

# Research on Environmental Accounting and Corporate Financial Performance in Low-carbon Economy

Yue Dai, Lunzhi Gan

Sichuan University of Science and Technology, Sichuan, China

**Abstract:** In recent years, China's economy has developed rapidly, and under such a rapid development trend, various environmental problems have also emerged. The government and other experts and scholars are paying more and more attention to the application of environmental accounting in enterprises. This has led to a new economic development model, the low-carbon economy. This paper mainly starts from the meaning and related characteristics of low-carbon economy, and aims to study how enterprises should rationally use resources and integrate various accounting methods to further achieve low-carbon in the low-carbon economic environment. By comparing the development of environmental accounting in other countries, it is also proposed that the implementation methods of environmental accounting in China are not fully mature at this stage. Moreover, enterprises in China generally have the problem of incomplete disclosure of accounting information, so this paper puts forward insights on how enterprises should better disclose accounting information.

**Keywords:** Low-carbon economy, Environmental accounting, Accounting information disclosure.

## 1. Introduction

In recent years, due to the pursuit of higher quality development, the problem of environmental pollution has become increasingly serious. Low-carbon economy and environmental accounting have become the focus of national and social attention. Although China has now implemented environmental accounting governance methods, compared with the severity of environmental pollution in other countries and its own countries, its implementable conditions are obviously insufficient. In the macro context of China's sustainable development, enterprises have the responsibility and obligation to do a good job in relevant low-carbon measures, reduce their pollution emissions, implement better environmental accounting methods, and make their own modest contribution to the macro development of the country. Therefore, this paper will use empirical analysis methods to explore the relationship between environmental accounting information disclosure and rational allocation of corporate resources, and put forward relevant suggestions to jointly build a green and energy-saving society.

### 1.1. Discussion on the development of environmental accounting at home and abroad Environmental accounting and development in China

Environmental accounting is a new research topic in the field of accounting, also known as green accounting, it is based on currency as the main unit of measurement, according to relevant laws, regulations and regulations, record the measurement of environmental pollution, environmental protection, environmental development and other issues. Combine traditional accounting with environmental economics to achieve the dual goals of coordinating economic development and protecting the environment. Nothing develops in isolation, and environmental accounting is even more so. Compared with other countries, the development of environmental accounting in China is relatively backward. It is roughly divided into the following two stages: first, the

initial embryonic formation from the late 70s to the late 80s of the 20th century, and the second is the development stage from the late 90s of the 20th century to the present. Although China's environmental accounting has foreign experience to learn from, due to various reasons such as national conditions, economy and society, the development and application in China is not quite mature. Globally, Japan's achievements in environmental accounting are obvious to all, although it started late in Japan, but due to the small land area of Japan and the relative lack of resources, it attaches more importance to environmental accounting than China, so it has achieved considerable results. In Japan, the Basic Law on the Environment was established in 1993 and is still in use today. Meanwhile, in July 2008, Japan's Ministry of the Environment conducted a comprehensive survey of 6,484 companies in Osaka, Tokyo, and Nagoya on their environmental behavior in 2007, and the results showed that 57.2% of companies had introduced environmental accounting. As of 2010, more than 1,300 listed companies and large unlisted companies have issued environmental reports, ranking first in the world. Although China formulated the "China Agenda 21-China's White Paper on Population, Resources and Development in the 21st Century" in 1994, there are only 7 environmental protection laws in China so far, and the popularization of environmental accounting and the awareness of environmental accounting by public enterprises are not enough.

### 1.2. The rise of a low-carbon economy

In the modern society where environmental pollution in the world of global warming is becoming more and more serious, the status of low-carbon economy has emerged. In short, a low-carbon economy is an economic development system that reduces greenhouse gas emissions such as carbon dioxide and makes buildings low energy consumption and pollution. The low-carbon economy also coincides with the sustainable development proposed by China. The term low-carbon economy was first coined by the United Kingdom in 2003, and its government document "The Future of Our Energy: Creating a Low-Carbon Economy" recognized for the first

time that it is necessary to develop a low-carbon economy in harmony with the ecology and people. In 2020, China also issued the "Blue Book of China's Low-carbon Economic Development Report (2020-2021)", which pointed out that China's move is a macro strategy for low-carbon transformation. The way to achieve emission reduction is not simply to reduce greenhouse gas emissions, but also to change the investment portfolio, adjust the organizational structure, increase investment in renewable resources, strengthen the construction of the low-carbon chemical industry, and so on.

