Examination of the Influence of Energy Corporations' Financial Results on the Revelation of Environmental Data

Quanyu Chen

Corresponding author's e-mail: 2859820961@qq.com

Shandong Agricultural University, Taian, Shandong, 271000, China

Abstract. Energy company information disclosure is particularly important for economic transformation. This article used listed companies in China's energy industry from 2012 to 2022 as a sample to analyze the impact of financial performance on corporate environmental information disclosure. Through linear regression analysis, it is found that there is a positive correlation between return on equity, company asset size and the degree of environmental information disclosure. A strong financial performance can enhance the disclosure of environmental information.

Keywords: Energy Enterprise; Environmental Disclosure; Financial Performance

1. Theoretical analysis and research hypothesis

With the optimization and upgrading of China's economy, the energy industry, as an important pillar of economic development, has long been widely concerned by the society. However, due to the increasing depletion of traditional energy resources and the emergence of environmental protection issues, the development of China's energy industry is facing huge challenges. With the increasing attention paid to environmental protection issues, environmental information disclosure has become an important window for all sectors of society to supervise the environmental performance of energy enterprises.[1]

As a bridge of environmental supervision, the importance of environmental information disclosure is self-evident. However, what factors will affect the quality of environmental information disclosure of enterprises? Due to the high cost of environmental information disclosure,[2]this paper speculates that if the level of financial performance is high, the enterprise will have more ability and willingness to disclose environmental information, that is, better financial performance has a positive effect on improving the disclosure of environmental information. On the contrary, if the level of financial performance is low, in order to reduce costs, There is a possibility of decreasing the divulgence of environmental data, so as to maximize the interests of the enterprise.

In summary,This paper puts forward the hypothesis that the financial performance of Chinese energy companies positively influences the standard of environmental information disclosure. The better the financial performance is, the higher the quality of environmental information disclosure is, and vice versa.

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2. Sample selection and research design

2.1 Research Object and Sample Data

This paper takes listed companies in China's energy industry from 2012 to 2022 as the research sample, and the industry classification is based on the Industry Classification Guide for Listed Companies issued by China Securities Regulatory Commission in 2012. With reference to the research of Pan C, the specific industry selection includes: coal mining and washing industry; oil and gas mining industry; petroleum processing, coking and nuclear fuel processing industry; electrical machinery and equipment manufacturing industry; electricity, heat production and supply industry; gas production and supply industry.[3]To minimize research inaccuracies, this study eliminates data from companies of the ST category and those with substantial missing indicators. After the above screening, a total of 295 groups of data observations from 184 sample companies are obtained. The data was downloaded from CSMAR database, and SPSS is adopted for data analysis.

2.2 Definition of research variables

①Independent variable: This paper uses the environmental transparency measure (ADDC) as the dependent variable, and the measurement method is detailed in Table 1.

Table 1: Environmental Information Disclosure Items and Scoring Rules

Serial number	Category of Disclosure	Score	ADDC
a	Annual Report of Listed Company	disclosure=1 Otherwise=0	(a+b+c)/max(a+b+c)
b	Social Responsibility Report	disclosure=2 Otherwise=0	
c	Environmental Report	disclosure=2 Otherwise=0	

②Explanatory variables:To test the hypothesis, this study makes use of return on equity (ROE) and company size (SIZE) as indicators of financial performance.ROE represents the relative value of financial performance, while SIZE represents the absolute value of financial performance.

③Control variables: Referring to the methods of predecessors,[4][5][6] this paper selects environmental protection investment (INV), working capital (WC), age of the enterprise (AGE), nature of the controlling shareholder (NOCE), sustainable growth rate (SGR), turnover of shareholders' equity (TOSE) as control variables, and control the individual variable (INDIV) and time variable (YEAR) in the model regression process.

④All variables and definitions are shown in the following table 2.

Table 2: Variables and definitions

Variable Name	Variable Code	Methods of Calculation or Representation
Environmental disclosure index	ADDC	∑ Score of Environmental Information Disclosure Item /∑ Best Score of Environmental Information Disclosure Item

Return on equity	ROE	Net profit / Owner's equity
Scale of the enterprise	SIZE	LN (Total Assets)
Environmental protection investment	INV	Environmental protection investment amount/total assets
Working capital	WC	LN [working capital + ROUND(MIN|working capital|)]
Age of the enterprise	AGE	Observation year - IPO year
Nature of controlling shareholder	NOCE	0: Non-state-owned enterprise, 1: State-owned enterprise
Sustainable growth rate	SGR	Return on net assets * Retained earnings/(1- Return on net assets * Retained earnings)
Turnover ratio of shareholders' equity	TOSE	Operating revenue/ending balance of shareholders' equity

3. Empirical Analysis

3.1 Descriptive Statistical Analysis

The descriptive statistical results are shown in Table 3. The standard deviations of ROE and SIZE are 1.012 and 1.614 respectively, indicating that the financial performance levels of enterprises in the sample are quite different. The minimum value of ADDC is 0.2, the maximum value is 1, and the standard deviation is 0.209, indicating that the degree of environmental information disclosure of different enterprises is dispersed.

