

Research on Optimization Effect of Environmental Pollution Accounting Control Based on Green Low Carbon Background

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Abstract. With the global temperature rising and the greenhouse effect serious, the development of a low-carbon green economy will inevitably become an international trend. Since China's current energy structure is a development model of high energy consumption and high pollution, and coal is the main energy source, China's environmental pollution control has a long way to go. Based on this, this paper comprehensively analyzes the statistical description of the accounting in the pollution control project, establishes the optimization model of accounting fair value, and aims to achieve low carbon green environmental governance, and proposes a regression analysis environment based on the second element. Governance accounting model. The linear statistical method is used to calculate the fair value, combined with the payment level of environmental governance and the quality benefit level as the dependent variable, and the equilibrium game control is carried out to realize the green low carbon cost accounting. Finally, through empirical analysis, the regression analysis of the model is better, which leads to the optimization of environmental protection cost.

1. Introduction

The rapid development of science and technology has promoted the rapid development of the economy, and at the same time, the environmental problems have become more prominent: land desertification, water shortage, sharp decline of tropical rain forest and frequent extreme weather. Environmental problems have brought a crisis of survival to mankind. As we enter the 21st century, the world has focused on global warming. After the Copenhagen conference in 2009, the low-carbon economy began to enter the eyes of ordinary people and became the economic development concept advocated by the whole people. China has also made a commitment to reduce carbon emissions per unit of GDP by 40% to 50% by 2020. To achieve this goal, we must develop a low-carbon economy and adjust the industrial structure while doing a good job of low-carbon development of traditional industrial enterprises.



2. Basic composition and system of environmental cost accounting from the perspective of low carbon economy

2.1. Energy saving and abatement costs

First, the cost of technological innovation, innovative R&D costs for production, operation management, and pollutant discharge for the implementation of the targets of “reduce reduction” and “energy conservation”. Second, environmental reserves and interest, funds and interest reserved for energy conservation, emission reduction and pollution prevention. The third is the cost of environmental protection personnel, the operation of environmental protection equipment and maintenance personnel. The fourth is the cost of environmental protection equipment and system operation, the various expenses incurred in the operation, maintenance, batching and depreciation of environmental protection equipment and systems used in energy-saving production and pollution discharge.

2.2. Environmental damage and damage costs

First, the cost of carbon emissions. In 2014, China's emissions reached 9.76 billion tons, ranking first in the world. Preventing, controlling and reducing CO₂ emissions has become the primary task of low-carbon economy development. On April 22, 2016, China signed the "Paris Agreement" and promised to actively carry out carbon emission reduction work. This requires enterprises to comply with the requirements of real development and calculate carbon emission costs as key expenditure items of environmental costs. Second, the cost of pollution, the company's sewage charges, environmental insurance premiums, excessive fines, environmental damage fines and environmental damages and other expenses incurred due to excessive discharge or deliberate environmental damage. The third is environmental taxes and fees, various resource taxes and carbon taxes related to environmental protection.

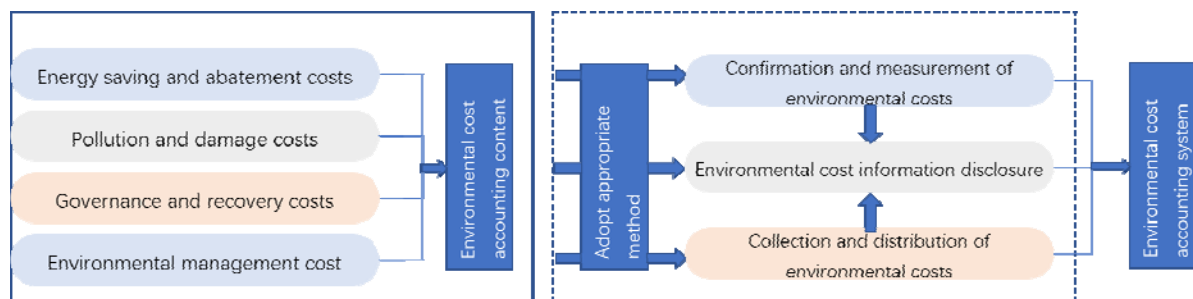


Fig.1 Framework of environmental cost accounting system from the perspective of low carbon economy

2.3. Environmental Governance and Recovery Costs

The cost of environmental governance and restoration is the related expenses paid by the enterprise after it has caused pollution or damage to the environment. For example, in order to purify the environment and reduce the degree of environmental pollution, the wages of employees employed, the materials for pollution control, the cost of water and electricity, and the purchase of environmental protection equipment And maintenance costs, sewage treatment costs, etc., in addition, environmental protection forest construction expenditures, production and installation of sewage discharge purifiers, etc. should be vested in such costs.

