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The Study on the Correlation between Environmental Information Disclosure and Economic Performance-With empirical data from the manufacturing industries at Shanghai Stock Exchange in China

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Abstract

With the gradual transformation of future economy from the lack of environmental management to a new form of economy which focuses on sustainable development, the enterprise must shoulder more environmental management responsibilities. As environmental information disclosure and economic performance have an intrinsic correlation, the institutional arrangement of environmental information disclosure system will necessarily promote the economic performance. This research finds that environmental information disclosure has a positive effect on economic performance, as is shown that enterprises which sufficiently discloses their environmental information have better economic performance.

Keywords: environmental information disclosure; economic performance; institutional arrangements; environmental management

1. Introduction

Along with the fast development of the economy, the consumption of the natural resources and the problem of environmental pollution are increasingly serious. The enterprises usually neglect the social responsibility and the environmental benefits and replace the enterprise cost with the social cost in order to maximize profits. However, in recent years there has been a great enhancement of awareness of

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environmental protection and sense of social responsibility among people. As mankind is gradually paying more attention to environmental protection, the international community sets out to discuss and draw up various conventions or agreements in the hope of maintaining the continuous development of the environment through global cooperation, such as the Montreal Protocol of 1987, the Basel Convention in 1989, the Rio de Janeiro Declaration on Environment and Development and the United Nations Framework Convention on Climate Change in 1992, the well known Kyoto Protocol in 1997, the Rotterdam Convention in 1998, and the Copenhagen Accord in 2009. They are all active responses of human to the consumption of natural resources and environmental pollution. At the Copenhagen World Climate Convention the Chinese government promised that it would reduce the intensity of carbon emissions per unit of its GDP in 2020 by 40 to 45 percent compared with the 2005 levels and would incorporate the emission reduction target as a mandatory one into China's mid-and-long term plan for national economic and social development. This large-scale cut in the emission of carbon dioxide in such length of time requires both the government and enterprises make exceptionally great efforts. Therefore, enterprises will encounter more and more regulations of environmental protection and the green competition from international industries, as all nations in the world are becoming more rigorous in terms of environmental protection laws. In light of the concept of the sustainable development, the making of business decisions also needs to be based on sufficient and complete environment information (Berthelot, Cormier, and Magnan, 2003). In view of the international development trend, the environmental information disclosure laws and measures in developed countries are already maturing （Hasseldine, Salama, and Toms, 2005）,while research and implementations in these respects either in the academia or the industries in china have just started the exploration.

Keeping business sustainable development and environmental protection in mind, enterprises should publicize their environmental information, including the environmental impact arising from enterprise operational activities, environment lawsuits, related pollution compensation, investments in the environmental protection and improvement, the environmental protection policies, etc.. The government and public as interested parties are making increasingly stronger demands on enterprises for their release of environmental information and showing more and more concerns about it in evaluating the economic performance of the enterprises, hoping to make a comprehensive evaluation of enterprise economic performance and the environment performance, then to adopt the appropriate decisions. The release of environment information imposes pressure on enterprises to strengthen the internal environment management and energy-saving, and also plays an important role in helping the nation to establish the environmental protection policies, to reach the goal of emission-reduction, and build a society of low carbon economy. In September 2010, the State Environmental Protection Ministry of China came up with the Guide to the Disclosure of Environment Information In Listed Companies (the draft for discussion) to increase the transparency and operationality in the disclosure of enterprise environment information. The Guide requires that 16 heavy polluting industries, such as thermal power electricity industry, steel industry, cement industry, and the electrolysis aluminum industry, should release an annual environment information report about the emission of pollutants, abiding by environment laws, environment management, etc..

However, the question of how the disclosure of environment information influences the economic performance is the great concern of enterprises and the government, because it determines whether enterprises are willing to release more environment information and also whether this system can be implemented effectively. This is very topic of this paper.

2. Literature review and research hypothesis

Is there a correlation between the release of environment information and economic performance? If yes, then what kind of correlation? Generally speaking researchers pay less attention to the correlation between the disclosure of environment information and economic performance. Richardson and Welker

(2001) studied the relation between social responsibility disclosure and the cost of equity capital and found a significant positive correlation between the extent of social responsibility disclosure and the cost of equity capital, demonstrating that social responsibility disclosure brings more benefits to company parties interested. This research included many voluntary disclosure items, such as fair trade regulations, human resource policy, and community participation, in addition to its concentrated effort in the study of the disclosure of environment information. Deegan and Gordon (1996) pointed out that what enterprises voluntarily discloses is mostly good environment performance information and those enterprises more sensitive to environment will highlight their positive information. This type of behavior which reveals only positive information but conceals bad information may help increase stock price and owner's equity ratio. At present, the government is getting more and more strict in the laws regarding the disclosure of financial statements, hoping that the enterprise can fully release information s o that the general public can have more information to make the correct judgment. However, the extent of environment information disclosure is still enterprises' voluntary behavior, it is not stipulated clearly in laws. This paper follows Deegan and Gordon' (1996) viewpoint and thinks that in theory enterprises' disclosure of more positive environment information to the public should contribute to their economic performance. In other words, the extent of environment information disclosure is more likely to have a positive effect on the economic performance of the current year or a time lag effect on the economic performance of the following year. The extent of environment information disclosure in particular is one reference for the public to evaluate an enterprise, enables the competitors to obtain more information and helps the market to make more accurate assessment of enterprises.