### **1.3. The relationship between low-carbon economy and environmental accounting**

The two are both interrelated and distinct from each other, and have an inseparable relationship. First of all, from a theoretical point of view, the development concept of low-carbon economy has laid a lot of foundation for the development of environmental accounting, and provided a theoretical basis and practical basis for environmental accounting. It is precisely because of the development of a low-carbon economy that people realize that they can combine the economy with the environment and accounting, and also make it theoretically possible. Second, from a practical point of view, more and more enterprises not only require the maximization of profits, but pay more attention to how to use environmental accounting more widely in the context of this low-carbon economy. In practice, the low-carbon economy also promotes environmental accounting. The integration of low-carbon economy and environmental accounting in practice has made enterprises in various countries pay more attention to the cost of ecological environment and resources in practice, and promoted the continuous improvement of environmental accounting system. Finally, in order to achieve the great goal of sustainable development, both low-carbon economy and environmental accounting will rationally develop and utilize limited resources, strive to form limited resources into a sustainable model, and maximize environmental and social benefits. Promote the strategic adjustment of the industrial structure, and finally win the first place in today's world of economic globalization, and realize the dual development of economy and environment.

## **2. The Research Status of Environmental Accounting Under the Low-carbon Economy**

### **2.1. Lack of awareness of enterprise environmental accounting**

After the reform and opening up, China has been under the role of market economy, enterprises basically pursue profit maximization and shareholder wealth maximization as the goal, environmental accounting and the coordination of corporate interests do not pursue too much, but also ignore the macro background of sustainable development, a social responsibility of enterprises. It is believed that once environmental accounting is taken into account, the operating costs of the enterprise will increase, and the profit of the enterprise will decrease. Some large industrial enterprises, due to the expensive environmental protection equipment and complicated environmental protection process, directly discharge polluted industrial wastewater and waste gas, seriously damaging the ecological environment, and directly

contradicting China's sustainable development strategy, and failing to fulfill the social responsibility of an enterprise.

### **2.2. The relevant laws and regulations on environmental accounting are not perfect**

Since the promulgation of the Environmental Protection Law in 1989, enterprises have gradually realized the existence of environmental accounting. Since then, various laws and regulations have also played a certain role in regulating environmental governance for enterprises. However, compared with other countries, the relevant laws and regulations established and implemented by environmental accounting in China are not perfect, and the rules and regulations are not perfect, so the resulting legal effect is not obvious, resulting in some enterprises unable to compare and easy to ignore environmental accounting. To a certain extent, this also restricts the development of environmental accounting in China.

### **2.3. The shortage of environmental accounting professionals**

Since environmental accounting is a new thing involving many fields, it requires professionals to be familiar with both accounting and environmental economics, and to link the two. Therefore, this kind of multi-functional compound talent is relatively lacking in the entire accounting industry. In practice, due to the strong professionalism and change of accounting itself, which greatly increases the economic cost of enterprises, enterprises are often unwilling to spend time and money to cultivate such compliance talents. Although it ensures the maximization of the company's profits in a short period of time, it ignores that the long-term development of the enterprise is exactly the need for such talents. At present, China does need more such compound talents to meet the needs of low-carbon economic development.

### **2.4. Lack of value in environmental information disclosure**

First of all, the disclosure of environmental accounting information by enterprises is mainly due to pressure from the government and the public, but at the same time, enterprises also profit from these two aspects. Objectively speaking, the disclosure and supervision of environmental accounting in China are extremely inadequate, and the internal control of environmental management and the excessive pursuit of profit maximization have led to the reluctance of enterprises to further disclose environmental accounting, which is also contrary to the laws and regulations related to environmental accounting promulgated in China. At the same time, when the government considers that it is difficult to combine the economic development of some regions and environmental accounting, it also turns a blind eye to the ecological pollution caused by the irregular operation of enterprises under the balance of pros and cons, which makes enterprises become more and more intense, and the damage to the environment is increasing, which has seriously hindered the sustainable development of China and the development of environmental accounting.

