2016, this paper studies the impact of institutional ownership on CER. It is found that institutional ownership, as an external supervision mechanism, can encourage enterprises to actively fulfill environmental responsibilities. Following the research of Bushee (1998), this paper classifies institutional ownership into two types, namely pressure-insensitive and pressure-sensitive ownership, and finds that pressure-insensitive institutional ownership has a significantly positive correlation with CER, while pressure-sensitive institutional ownership has a significantly negative relationship with CER. In addition, the present study also finds that the external supervisory role of institutional ownership plays a more important role in state-owned enterprises, especially in encouraging these enterprises to actively fulfill environmental responsibilities. These findings support the argument that institutional ownership should participate in environmental responsibility fulfillment.

THEORETICAL ANALYSIS AND RESEARCH HYPOTHESIS

Institutional Ownership and CER

Institutional ownership can help enterprises to carry out environmental responsibility, for the sake of maximizing long-term economic value. Compared with other shareholders, institutional ownership has higher expectations about the sustainable development and long-term development of enterprises. Institutional ownership not only concerns about economic returns, but also directly participates in corporate management and the decision-making process of important issues such as corporate environmental responsibility (CER). As CER is of great significance for increasing enterprise value, institutional ownership is more motivated to supervise the fulfillment of CER.

Brickley, Lease and Smith (1988) proposed that different characteristics should be taken into account when studying the governance effects of institutional ownership. Different types of institutional ownership have different roles in CER due to different concepts of investment and holding purposes (Chen *et al.*, 2015). Bushee (1998) classified institutional ownership into pressure-sensitive and pressure-insensitive ownership, and argued that only pressure-insensitive institutional ownership can insist their investment philosophy and actively improve the performance of corporate environmental responsibility, to obtain higher long-term returns. On the contrary, pressure-sensitive institutional ownership is often limited to commercial interests and rarely shares independent opinions on CER issues, but tend to gain commercial benefits from them (Dyck *et al.*, 2019). Based on these theories, the following hypotheses are proposed:

H1: Given the effect of other variables, institutional ownership can promote the implementation of CER.

H1a: Given the effect of other variables, the proportion of pressure-insensitive ownership is positively correlated with CER.

H1b: Given the effect of other variables, the proportion of

pressure-sensitive ownership is negatively correlated with CER.

The Nature of Corporate Nature and CER

The driving factors of fulfilling CER vary according to the nature of enterprises. In addition to economic objectives, state-owned enterprises also undertake various political and social objectives, and the realization of economic objectives often serves the government's participation and intervention in economic activities for state-owned ones (Hong, Li and Minor, 2016). In state-owned enterprises, managers are appointed politically in most cases. As a result of political appointment in state-owned enterprises, managers pursue not only maximization of the value of enterprises, but also carrying a variety of political tasks and social functions. Under this circumstance, people's livelihood issues such as environmental issues would be taken into account due to political and social welfare consideration. As an external restraint force, institutional ownership in state-owned enterprises can enhance the role of supervision and undertake environmental responsibility actively (McNulty and Nordberg, 2016). Based on this line of reasoning, this paper proposes the following hypothesis:

H2: Given the effect of other variables, compared with non-state-owned enterprises, there is a positive correlation between the institutional ownership and the performance of CER in state-owned enterprises.

METHODS

Data Selection

Making use of the data of A-share companies in coastal China from 2010 to 2016, this paper empirically examines the impact of institutional ownership on the performance of CER. Among them, the data of CER is from Hexun website, while institutional ownership and other financial data are accessed from the China Stock Market & Accounting Research (CSMAR) Database. The following data were excluded from the analysis of the present study: (1) ST and PT company samples. (2) the samples of financial and insurance categories. (3) the company without complete data. After the above screening, 8968 samples were included in this paper. In order to reduce the bias from extreme values, all continuous variables are tailed at the level of 1% and 99%. Stata 15 software is used for statistical and multiple regression analysis.

