

Factors Influencing the Enthusiasm to Disclose Environment Accounting Information

—Econometric Analysis from SSE Data—

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Abstract

Protection of the environment is one of the key issues for sustainable development in China, and it must be implemented by individual companies. It is an important field of study for economists to describe and analyze the enthusiasm of individual companies to protect environment. We chose typical companies listed on the Shanghai Stock Exchange (SSE) to describe and analyze their enthusiasm for environmental protection using the Probit model, and came to the conclusion that three factors influence the disclosure of the environmental accounting information (EAI), i.e., whether the company accepting the restriction of ISO14001 standards, the rate of increase in the primary business and the proportion of national capital. This is the first research about the environmental accounting information disclosure (EAID) of Chinese companies by the method of econometrics, and it is therefore significant in terms of both theory and practice.

Keywords: *Environmental Accounting Information (EAI), Disclosure Preference, Probit model*

I. Introduction

Environmental accounting (EA) gradually emerged from accounting theory as society and economies developed. The UN environmental conference passed the Human Environment Declaration in 1972, appealing to environmental maintenance and improvements, which started the beginning of an era of sustainable development. However, sustainable development needs expensive cost, so companies and countries need new accounting theory to deal with accounting problems with sustainable development. Therefore, the appearance of environmental accounting, i.e., a new branch of accounting theory, provided important theoretical and practical support for the implementation of sustainable development. The first step and principal task in the implementation of environmental accounting was the establishment of the EAID system. Approximately 75% of companies in 13 countries provided EAI as stated in their annual reports, and 25% provided an independent EAI report according

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to a statistical disclosure report of EAI organized by Klynveld Peat Marwick Goerdeler (KPMG) in 1996. However, the establishment and development of EAID systems in China is far from completion.

Current research indicates that few Chinese public companies emphasize EAI Disclosure Preference. The so-called EAI Disclosure Preference is the utility gap of a company between to and not to disclosure its EAI. EAI will be disclosed so long as a disclosure preference is higher than a critical point and it will be undisclosed if this is lower. Explicit choices about disclosures are obviously determined by implicit EAI Disclosure Preference, and the choice could also reflect whether the company having enough EAID Preference. Only 97 out of 223 public companies stochastically selected from the Shanghai Stock Exchange (SSE) disclosed their EAI in their annals in 2004, which was much worse than the situation in developed countries in 1996. Public companies represent superior companies in China, so the situation shows that the Disclosure Preference of Chinese company is not enough and that the attitudes toward environmental protection are also poor. If we wish protect environment better and promote sustainable development, it is necessary to compel public companies to strengthen their enthusiasm to protect environment, which asks for clear comprehension on key factors that influence EAI Disclosure Preference significantly. This article reviews 10 restrictions as variables influencing EAID obtained through estimating and examining the Probit model and draws the conclusion that three factors influence EAID significantly: whether the company accepting the restriction of ISO14001 standards, increasing rates of primary operating profits, and the proportion of the national capital in the capital structures of the public company.

II. Summary of research

It has been approximately 20 years since the first study on EAID and there have been more than 10 years of detailed and persuasive studies on this potential topic. Studies on EAID, based on public companies could retrieve data inexpensively and therefore became main stream. Studies on public companies have been confronted by two basic problems: first, the influence of EAID on share prices is still to be verified, or the incentive system for capital markets to protect the environment. These studies include Shane and Spicer's (1983), Lanoie, Laplante, and Roy's (1998), and Dasgupta, Laplante, and Mamingi's (2001). Their basic conclusion is that all capital markets, whether in developing or developed countries, have incentive systems for environmental protection. Another aspect of research is what factors have determined incentives for public companies on EAID. This paper is therefore focused on this. However, our study is different to international achievements in terms of two Chinese characteristics: compliance with ISO14001, and the increasing profits of major management services. Cowen, Ferreri, and Parker (1987) initially studied factors influencing the disclosure of accounting information as a social duty and found profitability had remarkable as well as unremarkable impacts on EAID. Their studies were extensions based on the pioneering work

by Cowen. Patten(1992) found the strong relationship of EAID with company scales and industries, while he found EAID was independent with profitability. A further study by Bewley and Li (2001) supported Cowen's and Ferreri and Parker's conclusion. Baliga (1994) found that inter-relationships in the power of management produced a greater tendency for information to be disclosed. Stanny (1998) and Barth (1997) examined Baliga's conclusion and proved that SAB92 had successfully raised preference levels. Cormier and Magnan (1999) presented the main factor in EAID and considered the deprecatory impact of applying EAID transparently. Dowling and Pfeffer (1975) theoretically assessed that although all companies need rely on laws, some companies are affected more because they need greater political support. However, there are not empirical research to support his conclusion because of the difficulty to separate political effects from the data.