2.4. Environmental Affairs Management Cost

The cost of environmental affairs management is mainly related to the expenditures involved in the management of environmental related matters, such as environmental management system construction, operating expenses, environmental greening expenditure, employee environmental

education expenditure and environmental protection publicity, environmental protection agency setting, staff salary, etc. There is no direct correlation between production and operation of enterprises, but they are closely related to environmental protection, so they need to be included in environmental costs.

3. Mathematical modeling of accounting for green low-carbon environmental pollution control projects

In order to optimize the accounting of green and low-carbon environmental pollution control projects, reduce accounting costs and improve the construction quality of environmental pollution control projects, it is necessary to optimize the design of accounting and fair value measurement methods, combined with descriptive statistics analysis and pluralism. The linear regression analysis method is used for accounting of green low-carbon environmental pollution control projects. First, the original accounting data is sampled. The collected data comes from the actual environmental pollution control project. Excel2016 software and finite element analysis software are used for data statistics analysis. A significant positive correlation analysis between the procurement business and the capital activities of the green low-carbon environmental pollution control project [2], using a multiple linear regression model to represent the sample subset of accounting for environmental pollution control, the formula is expressed as follows.

$$\begin{aligned}
 &S.t. \quad Q_i \geq Q_{th} \\
 &E_i \geq E_{th} \\
 &Q_{jk} \geq 0 \quad E_{jk} \geq 0 \quad C_{jk} \geq 0 \\
 &\sum_{j=1}^{N_j} x_{jk} = 1, \forall i, 1 \leq k \leq M, 1 \leq j \leq N_j
 \end{aligned} \tag{1}$$

Definition W_{ki} ($i=1,2,\dots,6; k=1,2,\dots,6$) indicates the initial investment ratio of environmental pollution control, and definition Z_i ($i=1,2,\dots,8$) indicates the market value return variable of the environmental pollution control project. The Bernanke budget constraint equation is used to adjust the environmental pollution control project under the asset and liability conditions. Downward equilibrium, improve the accuracy of the regression analysis results, combined with the robustness test analysis method to construct the dummy variables of the sample group, dynamically reorganize the cost, cash flow and capital structure, and obtain green low carbon environmental pollution control according to the above analysis principle. The mathematical modeling process of the accounting of the project.

According to the mathematical model of accounting calculation of the green low-carbon environmental pollution control project given above, the descriptive statistical analysis of accounting is carried out, and the descriptive statistics and independent variables of green low-carbon accounting are shown in Table 1.

Tab.1 Variables and description

Variable name	Variable definitions
Capital distribution structure of environmental pollution control projects	Ratio of financial inputs to static panel capital flows for environmental pollution control projects
Base money growth rate	Target capital investment/total assets for environmental pollution control
Monetary Policy	Policy factors for national investment in environmental pollution control projects
Target capital structure	Free cash flow/capital structure
Degree of development of accounting costs	Total fixed assets/assets for environmental pollution control
Prosperity index	Environmental Pollution Control Project Confidence Index
GDP growth rate	The promotion of the state's fiscal growth level to environmental pollution control
Hysteresis coefficient	The reactionary factor of the lag of accounting investment in environmental pollution control
Total asset logarithm	Scale/capital structure of environmental pollution control projects

4. Empirical regression analysis

Substituting Beijing, Zhejiang, Fujian, Shandong, Shanxi, Jilin, Heilongjiang, Liaoning, Anhui, Guangdong, Hainan, and Chongqing for energy consumption structure, environmental pollution control investment ratio, and accounting growth index data in 2017, and analyzing accounting related to environmental pollution control Sexual variables, using quasi-linear statistical analysis method for quantitative analysis of accounting fair value, obtained the descriptive statistical analysis results of accounting account of environmental pollution control projects in different provinces [3]. After substituting the data, the least squares method is used for regression analysis, and the energy distribution structure related to environmental pollution control is shown in Figure 2.