Model Building and Variable Definition

In order to test the hypotheses, this paper establishes the following model:

$$\text{Score}_{i,t} = a_1 \text{Institution}_{i,t} + a_2 \text{Controls}_{i,t} + \varepsilon_{i,t} \quad (1)$$

In this model, i and t represent the public company and the year respectively, and $\varepsilon_{i,t}$ is the residual of the model. $\text{Score}_{i,t}$ indicates the total score of CER. Referring to the practice of Han, You and Nan (2019), this paper uses the total score of the social responsibility report evaluation system of public companies published by Hexun as the measurement index of CER. $\text{Institution}_{i,t}$ is the share-holding ratio of institutional ownership. The data comes from CSMAR database. Following Bushee (1998), this paper divides institutional ownership into pressure-

sensitive and pressure-insensitive types. Pressure-sensitive institutional ownership (Sens_ins) refers to the sum of the shareholding ratio of securities investment funds, comprehensive securities firms and insurance companies, and pressure-insensitive institutional ownership (Nonsens_ins) refers to the sum of social security funds, QFII and other institutional investors.

Suggested by Bushee (1998), the following control variables are selected in this paper: Firm characteristic variables include firm size (Ln_Size), financial leverage (Leverage), enterprise age (Age), profitability (Roe), and the ability of growth (Salesgro). Corporate governance variables include ownership concentration (First), board size (Ln_Director), the ratio of independent director (Indep), the dual role of CEO (Dual) and management compensation (Ln_salary). The detailed definition of variables is shown in Table 1.

Table 1. Variable definitions.

Variables	Definitions
Interpreted Variable	
Score	Data comes from the Report on Social Responsibility of Hexun Public Companies
Explanatory Variables	
Institution	The total proportion of funds, QFII, securities firms, insurance companies, social security funds, etc.
Nonsens_ins	The proportion of social security funds, QFII and other institutional investors
Sens_ins	The proportion of funds, insurance companies,
Controls	
Ln_Size	The log of assets.
Leverage	The book value of total liabilities divided by lagged total assets.
Age	The log of year from the date of establishment to 2017.
Roe	Net profit divided by net assets.
Salesgro	Net current sales revenue divided by initial sales revenue.
First	Maximum shareholding divided by total shares.
Ln_Director	The log of the total number of director.
Indep	The number of Independent Directors divided by the total number of directors.
Dual	Dual equals 1, which means that the chairman and the general manager are the same person. Otherwise, Dual equals 0.
Ln_salary	The log of top three management payment

ANALYSIS

Descriptive Statistics

Table 2 presents the descriptive statistics of variables. From Table 2, we can see that the average value of CER is 29.07, and the standard deviation is 19.10, which indicate that the performance of environmental responsibility differs significantly among enterprises. In terms of the sub-sample, the average score of CER is 34.21 for state-owned enterprises, and the standard deviation is 21.73. The score of environmental responsibility is 25.78 for non-state-owned enterprises, and the standard deviation is 16.09, which indicates that with regard to the performance of CER in eastern China, state-owned enterprises

indeed outperformed private enterprises. The average value of institutional ownership is 6.778 and the standard deviation is 9.577. The average institutional ownership of state-owned enterprises and non-state-owned enterprises are 8.200 and 5.738, and the standard deviations are 12.29 and 6.028 respectively. This shows that the concentration of ownership in state-owned enterprises is higher than that in non-state-owned ones, whereas in terms of ownership difference, state-owned enterprises are higher than non-state-owned ones. The t-statistics of comparing means of all variables under different enterprise nature are significant at the confidence level of 1%. It shows that there are significant differences between samples under different enterprise nature, and it is necessary to test the impact of institutional ownership on CER by enterprise nature.

Table 2. The description statistics of variables.