Meng (1999) investigated the annual reports of all public companies in SSE in 1994 and 1995 and various public companies in 1996, and found that no public company had made any kind of EAID in their annual reports. Investigations by Wang et al. (1998) found that 50% of corporations had disclosed environmental items. However, only 5% of questionnaires were returned in their survey. Most companies did not have EAID from their telephone investigations. Their investigations also revealed that the most important factors pressing public companies to compile and report their EAID are mostly those from the government, while pressure from the general public is quite low (less than 12% of investigated items). However, their effective return-ratio for questionnaires was only 5%, and the majority of enterprises surveyed through telephone inquiries did not practice environmental accounting. Their investigations also revealed that the most important factor encouraging enterprises to compile environmental reports and to disclose environmental information was pressure from the government. The main reasons for enterprises to compile environmental reports in an investigation by Li and Xiao (2002) were compulsory requirements by the government (70% of investigated items) and their own need to establish a good public image regarding environmental protection (55% of investigated items). This indicated that, as time goes by, enterprises will make and disclose their environmental reports both due to compulsory requirements by the government and voluntarily, with the latter increasing rapidly throughout China. Their research also demonstrated that companies disclosing their environmental information achieved better financial success than those not doing so. There is a positive correlation between the degree of disclosure regarding environmental information and annual profits. The investigations by Xiao and Mi (2004) demonstrated that the reasons enterprises disclose their fiscal information regarding environmental protection are: 70% of enterprises do so due to government supervisory and management departments, 48% do so to establish a good public image for protecting the environment and 41% do so due to pressure by the public or an environment-protection organization, but only 9% do so conscientiously. This is in accordance with the tendency described by Li and Xiao (2002). Geng and Jiao (2002) did research on various excessively polluting enterprises listed on SSE, and found that 30 of these did not publicize their fiscal information on environment protection in their published stock

offers in 1992 and 1995. They found all public companies publicized their fiscal information on environment protection in 1993, 1995, 1996, and 1999, and in 1997, five out of eight companies publicized their fiscal information on environment protection. Of these, only five companies publicized their expenses on environment protection in their published stock offers. Geng and Jiao believed that polluting enterprises must be asked to announce their EAI more openly. Li (2005) chose 55 companies out of 139 heavy-industry-manufacturing public companies from the Shenzhen and Shanghai stock exchanges listed before December 31, 2002 and statistically analyzed them, discovering that 18 of the 55 publicized their fiscal information on environment protection in their published stock offers, i.e., less than 33%, which is in conflict with the environmental-protection laws and the public rules of the Securities Supervisory Association. So it shows that heavy-industry-manufacturing enterprises have not enough enthusiasm to disclose their fiscal information on environmental protection when they are to be listed.

There is still much to do on research into environmental accounting in China, and quantitative analyses still remain to be done as a new area of study. The weak EAID preference of public companies shows a strong need to research the factors influencing EAID. The process for the system of EAID in China could be promoted through enforcing companies to meet the restrictions. This paper is just a beginning and uses the Probit model to study variables that affect EAID, leading to important achievements both in theory and in practice.

III. Foundation of Metrology Model

Up to now, Chinese statistical research about EAID has been based on companies disclosed EAID. This paper coupled companies both disclosed and hid EAID together to one econometric examination to look for influential factors. Because intrinsic and implicit information in disclosing Preference cannot be directly observed, the Probit or the Logit model has been used to provide indirect statistical analysis in explicit EAID. We used the Probit model and our analysis is divided into three steps:

- (1) Analyze all the influential factors in EAID Preference,
- (2) Adopt the Probit model to establish the function relation between variables and disclosure Preference, and
- (3) Estimate the parameters, carry out significance and goodness of fit tests on the Probit model with the Eviews3.1. statistical software, and make a forecast.