To summarize, this paper puts forward the following hypotheses:

Hypothesis a：the extent of environment information disclosure has a positive impact on the economic performance of the current year.

Hypothesis b：the extent of environment information disclosure has a positive time lag effect on the economic performance of the following year.

3. Method

3.1. Variables

3.1.1. Economic performance

As economic value added（EVA）is more and more generally considered to be able to represent enterprise's market value, this paper uses it as one indicator of economic performance and chooses Tobin Q as another one. Tobin Q is the ratio between the market value and replacement value of the physical asset. The economic performance indicators can be derived from obtaining and the calculation of data from the annual financial reports and announcements of enterprises released by the public media.

3.1.2. Environment information release

In the measurement of the extent of environment information disclosure, this paper adopts two disclosure methods. The first method is to create the enterprise environment information disclosure rating chart based on the thirteen aspects of environment information which should be disclosed in the annual environment report according to the Guide to the Disclosure of Environment Information in Listed Companies (the draft for discussion) formulated by the Ministry of Environmental Protection. This environment information disclosure rating chart refers mainly to the annual reports and provisional reports released by the rated companies, and the conformity to one item gains one point (as is shown by table 1). Besides, this paper makes use of another method of measuring the extent of environment information disclosure from Patten (2002), that is to calculate the score according to the content mention rate of environment information disclosure (number of lines of environment information disclosure divided by the number of lines of overall disclosure information）included in the enterprise annual report

and provisional report in the testing year of the enterprise, this is the second method of measuring the extent of disclosure.

Table 1 Environment information disclosure rating chart of listed companies

Ser no.	Items	Score
1	Occurence of Important environment problems	
2	Environment impact evaluation and the implementation of "three meantimes" system	
3	Meeting Pollutant Emission Standards	
4	the disposal of general industrial solid waste and hazardous waste in accordance to law	
5	Completion of overall emission reduction tasks	
6	payment of pollutant discharge fees in accordance to law	
7	Implementation of hygienic production	
8	Establishment and operation of environment risk management system	
9	Environment protection concept of managers	
10	the organizational structure of environment management and environment protection target of listed companies	
11	environment management	
12	Environment performance	
13	Other environment information	
Total		

3.1.3. Control variable

In order to prevent other factors influencing the environment information disclosure, this research takes the size of enterprises as the control variable. The size of enterprises is measured through Patten's (2002) method, using the natural logarithm of enterprise operating income to reduce the differences among companies.

3.2. Research sample and data source

Because of the dominance of the manufacturing industries in creating environment pollution and the consideration of the availability of research material, this paper selects 445 listed companies of the manufacturing industries at Shanghai Stock Exchange in China as the research sample, 34 of food and drinking industry, 34 of the textile clothing and fur Goods Industry, 2 of the wood and furniture industry, 16 of the papermaking industry, 76 of the petroleum chemistry and plastic industry, 27 of electronics industry, 70 of metal and non-metal industry, 130 of the mechanical equipment and measuring appliance industry and 56 of medicine and biological production industry. The data are collected independently from among the environment information disclosure material of the 2008～2009 year annual reports, supplementary annual reports and the provisionary announcements of CSRC listed companies and the financial data of sample enterprises from the CCER database.

3.3. Empirical model

This research uses the multiple regression model to test the research hypotheses. With the enterprise size as the control variable，the extent of environment information disclosure as the explaining variable and the economic performance as the explained variable a regression model is established as follows:

（1）the extent of enterprise environment information disclosure in the current year will have a positive impact on economic performance.

$$Y_t = a_0 + a_1 X_i + a_2 X_t + \varepsilon_t \qquad \text{(Model a)}$$

（2）the extent of enterprise environment information disclosure in the current year will have a positive time lag effect on the economic performance of the following year.

$$Y_{t+1} = a_0 + a_1 X_{i+1} + a_2 X_{t+1} + \varepsilon_t \qquad\qquad\qquad\qquad (\text{Model b})$$

Note：Y_t：stands for the enterprise economic performance at t year, Y_{t+1}：stands for the enterprise economic performance at t+1 year, ε_t stands for the residual category；X_i：stands for the enterprise size, X_t stands for the score of the extent of enterprise environment information disclosure at t year; X_{t+1}：stands for the extent of enterprise environment information disclosure at t+1 year.

This research expects that in the empirical Model a and Model b the coefficient *a* should be positively significant, showing that the extent of environment information disclosure has a positive impact on economic performance.