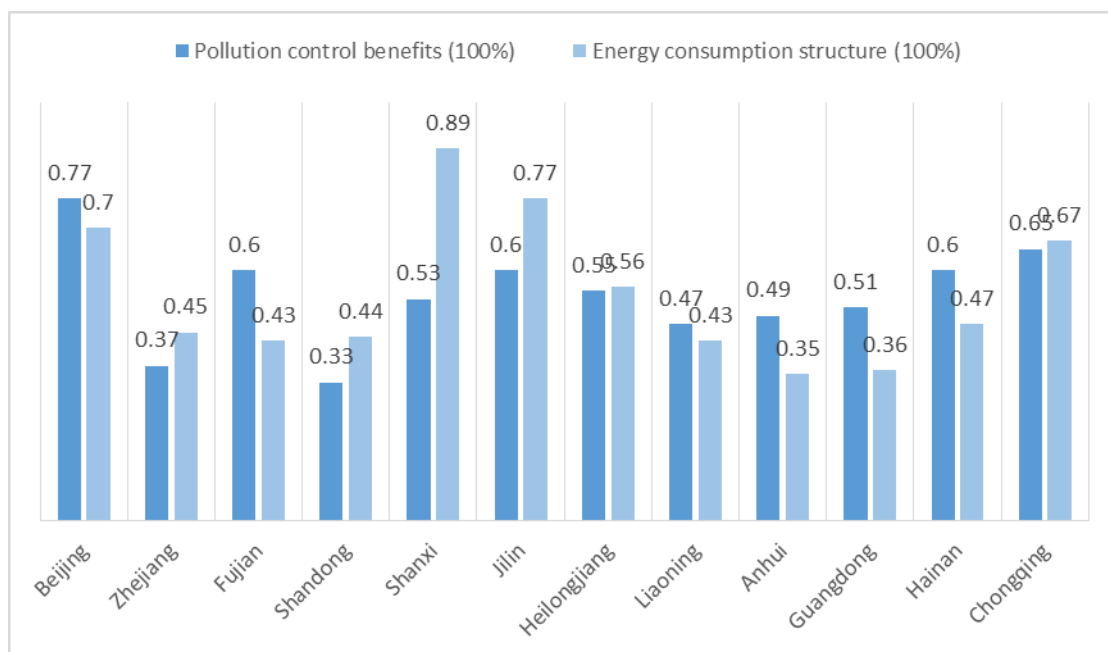


Fig.2 Distribution of energy consumption structure related to environmental pollution discharge in various regions and distribution of pollution control benefit indicators

The use of the Chinese model for green low-carbon accounting has effectively improved the effectiveness of environmental pollution control, reduced accounting costs, and improved the effectiveness of environmental pollution control.

5. Optimization strategy of environmental cost accounting under the perspective of low carbon economy

5.1. Promote the construction of corporate carbon emission system

The calculation of carbon emissions is the key to environmental cost accounting, which determines the accuracy of accounting. Carbon emissions are closely related to energy consumption and utilization efficiency. The greater the energy consumption, the greater the carbon emissions, and the higher the energy efficiency. The less carbon consumption. To this end, carbon emissions control has two paths: one is to reduce energy input at the source of production, and the other is to collect, store and reuse carbon dioxide emitted from the terminal. By monitoring the carbon emissions of the source and terminal, the company can provide accurate data support for accounting. At present, the measurement standards for carbon emissions are more authoritatively issued by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), the “Greenhouse Gas Protocol—Enterprise Accounting and Reporting Standards”. Carbon cost accounting standards and procedures are defined, whereby companies can measure greenhouse gas emissions and convert accurate carbon costs.

5.2. Improve environmental laws and regulations and formulate environmental accounting standards

We must improve environmental laws and regulations. At present, China has promulgated a number of laws and administrative regulations such as the Environmental Protection Law and the Air Pollution Prevention and Control Law. These laws and regulations constitute the legal basis for the implementation of the environmental accounting system of Chinese enterprises. However, the penalties for environmental damage caused by these laws and regulations are too small to deter environmental damage [4-5]. Laws and regulations should specify the legal liability for environmental damage. It is clear to what extent administrative responsibility should be imposed and to what extent criminal responsibility should be imposed. Specific administrative punishment standards and specific sentencing standards should be uniformly established to reduce human factors and reduce the interference of relevant departments or personnel. Strengthen multi-sectoral cooperation and improve the operability of the law. When the environmental protection department issues a notice to close the polluting enterprises, it should be supplemented with measures such as water cut-off, power cut-off, and revocation of licenses, or give the environmental protection department the power to dismantle the polluting equipment, so that the polluting enterprises can truly be shut down, not just a piece of paper. Only the improvement of environmental laws and regulations can make the supervision have laws to follow, in order to enable enterprises to consciously protect the environment and take the initiative to carry out environmental cost accounting and disclosure [6].