Using y^* to calculate EAID Preference, and y to calculate EAID results, we can establish the EAID variable model:

$$y^* = F(\vec{x} \cdot \vec{\beta} + u_i) \quad \text{and} \quad (3.1)$$

$$y = \begin{cases} 0, y^* < 0 \\ 1, y^* > 0 \end{cases} \quad (3.2)$$

Here, y^* are noticeable data, called potential variables, \vec{x} is the vector that influences EAID factors, and $\vec{x} \cdot \vec{\beta}$ is the product of two vectors. Also, y is a variable that can be observed, if y discloses EAI, $y=1$, otherwise, $y=0$, u_i is a random disturbing parameter, and $F(\vec{x} \cdot \vec{\beta})$ in the Probit model is the standard normal distributable cumulate probability density function. From this model, we know the expectation of y^* is $y=1$, viz.,

$$\begin{aligned} E(y^* | \vec{x}, \vec{\beta}) &= 1 \times P(y = 1 | \vec{x}, \vec{\beta}) + 0 \times P(y = 0 | \vec{x}, \vec{\beta}) \\ &= P(y = 1 | \vec{x}, \vec{\beta}) \end{aligned} \quad (3.3)$$

The probability of $y=1$ is the probability of $y^* > 0$, therefore

$$P(y = 1 | \vec{x}, \vec{\beta}) = P(y^* > 0) = P(\vec{x} \cdot \vec{\beta} + u_i > 0) \quad (3.4)$$

Known from (3.1) is

$$F^{-1}(P) = \vec{x} \cdot \vec{\beta} \quad (3.5)$$

We can thus estimate the parameters in (3.5) and verify the relative factors using econometrics software.

$$F^{-1}(P) = \vec{x} \cdot \vec{\beta} + u \quad (3.6)$$

The probability of EAI being disclosed according to this model is determined by individual factors that influence EAID Preference. We can analyze the extent of these various influencing factors and provide related policy support to urge companies to disclose their EAI. As this model can also simultaneously yield the extent of the margin effect for all influencing factors, if given a series of variable X, we can make a forecast and evaluate the choice of EAI policy.

IV. The Analysis of Influential Factors

This section analyses factors having a great influence on EAID. We defined 11 factors influencing comprehensive analysis as listed in Table 1.

One reason we chose these is the rather high cost of authenticating an ISO14001 environmental-management system would necessarily greatly influence companies to disclose their EAI. A public company with more power, reflected by its total capital stock, is more likely and enthusiastic to disclose its EAI. The enterprise assets liabilities ratio represents an

enterprise's strength from another perspective. "The increase in surplus to the previous year", "the profit increase ratio for the primary business", and "the confidence index of corporate strategy development" all represent a corporation's potential, and potentially stronger companies are expected to be more enthusiastic on EAID. China has two kinds of stocks, A for domestic investors and B for overseas investors. Overseas investors are probably more conscious of environmental protection. "The portion of the state share in public companies",

Table 1: Individual Factors Influencing EAID Preference

	Variables	Forecast Signs	Definitions
Attributive Variables	y		When $y=1$, this means disclosed EAI. When $y=0$, this means undisclosed EAI. Here, P means the probability EAI will be disclosed.
	x_1	+	Whether public companies obtain an ISO14001 environment management system or not: If yes, $x_1 = 1$, else $x_1 = 0$.
Independent Variables	x_2	+	Public companies' overall capital reflects their management size.
	x_3	-	Assets Liabilities Ratio
	x_4	+	Return on Net Worth (Return on Equity)
	x_5	+	Whether surplus has increased based on the previous year: if yes, $x_5 = 1$, else $x_5 = 0$.
	x_6	+	The ratio of increasing profit for the primary business
	x_7	+	The confidence index for corporate strategy development
	x_8	+	The kinds of public companies publishing stocks; if only stock A, $x_8 = 1$; otherwise, $x_8 = 0$.
	x_9	+	The portion of state share in public companies
	x_{10}	+	The portion of state-owned corporate share in public companies
	x_{11}	+	The portion of state-owned share in public companies: $x_{11} = x_9 + x_{10}$

and “the portion of the state-owned corporate share in public companies”, and their combination represent the direct influence of government in enterprises. With much more emphasis on environmental protection by the government, they are expected to have beneficial effects on EAID. However, most public companies only have one form of state-owned stock; if we consider two forms of state-owned shares separately concerning their separate influence on EAID Preference, we may draw the wrong conclusion. We therefore further integrated state-owned stocks into the analysis category, first examining whether the two forms of state-owned stocks had a separate clear influence on EAID Preference. If the answer was negative, then the total influence on EAID Preference was estimated and examined. The data were extracted from the year 2004 before non-tradable shares were re-structured because the problem with the flow of state-owned shares was solved in May, 2005.