### **3. Suggestions for Environmental Accounting Optimization in Low-carbon Economy**

#### **3.1. Refine environmental accounting elements with reference to traditional accounting**

Referring to the meaning of assets or liabilities in traditional accounting, elements owned or controlled by the enterprise and brought economic benefits to the enterprise within a certain period of time are classified as environmental assets. Another example is that it is classified as an environmental liability that will directly or indirectly bring economic benefits to the enterprise within a certain period of time. Similarly, environmental costs, expenses and other elements can also be obtained. Consolidating these elements and formulating an appropriate accounting system that means disclosure in or in financial statements will enhance corporate social responsibility and contribute to the further development of environmental accounting.

#### **3.2. Strengthen the quality of information disclosure in enterprise environmental accounting**

Due to the imperfection of China's environmental accounting laws and regulations, the quality of information disclosure of environmental accounting by most enterprises is also uneven, and in general, the quality of environmental accounting information disclosure in China is not high. Therefore, for enterprises, a series of complete environmental accounting reporting systems should be established, and like other accounting elements, the environmental accounting information of the enterprise should be independently disclosed, and the environmental costs, environmental losses, environmental profits, etc. of the enterprise should be disclosed one by one. At the same time, environmental accounting disclosure should be carried out in combination with the actual situation of the enterprise, so that the environmental accounting disclosure of the enterprise can be clear at a glance, so that the leadership can make more effective decisions. At the same time, high-quality environmental accounting disclosure of enterprises can obtain various government environmental protection policies and subsidies, reducing the operating costs of high-quality environmental accounting disclosure. It can also effectively improve the reputation and social responsibility of enterprises. Form a win-win situation for enterprises and ecosystems.

#### **3.3. Enhance the overall environmental accounting awareness of enterprises**

In the context of the overall low-carbon economy, managers play a vital role in the major decisions and operations of enterprises. Therefore, managers should lead by example, not only shout slogans, but fundamentally accept the new concept of environmental accounting, first take the initiative to learn the relevant knowledge of environmental accounting, and pass the level of environmental accounting knowledge to subordinates based on the situation of their own enterprises. In addition, enterprises can also carry out environmental protection work performance appraisal, improve employees' enthusiasm for environmental accounting, and deeply imprint environmental awareness on every employee.

### **4. Theoretical Analysis and Research Hypotheses**

From the research results at home and abroad, it can be concluded that the carbon emissions of enterprises have a significant negative impact on the enterprise value, and the quality of carbon information disclosure has a significant positive impact on the enterprise value to a certain extent. In the social environment where the state strongly advocates low-carbon environmental protection, this paper aims to study the relationship between environmental protection behavior and corporate financial performance in the coal industry. Based on encouraging enterprises to disclose high-quality carbon information, so that all industries can actively participate in energy conservation, low-carbon and environmental protection, so as to improve the reputation of enterprises on the one hand, and improve their financial performance on the other hand. While increasing the operating income of enterprises, enterprises are more proactive in carbon information disclosure. Therefore, based on the above analysis, it is assumed that carbon information disclosure has a significant positive impact on corporate financial performance.

### **5. Empirical Research Design**

#### **5.1. Sample selection and data sources**

This paper mainly focuses on the coal industry, and selects the coal industry that disclosed social responsibility reports from 2020 to 2022 as the research sample, and excludes the following samples: enterprises with missing data in a certain year, ST enterprises and enterprises with extreme worthiness. A total of about 38 sample companies were obtained. The corporate financial data in this article are all from the Sina Finance database, and the carbon information disclosure data is taken from Hexun.com and Sina Finance.

#### **5.2. Variable definition and model construction**

1. Explained variables: In this paper, relevant indicators such as return on total assets (ROA) and return on net assets (ROE) are selected. Among them, ROE mainly evaluates the level of capital income of enterprises from the perspective of investors, and ROA mainly reflects the overall profitability of enterprises. Therefore, in this paper, return on total assets (ROA) is used to evaluate the financial performance of enterprises, and return on equity (ROE) is selected for robustness testing.

2. Explanatory variables: Since China's carbon information disclosure system is not very perfect, and it is not stipulated as a mandatory disclosure project, there is less carbon information disclosure management data for coal industry enterprises. Therefore, the carbon information disclosure in this paper is combined with other environmental disclosures, and the replacement data related to carbon information disclosure are obtained from the information rating database of authoritative institutions.