4. Empirical results analysis

4.1. Variable descriptions and statistical analysis

4.1.1 .Economic performance

In Table 2, the average of Tobin Q is 0.71 in 2008 and 2.97 in 2009 while EVA is -64.06 in 2008and 36.13 in 2009. The t testing shows the EVA in 2008 is significantly bigger than that in 2009（t=4.134）, and there is significant difference in Tobin Q（t=3.182）.

Table 2 The descriptive statistical value of all variables

Variable	Smallest value	Largest value	Average	SD
Disclosure one（2008）	0	9	3.53	1.74
Disclosure one (009)	0	9	3.86	1.37
Disclosure two (2008)	0	12%	3.23%	4.35
Disclosure two（2009)	0	17%	3.69%	5.66
EVA（2008）	-130.42	50.39	-64.06	39.96
（2009）	-93.54	65.10	-36.13	34.57
Tobin Q（2008）	0.11	13.47	0.71	0.43
（2009）	0.23	44.96	2.97	0.38

Note: the unit of EVA is RMB 100,000,000

4.1.2. Environment information disclosure

The environment information disclosure method one reveals that the information enterprises mostly disclose are environment impact evaluation and the implementation of "three meantimes" system, the establishment and operation of environment risk management system, and the environment protection concept of managers. The environment information disclosure method two is dominated by the situation of environment management. Both of the methods demonstrate that managers are more devoted to the publicity of the policies and achievements of environment protection, but provide obviously less descriptions of detailed environment performance, such as the emission of pollutants and completion of overall emission reduction tasks, and future environment planning.

From Table 2 it can be seen that in the statistical data of 2008 the average score of disclosure method one is 3.53, the content mention rate of disclosure method two is 3.23%; in the statistical data of 2009 the average score of disclosure method one is 3.86, the content mention rate of disclosure method two is 3.69%，the t testing results show that there is no big difference in the extent of disclosure in these two years（t = 0.364；t =-0.297）.

5. Hypothesis testing

Table 3 presents the testing results of the impact of the extent of environment information disclosure on economic performance. When EVA is taken as the indicator of economic performance, the testing results proves that the extent of environment information disclosure does not produce a significant effect on EVA of economic performance either in 2008 or 2009. However, Table 4 reveals that with Tobin Q as the indicator of economic performance, the environment information disclosure of the second method has a significant positive effect on Tobin Q of economic performance （2008：$a_2 = 0.284$**；2009年：$a_2 = 0.209$*）. Therefore, Ha and Hb are only partly supported, meaning that the larger extent of environment information disclosure with the second method will produce a positive effect on Tobin Q of the current year and the following year.

Table 3 The testing of the impact of the extent of environment information disclosure on economic performance（EVA）

Items	Standardized coefficient（2008）		Standardized coefficient （2009）	
	Disclosure method one	Disclosure method two	Disclosure method one	Disclosure method two
X_i	-0.084	-0.103	-0.159	-0.239
$X_i$disclosure method one	-0.075		0.063	
$X_i$disclosure method two		0.117		0.236
R^2	0.073	0.096	0.058	0.082
Adj-R^2	0.035	0.056	0.011	0.013
F-value	1.966	2.704*	0.847	1.971

Note:
1. *means $p<0.1$，**means $p<0.05$，***means $p<0.01$。
2. X_i means the enterprise size at t year；X：means the extent of enterprise environment information disclosure at t year；
3. the result of collinear analysis：the values of VIF are all below 1.50 .

Table 4 Testing the impact of environment information disclosure on economic performance（Tobin Q）

Items	Standardized coefficient （2008）		Standardized coefficient （2009）	
	Disclosure Method one	Disclosure Method two	Disclosure Method one	Disclosure method wo
X_i	-0.199*	-0.367**	-0.158	-0.114**
$X_i$disclosure method one	0.008		0.069	
$X_i$disclosure Method two		0.389**		0.319*
R^2	0.145	0.198	0.027	0.059
Adj-R^2	0.094	0.134	0.022	0.042
F-value	2.597**	4.915***	0.898	3.518**

6. Conclusion and suggestions

This paper is aimed at studying the correlation between the economic performance and environment information disclosure of Chinese enterprises. As empirical results show, the environment information disclosure has a positive effect on the Tobin Q of economic performance.

Based on the research results, this paper suggests that the relevant government departments, the academia and enterprises should actively cooperate in pushing forward the making of environment management policies, which include the environment information disclosure system, the economic performance evaluation system or environment accounting system. The main purpose is to enable enterprises to provide the parties interested with as much environment information as possible, maximizing the utility of limited natural resources and meanwhile helping the parties interested to have a

full understanding of the nature of enterprise environment investment, publicizing the efforts and achievements enterprises make in terms of environment protection. This actually contributes to the enhancement of the reputation of enterprises, guides enterprises in the direction of voluntary reports, helps form a virtuous cycle of environment information and economic performance, and promotes the environment protection and the sustainable development of enterprises.

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