V. Results of analysis

We used the Eviews3.1 statistical software and the data were extracted from annual reports by 223 public companies on SSE. All the statistical characteristics of the control variables are listed in Table 2.

Table 2 Statistical Characteristics of Control Variables

	y	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Mean	0.43	0.08	9.30	2.71	5.90	0.47	20.84	2.18	0.06	26.94	10.00	36.94
Median	0.00	0.00	9.24	2.19	6.85	0.00	17.54	1.95	0.00	17.59	0.00	44.48
Maximum	1.00	1.00	11.66	28.38	38.6	1.00	441.45	21.44	1.00	85.00	82.05	85.00
Minimum	0.00	0.00	8.49	0.84	-148.99	0.00	-236.98	-13.31	0.00	0.00	0.00	0.00
Std. Dev.	0.50	0.27	0.45	2.33	19.13	0.50	51.12	1.94	0.24	28.69	22.39	28.07
Skew	0.26	3.06	1.25	6.95	-5.093	0.17	1.95	2.19	3.59	0.37	1.97	-0.20
Kurtosis	1.07	10.37	6.15	70.3	36.38	1.02	25.65	63.45	13.85	1.47	5.18	1.48

We first estimate the function, and determine the significance of various variables according to SPSS13. We then reject variables with insignificant influence, re-estimate, determine the linearity of the model, and remove variables with notable linearity. The estimated results are obtained as follows:

First, calculate all the commands (including variable x_{11} composed of x_9 , x_{10}) and the correlations in Table 3:

Table 3 Correlation Matrix for All Commands and Explanation Variables

	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y	.153(*)	.182(**)	-.060	.130	.159(*)	.183(**)	.109	.146(*)	.082	.077	.144(*)
Sig. (2-tailed)	.022	.006	.375	.052	.018	.006	.105	.029	.221	.257	.031

* Correlation is significant at 0.05 level (2-tailed).

** Correlation is significant at 0.01 level (2-tailed).

Since the degree of relevance for $x_3, x_4, x_7, x_9, x_{10}$ and variable y is very low, and they are insignificant under 5%, they should be eliminated. Also, x_1, x_2, x_5, x_6, x_8 and x_{11} are retained and calculated for correlation; the results are listed in Table 4.

Table 4 Correlation Matrix for All Commands

		x_1	x_2	x_5	x_6	x_8	x_{11}
x_1	Pearson Correlation	1.000	0.179(**)	0.133(*)	-0.012	-0.013	0.009
	Sig. (2-tailed)		0.007	0.047	0.854	0.850	0.889
x_2	Pearson Correlation	0.179(**)	1.000	0.117	0.229(**)	0.433(**)	0.191(**)
	Sig. (2-tailed)	0.007		0.080	0.001	0.000	0.004
x_5	Pearson Correlation	0.133(*)	0.117	1.000	0.399(**)	0.017	0.102
	Sig. (2-tailed)	0.047	0.080		0.000	0.796	0.128
x_6	Pearson Correlation	-0.012	0.229(**)	0.399(**)	1.000	-0.018	0.059
	Sig. (2-tailed)	0.854	0.001	0.000		0.786	0.380
x_8	Pearson Correlation	-0.013	0.433(**)	0.017	-0.018	1.000	0.086
	Sig. (2-tailed)	0.850	0.000	0.796	0.786		0.199
x_{11}	Pearson Correlation	0.009	0.191(**)	0.102	0.059	0.086	1.000
	Sig. (2-tailed)	0.889	0.004	0.128	0.380	0.199	

* Correlation is significant at 0.05 level (2-tailed).