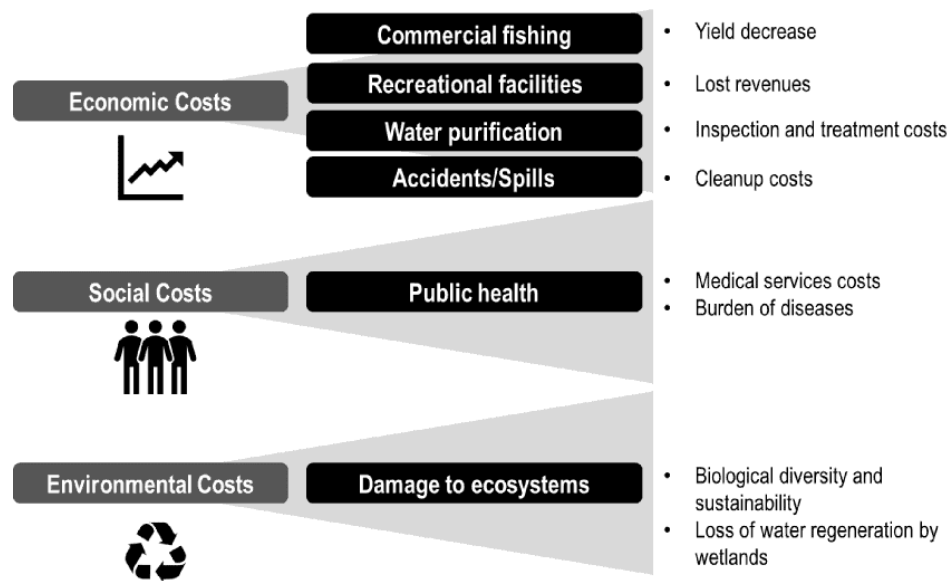


Fig.3 Improve environmental governance accounting control strategy

5.3. Introduce reward and punishment mechanisms and strengthen supervision

In addition to compulsory disclosure, a reward and punishment mechanism may be introduced for companies that do not actively disclose environmental cost information. Many Western countries have established reward and punishment mechanisms for disclosure of environmental costs. For example, the Institute of Chartered Accountants has established an “Environmental Report Award” to reward companies that actively disclose environmental information. China's accountant association or the State Environmental Protection Administration should also set up an incentive mechanism for environmental cost information disclosure, rewarding enterprises that actively disclose environmental cost information that may affect the decision-making of information users, and enterprises that actively undertake environmental social responsibility, such as cash incentives, tax incentives, and Credit tilt, etc., guide companies to increase the initiative to disclose environmental cost information. In addition, it is necessary to strengthen the supervision of the government and the public. At present, the CSRC has clearly defined the environmental report in the “Contents and Formats for Information Disclosure of Public Offering of Stock Companies”, requiring listed companies to disclose environmental performance information and the impact of environmental activities on the company's financial and development prospects, but not involved. Disclosure of environmental cost information. The CSRC should continue to improve this standard and increase the content of environmental cost information to provide a basis for government and public supervision.

6. Conclusion

China studies the accounting optimization method for green and low-carbon environmental pollution control projects, promotes the optimization and upgrading of environmental governance and reduces the cost of environmental governance projects. It proposes an accounting model for environmental pollution control projects based on binary stepwise regression analysis to analyze environmental pollution control. Accounting-related variables, using quasi-linear statistical analysis methods for quantitative analysis of accounting fair value, to achieve optimization of green low-carbon accounting methods, through empirical data analysis and data modeling methods, to achieve improved design of accounting models for environmental pollution control projects. The research shows that the accounting standards of environmental pollution control have a significant positive correlation with factors such as energy carbon emissions. Through cost optimization accounting, the cost of governance is reduced and the efficiency of environmental pollution control is improved.

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