3. Control variables: The variables in this paper generally select the variables of enterprise growth, asset turnover speed (ATR), enterprise profitability (NPR), and equity concentration (stock) as the research variables of this paper, and summarize all the above variables into Table 1.

4. Model construction: Based on the relevant variables in Table 1, this paper establishes the following models of carbon information disclosure and financial performance based on

the data, as follows:

$$ROA_{i,t} = \beta_0 + \beta_1 CDI_{i,t} + \beta_2 GROWTH_{i,t} + \beta_3 ATR_{i,t} + \beta_4 NPR_{i,t} + \beta_5 STOCK + \alpha_{\Sigma i,t}$$

**Table 1.** Variable definition tables

The variable type	The variable name	Variable symbol	Variable definitions
Dependent variable	Corporate financial performance	ROA	Return on total assets
argument	Level of carbon disclosure	CDI	(Sina Finance Network Summary Score)
Control variables	Business growth	GROWTH	Total revenue growth rate
Control variables	Asset turnover speed	ATR	Asset turnover
Control variables	Business profitability	NPR	Net profit margin
Control variables	Equity concentration	STOCK	The sum of the shareholding ratios of the top 10 shareholders

### 5.3. Empirical analysis

#### 1. Descriptive statistical analysis

For the variables involved above, the calculation is carried out in combination with the model designed in the paper. Descriptive statistics can be found in Table 2.

**Table 2.** Descriptive statistics table

Variable symbol	Number of samples	minimum	maximum	median	average	standard deviation
ROA	38	-0.0082	0.2641	0.0987	0.0978	0.0634
CDI	38	42.2900	81.6100	58.6750	60.9118	8.6566
GROWTH	38	0.0071	0.7806	0.2033	0.2438	0.1709
ATR	38	0.2200	3.4200	0.4650	0.6526	0.5937
NPR	38	-0.0404	0.3676	0.1871	0.1575	0.1183
STOCK	38	0.3302	0.9315	0.6682	0.6427	0.1504

It can be seen from Table 2 that the median return on total assets of the 38 coal industries is 0.0987, and the average value is 0.0978, which shows that the financial performance distribution of the sample enterprises in the coal industry is relatively even. The minimum value of carbon information disclosure of 38 coal industry sample enterprises is 42.29, and the maximum value is 81.61, indicating that in the coal

industry, China's coal industry attaches better importance to carbon information disclosure than other industries, and its overall level of carbon information disclosure is average.

#### 2. Correlation analysis

In order to ensure the accuracy of the correlation analysis, SPSS22.0 is used to analyze the correlation between the variables, and the specific results are shown in Table 3.

**Table 3.** Spearman correlation - standard format

	CDI
GROWTH (Total revenue growth rate)	0.214**
ROA (Return on total assets)	0.554**
NPR (Net profit margin)	0.450**
STOCK (The sum of the shareholding ratios of the top 10 shareholders)	0.440**
ATR (Asset turnover)	-0.008

\* p<0.05 \*\* p<0.01

**Table 4.** Regression coefficient (intermediate process) (n=38)

	Non-normalized coefficients		Normalization factor	t	p	95% CI	VIF
	B	标准误	Beta				
constant	51.138	5.929	-	8.625	0.000**	39.517 ~ 62.759	-
ROA (Return on total assets)	71.397	37.795	0.523	1.889	0.068	-2.680 ~ 145.474	4.265
NPR (Net profit margin)	-18.764	22.66	-0.256	-0.828	0.014	-63.177 ~ 25.650	5.334
STOCK (The sum of the shareholding ratios of the top 10 shareholders)	19.256	8.799	0.334	2.188	0.036*	2.009 ~ 36.503	1.3
GROWTH (Total revenue growth rate)	-4.132	2.045	-0.312	-2.021	0.052	-8.140 ~ -0.124	1.326
ATR (Asset turnover)	-4.398	2.637	-0.302	-1.668	0.105	-9.567 ~ 0.771	1.82

Dependent variable: CDI  
\* p<0.05 \*\* p<0.01

Combined with the final correlation results, it is concluded that the above factors are correlated except for asset turnover. The correlation coefficient between ROA and CDI is 0.554, which is positive at the level of 1%, and the correlation is significant. The results show that there is a significant positive correlation between the carbon information disclosure of enterprises and the financial performance of enterprises. Although the correlation coefficients between the variables in

this article vary slightly in nature, most of the results show that they are still relevant overall, so regression analysis can be performed. The carbon information disclosure and enterprise performance of coal enterprises in China were regression, and the comparison results and analysis process are shown in Table 4.