** Correlation is significant at 0.01 level (2-tailed).

Since the degree of relevance for x_2 with x_1, x_6, x_8 and x_{11} is very high, and they are very significant under 5%, they should be eliminated. Then, x_5 should be preferentially eliminated for its correlation with x_1 and x_6 . Therefore, the remaining commands are x_1, x_6, x_8 and x_{11} .

We estimated the model with Eview3.1 with the commands for non-linearity and the results are listed in Table 5.

Table 5 Estimates According to Four Commands

Variables	Coefficients	Std. Errors	z-Statistics	Prob.
x_1	0.753466	0.319234	2.360229	0.0183
x_6	0.005820	0.002165	2.687777	0.0072
x_8	0.781216	0.370335	2.109484	0.0349
x_{11}	0.006026	0.003140	1.919105	0.0550
C	-0.623906	0.158331	-3.940514	0.0001

When the confidence interval is 5%, the x_1, x_6 composition has a significant influence on y . The estimate is the same as ours. Although x_{11} does not pass the significance test of 5%, it does have a strong influence on y at a level of 5.5%. The estimate is satisfactory on the whole.

Because we have eliminated x_2, x_3, x_4, x_5 and x_7 due to the possibility of multi-linearity here, we need to further test the rationale for eliminating x_2, x_3, x_4, x_5 and x_7 with the Wald test. The method is: (1) do a Probit estimate of equations containing $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$ and x_{11} and (2) do a Wald test of $C(2)=0, C(3)=0, C(4)=0, C(5)=0, C(7)=0$ on the equations estimated. The results are listed in Table 6.

Table 6 Wald test of C(2)=0, C(3)=0, C(4)=0, C(5)=0, C(7)=0

Null Hypothesis: C(2)=0, C(3)=0, C(4)=0, C(5)=0, C(7)=0			
F-statistic	0.431411	Probability	0.826411
Chi-square	2.157056	Probability	0.827014

As we obviously cannot reject the supposition resulting from the hypothesis that the coefficient of $x_2, x_3, x_4, x_5, x_7, x_8$ is 0, it is reasonable to delete them from the model.

According to Table 4, we can affirm that the result estimated with function (3.5) is

$$F^{-1}(P) = -0.624 + 0.753x_1 + 0.006x_6 + 0.781x_8 + 0.006x_{11}$$

and therefore the equation establishing the probability of EAID is

$$\hat{y}^* = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{-0.624+0.753x_1+0.006x_6+0.781x_8+0.006x_{11}} \exp(-t^2/2) dt \quad (3.6)$$

The effect of model goodness fitting is an important aspect of the econometric model. However, it is not suitable to evaluate the Probit model' goodness of fit by using R^2 . We therefore chose the Hosmer-Lemeshow (H-L) statistic to test the goodness of fit of the model. The H-L-statistic's goodness of fit is based on the probability of model forecasting, evenly dividing every observed object into ten parts, and then calculating both the actual and the theoretical values for all attributive variables. The H-L-statistic's statistic is

$$Q_p = \sum_{h=1}^s \sum_{j=1}^2 \frac{(A_{h_j} - T_{h_j})^2}{T_{h_j}}, \text{ where } j=1,2, \text{ h expresses the independent variables from 1 to s, A}$$

expresses the actual value, and T expresses the theoretical value, where, $Q_p : \chi^2 (n - 2)$, n is an ordinal number. The evaluated results are listed in Table 7.

Table 7 Goodness of Fit Test

H-L Statistics:	8.9617	Prob. Chi-Sq(8):	0.3455
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As this table indicates that the probability of significance is 0.3455, i.e., much larger than 0.05, its goodness of fit is excellent.

Finally, we tested the estimation model's ability to forecast, as shown in Table 8.

Table 8 Estimated Equation

	Estimated Equations		
	Dep=0	Dep=1	Total
P(Dep=1)≤C	104	54	158
P(Dep=1)>C	22	43	65
Total	126	97	223
Correct	104	43	147
% Correct	82.54	44.33	65.92
% Incorrect	17.46	55.67	34.08
Total Gain*	-17.46	44.33	9.42
Percent Gain**	NA	44.33	21.65

Whether the forecasting result is correct or not depends on two variables, (1) when Dep=0 and P(Dep=1)≤C, and (2) when Dep=1 and P(Dep=1)>C. In our forecast, the resulting quantity was 104 when Dep=0 and P(Dep=1)≤C, and the quantity was 40 when Dep=1 and P(Dep=1)>C. When the total sum of the two variables was divided by the quantity of the total sample, the total forecasting accuracy was 65.92%, which is satisfying.