Variable	Total N=8968		State N=3501		Non_State N=5467		Mean_ Diff
	Mean	Std.de v	Mean	Std.d ev	Mean	Std.de v	
Score	29.07	19.10	34.21	21.73	25.78	16.09	8.468* **
Institution	6.778	9.577	8.200	12.29	5.738	6.028	2.570* **
Ln_Size	22.12	1.306	22.79	1.430	21.69	1.008	1.099* **
Leverage	0.424	0.212	0.510	0.201	0.369	0.199	0.141* **
Age	2.949	0.288	3.062	0.236	2.876	0.296	0.186* **
Roe	0.082	0.095	0.079	0.101	0.085	0.091	0.005* **
Salesgro	0.212	0.460	0.165	0.426	0.242	0.479	0.077* **
First	36.33	14.98	40.11	15.66	33.91	14.00	6.198* **
Ln_Director	2.143	0.193	2.207	0.192	2.102	0.181	0.105* **
Indep	0.373	0.053	0.368	0.053	0.376	0.053	0.008* **
Dual	0.265	0.441	0.098	0.297	0.372	0.483	0.274* **
Ln_salary	14.29	0.663	14.41	0.660	14.20	0.652	0.206* **

Correlation Analysis

Table 3 shows the Pearson correlation coefficients and multiple collinearity tests among variables. As can be seen in Table 3, Institution as well as Score is significant at the confidence level of 1%, indicating that institutional ownership

Table 3. *Pearson correlation test among variables.*

	VIF	Tolerance	Score	Institution	Ln_Size	Leverage	Age	Roe	Salesgro	First	Ln_Director	Indep	Dual	Ln_salary
Score	1.430	0.699	1											
Institution	1.040	0.966	0.131***	1										
Ln_Size	2.250	0.444	0.397***	0.116***	1									
Leverage	1.580	0.631	0.069***	0.024**	0.534***	1								
Age	1.120	0.896	0.071***	0.053***	0.104***	0.246***	1							
Roe	1.340	0.747	0.394***	0.108***	0.142***	-0.078***	-0.00400	1						
Salesgro	1.080	0.924	0.029***	0.026**	0.032***	0.050***	-0.024**	0.240**	1					
First	1.120	0.893	0.155***	0.048***	0.262***	0.077***	-0.094***	0.108**	-0.00700	1				
Ln_Director	1.540	0.648	0.152***	0.074***	0.249***	0.124***	0.108***	0.032**	-0.037**	0.018*	1			
Indep	1.440	0.695	-0.00300	-0.044***	0.040***	0.0130	-0.087***	-0.019*	0.024**	0.076***	-0.518**	1		
Dual	1.090	0.915	-0.095***	-0.029***	-0.192***	-0.153***	-0.161***	0.00300	0.029**	-0.042***	-0.190**	0.117***	1	
Ln_salary	1.400	0.717	0.322***	0.130***	0.461***	0.145***	0.050***	0.265**	0.018*	0.047***	0.148**	-0.00600	-0.034***	1

*Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level.

related to the implementation of CER. Hypothesis 1 of this paper has been preliminarily supported. Except Indep, the control variables are significantly correlated with Score at 1% significance level, indicating these variables should be included as covariates. In addition, tolerance and VIF are used to test whether there are multiple collinearities in the variables. The test results show that VIF is less than 10, and the tolerance of each variable is significantly greater than 0, indicating that there is no obvious multi-collinearity among the variables.

Regression Analysis

Table 4 presents the impact of institutional ownership of Chinese coastal enterprises on CER. According to columns 1 and 4, both when include and exclude industry and year dummy variables, results show that the explanatory variables of CER

(Score) is positively correlated with the explanatory variable institutional ownership (Institution) at a 5% significant level. This correlation indicates that the higher the proportion of institutional ownership, the better the ability of external supervision, and the more conducive to the implementation of CER. Hypothesis 1 of this paper is supported. One plausible reason might be: Institutional ownership generally holds a large proportion of stocks, which makes them easier to approach the board of directors and the senior management. Institutional ownership can even remove management through agency competition and take-over, and has the ability to guide enterprises to better undertake environmental responsibility.