Table 4 shows that CDI has a significant positive impact on ROA, and the results show that the regression coefficient is

0.001 and is significant at the level of 1%, and the regression coefficient is positive, indicating that the 38 coal enterprises in this paper will have a positive impact on their financial performance when the carbon information disclosure score is high. The variance inflation factor shows that the value of this value in the regression model analysis in this paper is 1.889, which is greater than 0 and less than 10, so it indicates that there is no multicollinearity problem in the research model of this paper, the regression results are meaningful, and the propositional hypothesis is true. In short, carbon information disclosure generally has a significant positive impact on the financial performance of enterprises, and the higher the quality of carbon information disclosure of enterprises, the higher their financial performance index, and this paper proves that the hypothesis is valid.

#### (4) Robustness test

To verify the validity of this paper, the above regression analysis steps will be repeated by replacing the explanatory variable ROA with ROE. The results show that carbon disclosure still has a positive correlation on the financial performance of enterprises. On the whole, it can be seen that the results of studying the financial performance of enterprises using different variables are consistent, so the research in this paper is robust.

#### 4. Research conclusions and recommendations

Based on the coal industry, taking 38 coal enterprises in China's A-share securities regulatory commission industry as research samples, this paper combines the research questions and empirical analysis of this paper and finds that carbon information disclosure and financial performance of China's coal industry have a significant positive correlation, and with the increase of carbon information disclosure of enterprises, their financial performance will increase accordingly.

Based on the above research conclusions, this paper puts forward the following suggestions: First, from the perspective of the carbon information disclosure level of the coal industry, compared with other industries, the carbon information disclosure level of the coal industry is relatively good, and China's support for green and low-carbon is also increasing, therefore, the management of enterprises should establish a correct concept of carbon information disclosure level, bring green concepts into the daily work management of enterprises, and train employees to deepen employees' awareness of green environmental protection, energy conservation and emission reduction; Take the initiative to publish the carbon information of the enterprise openly and transparently, reduce

the carbon emissions of the enterprise as much as possible, and achieve consistent environmental protection and energy conservation throughout the enterprise; And use green and low-carbon to drive the benign development of enterprises, and bring enterprises into a new development environment and development height from the financial performance. Secondly, coal institutions can also establish a special green credit rating system, divide the green credit rating of each enterprise into grades, adopt preferential policies for enterprises with high ratings, and restrict their coal financing with low ratings. Finally, although China has issued a series of relevant policy documents on green and low-carbon, they are not fully applicable to many enterprises in China, so the state can introduce more professional policies and regulations for various industries, and at the same time introduce corresponding compulsory measures, include a series of enterprises that do not carry out green development in the list, and implement corresponding punishment measures. With these suggestions and measures, we will make better contributions to China's green development.

## References

- [1] Lin Qiaoping, Xie Haijuan; Strategies for enterprises to implement environmental accounting under the concept of sustainable development "Friends of Accounting"; 2018-03-01.
- [2] Tang Pei; Problems and Solutions in the Development of Environmental Accounting in China Enterprise Herald; 2012-04-05.
- [3] Li Xiulian, Zhao Lili, Sun Zhimei; On Low-Carbon Economy and Environmental Accounting, Finance and Accounting Newsletter: Comprehensive Edition; 2011-01-01.
- [4] Lu Haixu (mentor: Jia Baohua); Research on China's Industrial Structure Optimization Based on Low-carbon Economy University of International Business and Economics, Master (Major: World Economy); 2013.
- [5] Liu Chang, Lu Jing; Strategic Research on the Development and Implementation of Environmental Accounting in China, Finance and Accounting Newsletter; 2017-01-01.
- [6] by Xiaoqin; Design of Enterprise Environmental Accounting Information Disclosure Model from the Perspective of Low-carbon Economy, Finance and Accounting Newsletter; 2018-01-01.
- [7] Zhang Xiaolang; Exploring the theory and practice of green accounting for enterprises under the low-carbon economy, "Commodities and Quality"; 2015-09-28.