Table 3: Descriptive statistics

variable	Sample	mean value	standard deviation	minimum value	maximum value
ADDC	295	0.477	0.209	0.200	1.000
ROE	295	0.117	1.012	-2.790	16.889
SIZE	295	14.318	1.614	9.988	19.338
INV	295	74.498	1177.532	0.000	9223.372
WC	295	26.229	0.228	22.496	26.627
AGE	295	13.020	8.391	0.000	30.000
NOCE	295	0.140	0.343	0.000	1.000
SGR	295	0.036	0.259	-3.758	0.453
TOSE	295	1.670	2.073	0.000	19.512

3.2 Correlation Analysis

The findings of the correlation analysis are displayed in Table 4.It is evident from the table that none of the correlation coefficients among variables greatly surpassed 0.5.

Table 4: Pearson correlation

	ADDC	ROE	SIZE	INV	WC	AGE	NOCE	SGR	TOSE	YEAR	INDIV
ADDC	1										
ROE	0.026	1									
SIZE	.413**	-.139*	1								
INV	-0.084	0.008	-0.038	1							
WC	0.093	0.01	-.212**	0.006	1						
AGE	.182**	0.019	.381**	-0.084	-0.036	1					
NOCE	0.024	-0.019	.116*	-0.025	0.003	.123*	1				
SGR	-0.056	-.141*	0.08	0.072	0.018	-0.105	0.023	1			
TOSE	-0.068	.415**	-0.051	0.002	-0.09	.178**	-0.048	-.190**	1		
YEAR	-.145*	-0.032	-0.058	-0.038	.125*	-0.028	-0.052	.153**	-0.025	1	
INDIV	-.242**	0.026	-.318**	0.061	0.068	-.503**	-0.103	0.058	-0.021	.392**	1

[a]** The correlation is statistically significant at the 0.01 significance level, in a two-tailed test.
[b]* The correlation is statistically significant at the 0.05 significance level, in a two-tailed test.
[b] * at the 0.05 level (two-tailed), the correlation is significant.

3.3 Analysis of regression linear model

In this paper, the fixed effect model is adopted for regression analysis. The p-p graph of the normalized residuals means that the residuals follow the normal distribution, This suggests that the regression model demonstrates a strong fit and reliability, making it suitable for additional regression analysis. As shown in Figure 1.

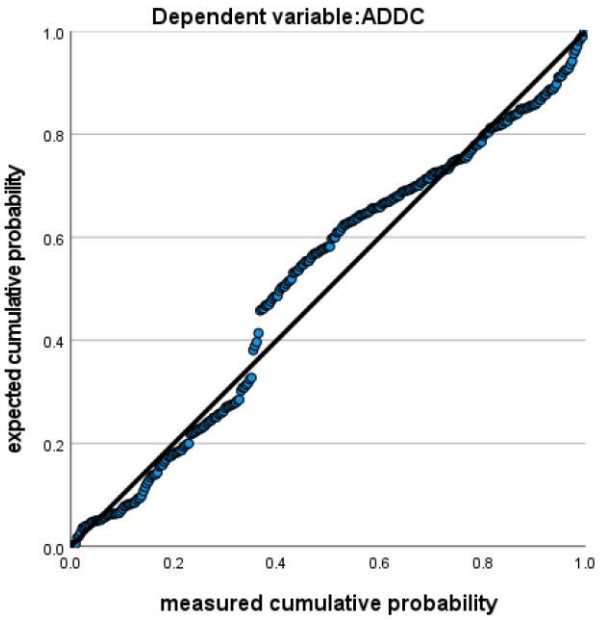

Figure 1: Normal P-P plot of regression normalized residuals

In addition, this paper also conducts VIF tests on the multiple collinearity between variables. As can be seen from Table 5, the VIF is all less than 10, so there is no serious collinearity problem between independent variables.

By testing the relationship between ROE, SIZE and ADDC, the results show that the significance of ROE and SIZE is less than 0.05, and the regression coefficient is positive, indicating that ROE and SIZE have a significant positive correlation with ADDC, so the hypothesis is verified.

Table 5: Regression Linear Model

Model	standardized coefficient Beta	t	significance	collinearity statistics tolerance	VIF
(constant)		1.208	0.228		
ROE	0.112	1.973	0.0495	0.809	1.236
SIZE	0.451	7.661	<0.001	0.76	1.316
INV	-0.065	-1.255	0.211	0.983	1.017
WC	0.199	3.744	0.000219	0.926	1.08
AGE	-0.021	-0.317	0.752	0.616	1.624
NOCE	-0.042	-0.81	0.418	0.972	1.029
SGR	-0.073	-1.355	0.177	0.913	1.095
TOSE	-0.09	-1.538	0.125	0.767	1.304
YEAR	-0.105	-1.795	0.074	0.771	1.297
INDIV	-0.083	-1.232	0.219	0.585	1.71

4. Conclusion

This paper selects 184 listed companies in the energy industry from 2012 to 2022 as the research object, and explores the impact of financial performance on environmental information disclosure. The results show that the higher the level of financial performance, the greater the environmental information disclosure index. With the increase of enterprise size and return on net assets, the willingness of enterprises to assume social responsibility increases.

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