Table 4. *The regressive result of institutional investors and CER.*

	(1)	(2)	(3)	(4)	(5)	(6)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
VARIABLES	Score	Score	Score	Score	Score	Score
Institution	0.093* (0.038)			0.089** (0.038)		
Nonsens_ins		0.250** (0.065)			0.175** (0.064)	
Sens_ins			-0.314** (0.075)			-0.213** (0.062)
Ln_Size	5.023** (0.281)	5.124** (0.277)	5.164** (0.280)	5.464** (0.288)	5.535** (0.283)	5.579** (0.285)
Leverage	-11.503*** (1.569)	-11.704** (1.574)	-11.727*** (1.584)	-13.201** (1.607)	-13.330** (1.612)	-13.391** (1.620)
Age	3.661** (1.001)	4.022** (1.010)	4.035** (1.001)	2.677** (1.050)	2.979** (1.056)	2.971** (1.050)
Roe	62.423*** (2.725)	60.443** (2.730)	62.367*** (2.744)	57.398** (2.671)	56.285** (2.676)	57.592** (2.690)
Salesgro	-2.083** (0.373)	-2.120** (0.373)	-2.014** (0.375)	-2.154** (0.356)	-2.162** (0.356)	-2.106** (0.357)
First	0.045* (0.020)	0.053** (0.020)	0.042* (0.020)	0.016 (0.021)	0.022 (0.021)	0.015 (0.021)
Ln_Dir	5.790* (0.020)	5.931** (0.020)	5.601* (0.020)	1.924 (0.021)	2.073 (0.021)	1.890 (0.021)

ector	**	*	**			
	(1.863)	(1.848)	(1.855)	(1.847)	(1.840)	(1.844)
Indep	10.835* (6.258)	10.275 (6.249)	9.949 (6.242)	7.146 (6.076)	6.636 (6.076)	6.376 (6.072)
Dual	-1.105* (0.557)	-1.135** (0.557)	-1.068* (0.557)	-0.900 (0.550)	-0.925* (0.550)	-0.897 (0.550)
Ln_salary	2.244** (0.469)	2.243** (0.471)	2.341* (0.473)	2.946** (0.478)	2.962** (0.481)	3.023** (0.482)
Constant	-143.119*** (8.316)	-146.742*** (8.237)	-146.665*** (8.286)	-144.214*** (8.914)	-147.345*** (8.822)	-147.310*** (8.856)
Year	No	No	No	Yes	Yes	Yes
Industry	No	No	No	Yes	Yes	Yes
Observations	8,968	8,968	8,968	8,968	8,968	8,968
Adjusted R ²	0.300	0.301	0.302	0.356	0.355	0.355
F	160.7	161.6	159.4	71.16	71.18	70.22

*T-Statistics are reported in parentheses. All variables are defined in Table 1. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level.*

According to columns 2 and 5, Nonsens_ins is positively correlated with CER at a significant level of 1% regardless of whether the industry and year dummy variables are included or not, which means that pressure-resistant investors can effectively reduce agency costs by taking advantage of their strong expertise and governance capabilities. The hypothesis H1a in this paper is supported. From column 3 and column 6, it can be seen that both when control and neglect the effect of industry and year dummy variables, Sens_ins is negatively correlated with Score at a significant level of 1%. This shows that pressure-sensitive institutional ownership is unwilling to give up the benefits of business relationship related to the company, and it fails to play an effective role as external supervision. The hypothesis H1.b in this paper has also been supported.

In terms of control variables, firm size (Ln_Size), enterprise age (Age), profitability (Roe) and management compensation (Ln_salary) are significantly positive correlated with environmental responsibility, which indicates that with larger

scale, longer existence time, higher profitability and salary, the enterprises tend to undertake more environmental responsibility. This finding is consistent with the results from previous research. Debt ratio (Leverage) is negatively correlated with CER. The higher the debt level, the worse the environmental performance of enterprises. One possible reason is that enterprises with high debt level are facing greater financial risks, and they would be likely to reduce the investment in environmental protection.