VI. Conclusion and Suggestions

The examination discussed in this article differs greatly from the present studies on EAID factors both in China and internationally. First, total capital stock, an index representing the scale of an enterprise, has little significant influence on EAID Preference, which contradicts the conclusion by Cowen (1987) being supported in developed countries. There are probably two reasons for this phenomenon. The strength of a corporation, on the one hand, will not inevitably convert into enthusiasm for environmental protection. This is even if large companies in developed countries take regular action to protect the environment if they have certain environmental-protection needs. Under these circumstances, it still takes time for a transition from sole emphasis on increased GDP to sustainable development with simultaneous emphasis on increased GDP. Representative public companies, on the other hand, are commonly large scale, which are usually included as an index implied in the features of sampling and these hardly affect the variables. However, the validity of the second conclusion is still being evaluated in reference to data from additional non-public companies.

The second conclusion worth mentioning is that the authorization of ISO14001 environmental-management systems has a strong influence on EAID Preference. There have been few international studies particularly on ISO14001 environmental-management systems, because authorization has been part of the social duty of public companies and their legal obligations, which could not be effectively removed from the general sampling. Our special

legal and systematical environment obviously provides enormous amounts of data enabling ISO14001 environmental-management systems to be analyzed and this research can make contributions worldwide. In economics, the authorization of ISO14001 environmental-management systems has a strong influence on EAID Preference of public companies because first, ISO14001 has clear criteria and asks for maintaining these standards. Second, getting the authorization of ISO14001 system needs companies large amounts of work and expenditure. The companies will face enormous sunk cost if they do not use the qualification well. At last, many companies comply with ISO14001 to avoid environmental barriers to export and EAID at the appropriate time is more advantageous for them.

The third notable conclusion we found through econometric analysis is that the government has a dramatic impact on disclosure preference by public companies, which at least, being the first in China and probably internationally, substantiates the conclusion drawn by Dowling and Pfeffer on the basis of their data. The Chinese government needs to increase its efforts to change non-sustainable development to address increasingly severe problems with environmental protection. However, the government can only interfere in economic fields in a limited way as China has largely become a market economy. In this case, the government surely influenced the EAID preference of public companies through the share controlled directly by it. In addition, the proportion of state-owned share in the capital structure of public company determines the strength of the influence. We conclude that the Chinese government is indeed promoting the implementation of environmental protection through the direct impact of state-owned shares in public companies. However, in restructuring non-tradable shares the ratio of state-owned shares in public companies keeps decreasing, suggesting the lessening impact of government on preference disclosures. Urgent tasks are to strengthen the awareness of environmental protection through establishing a more effective management system to coincide with a reduction in state-held stocks and avoiding increases in pollution.

The fourth important conclusion is the remarkable influence of the primary business of companies, an index of profitability, on their disclosure Preference, which differs from overseas studies on developed countries indicating more emphasis on environmental protection. In recent years the high-increasing enterprises in China belongs to different industries from developed countries, which are Hi-tech companies and heavy-industries companies with more pollution. The conclusion shows that the latter also have an strong enthusiasm in environmental protection, which is very invigorative.

In the values of x_8 , we assumed $x_8=0$ if companies first issued A shares, while $x_8=1$ when B shares followed or were solely issued. Therefore, that the estimated coefficient of x_8 is positive proves stronger EAID for companies with B shares. The fifth conclusion with Chinese characteristics is the expected remarkable predilection by overseas investors for stocks with disclosure Preference and this implies the indirect impact of mass needs for environmental protection by domestic companies but what is more, a still insufficient awareness of

environmental protection by domestic companies. The combination and all-round openings of B and A shares is expected to be an inevitable trend in the near future, which, according to this article, will contribute to the promotion of environmental protection.

All in all, this study is vastly different from those done by developed countries in that it found two influential factors that used to be neglected by international academia and it came to important conclusions in this area based on tested data. The simple implementation of internationally popular theories would probably lead to severe problems with incompatibility and strategies should therefore be founded on a practical basis through particular analyses of theories and data by domestic economic researchers.