Table 5. *The result of institutional ownership and CER under different enterprise nature.*

	(1)	(2)	(3)	(4)
	State	Non_State	State	Non_State
	Model7	Model8	Model9	Model10
VARIABLES	Score	Score	Score	Score
Constant	135.167** *	113.794***	138.763* **	116.906***
	(16.497)	(11.765)	(16.870)	(12.452)
Institution	0.096**	0.004	0.101**	-0.016
	(0.047)	(0.044)	(0.047)	(0.044)
Controls	Yes	Yes	Yes	Yes
Year	No	No	Yes	Yes
Industry	No	No	Yes	Yes
Observations	3,501	5,467	3,501	5,467
Adjusted R ²	0.284	0.263	0.371	0.306
F	78.94	66.16	48.81	35.35

*T-Statistics are reported in parentheses. All variables are defined in Table 1. The control variables are consistent with table 4. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level.*

In order to examine the impact of institutional ownership on CER performance under different corporate nature, this paper divides the samples into state-owned and non-state-owned enterprises and thereafter builds a regression model. Table 5 presents the regression results of the model. As can be seen from Table 5, compared with non-state-owned enterprises, the performance of CER of institutional investors in state-owned enterprises is significant in the 5% confidence interval regardless of whether including the industry and year control or not. There is a significantly positive correlation between institutional ownership and CER at 5% level in state-owned ones. This can be interpreted that in state-owned enterprises,

most managers have to undertake environmental and other social responsibilities apart from realizing the maximization of enterprise value due to their political background. Enterprises will be more actively to take environmental responsibility under external institutional ownership.

Robust Test

Considering the endogenous problem brought by the causal relationship between institutional ownership and CER, this paper uses two-stage least squares method to regress the model. As institutional investors tend to invest in powerful companies, whether public companies are in the Shanghai-Shenzhen 300 Index were set as a standard to form a new variable H300. If the public company is in the Shanghai-Shenzhen 300 index, H300 scores 1, otherwise H300 scores 0. The variable H300 is calculated as the tool variable of institutional ownership. Table 6 reports the regression results of the two-stage least squares method which shows that both institutional ownership and CER are positively correlated at 1% confidence level. Therefore, the results of regression analysis through using instrumental variables well support the above conclusions.

Table 6. *Two-stage least squares regression.*

	(1)	(2)	(3)
	Model1	Model2	Model3
VARIABLES	Score	Score	Score
Institution	0.277*** (0.022)	0.093*** (0.019)	0.089*** (0.018)
Constant	27.218*** (0.246)	-143.119*** (5.103)	-144.214*** (5.257)
Controls	No	Yes	Yes
Year	No	No	Yes
Industry	No	No	Yes
Observations	8,968	8,968	8,968
Adjusted R ²	0.0175	0.300	0.356
F	160.4	351.0	151.0

*T-Statistics are reported in parentheses. All variables are defined in Table 1. The control variables are consistent with table 4. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level.*

CONCLUSIONS

Based on the data of 8968 A-share public companies in coastal China from 2010 to 2016, this paper studies the impact

of institutional ownership on CER. Three main findings emerge from the present study. (1) Institutional ownership has a significant positive impact on CER. (2) Different institutional ownerships have different willingness to intervene in the corporate governance and supervise the performance of CER due to the characteristics, shareholding objectives and shareholding scale. (3) Compared with general enterprises, state-owned enterprises bear more social objectives besides economic objectives. In state-owned enterprises, institutional ownership can better promote the implementation of CER.

The following suggestions are put forward: When developing institutional ownership to improve corporate governance vigorously, other than focusing on the overall shareholding level, more attention should be paid to the heterogeneity of institutional investors. Different institutional ownership plays different roles depending on different shareholding purposes, scale and ranking they have. In addition, state-owned enterprises can give full play to the exemplary role in environmental protection by introducing institutional ownership to actively perform environmental responsibility.

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