Our four suggestions for policies are straightforward: first, large corporations should always be supervised in the process of promotion for they unnecessarily emphasize environmental protection. Secondly, it is necessary to emphasize environmental responsibilities of companies by legal means. legislation should mandate compulsory compliance with ISO14001 environmental systems to public companies and companies on a certain scale, and those not complying should be punished. Third, the government should accelerate the establishment of environmental-management systems, otherwise enthusiasm may soon disappear due to the withdrawal of government from companies. Fourth, the government should manage to provide a better environment for development since more profitable companies are paying greater attention to environmental protection in China.

References

- Baliga,W.**, 1994. Many Companies Fail to Disclose Environmental Liabilities. *Journal of Accountancy*, 178 (1), 12-14.
- Barth,M.E., McNichols, M.F. and Wilson, G.P.**, 1997. Factors Influencing Firms' Disclosures about Environmental Liabilities. *Review of Accounting Studies*, 2, 35-65.
- Bewley,K. and Li,Y.**, 2001. Disclosure of Environmental Information by Canadian Manufacturing Companies : A Voluntary Disclosure Perspective . *Advances in Environmental Accounting & Management*, 201-226.
- Cormier, D. and Magnan, M.**, 1999. Corporate Environmental Disclosure Strategies: Determinants, Costs and Benefits. *Journal of Accounting, Auditing and Finance*. 14 (4), 429-451.
- Cowen, S., Ferreri, L. and Parker, L.**, 1987. The Impact of Corporate Characteristics on Social Responsibility Disclosure:A Typology and Frequency-Based Analysis. *Accounting, Organizations and Society*, 12(2), 111-122.
- Damodar, N. G.**, 2000. Basic econometrics, China People's University Press, 557-560. Published in Chinese in China.
- Dasgupta, S., Laplante, B. and Mamingi, N.**, 2001. Pollution and Capital Markets in Developing Countries, *Journal of Environmental Economics and Management*, 42(3),

310-335.

- Dowling, J. and Pfeffer, J.**, 1975. Organizational Legitimacy: social values and organizational behavior. *Pacific Sociological Review*, 18(1), 122-36.
- Geng, J. and Jiao, R.**, 2002. The Primary Research of Public Companies Environmental Accounting Information Disclosure, *Accounting Research*, Published in Chinese in China.
- Lanoie, P., Laplante, B. and Roy, M.**, 1998. ANALYSIS : Can Capital Markets Create Incentives for Pollution Control? , *Ecological Economics*, 26(1), 31-41.
- Li, H.**, 2005, Environmental Accounting Information Disclosure: *the Positive Analysis to Public Companies of Heavy Machinery Manufacturing in China*, Qilu Zhutan, Published in Chinese in China.
- Li, J. and Xiao, H.**, 2002. China's business environment report: the Status, *Demand and Future*, *Accounting Research*, Published in Chinese in China.
- Meng, F.**, 1999. The Review of Environmental Accounting Information Disclosure and Correlative Theoretical Problems, *Accounting Research*, Published in Chinese in China.
- Patten, D.M.**, 1992. Intra-Industry Environmental Disclosure in Response to the Alaskan Oil Spill: A Note on Legitimacy Theory. *Accounting, Organizations and Society*, 17(5), 471-475.
- Shane, P.H. and B.H.**, 1983. Spicer, Market Response to Environmental Information outside the Firm, *The Accounting Review*, LVIII(3), 521-538.
- Stanny, E.**, 1998. Effect of Regulation on Changes in Disclosure of Reserved Amounts for Environmental Liability, *Journal of Financial Statement Analysis* (summer), 34-49.
- Wang, L., Yin, C. and Li, W.**, 1998. Investigation and Analysis of Industrial Environmental Accounting in China, *Accounting Research*, Published in Chinese in China.
- Xiao, S. and Mi, H.**, 2004. Analysis on the Survey of Enterprises' Environmental Protection and Accounting--Views on the Necessity and Feasibility of Establishing Environmental Accounting in China, *Forestry Economy*, Published in Chinese in China.
- Zhou, J. and Wang, J.**, 2005. The Environmental Disclosure of Listed Companies from Heavy Pollution Industry in US, *Ecological Economy*, Published in Chinese in China.

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