

# *Research on Enterprise Green Transformation under Environmental Tax*

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**Abstract:** On December 25, 2016, the “Environmental Protection Tax Law of the People’s Republic of China” changed the current sewage charges to environmental taxes and implemented it in 2018. This study investigates Beijing-Tianjin-Hebei enterprises to understand the impact of the environmental tax system on Beijing-Tianjin-Hebei enterprises' operations and green transformation mechanisms. The survey results show that the implementation of environmental tax has little impact on the tax burden of most industries, but it increases the upstream raw material cost of enterprises and brings the burden of cash flow to enterprises. Moreover, the motivation of enterprises to save energy and reduce emissions mainly comes from the strengthening of national environmental regulations and the requirements of local governments. So we think that the state should raise the intensity of levy on enterprises with high pollution emissions, realize the stepped-difference levy, and improve the intensity and rigidity of law enforcement. We should improve the policy of green environmental tax deduction, reduction, and exemption, and return, and give full play to the positive role of Banks, industry associations, and other third-party organizations in providing enterprises with credit, talent, technology, and rating support.

## **1. Introduction**

Promoting green development and adhering to the harmonious coexistence of man and nature is one of the basic strategies for adhering to and developing socialism with Chinese characteristics in the new era put forward by the report of the 19th National Congress. To internalize the externalities of corporate pollution and encourage companies to control pollution and protect the environment from the perspective of their interests, China has imposed an environmental tax on January 1, 2018. The Beijing-Tianjin-Hebei region, which is heavily polluted, has generally determined a higher trial tax amount, of which the applicable tax amount in Beijing is the upper limit prescribed by the Environmental Protection Tax Law.

As China's first "green tax system", the purpose of environmental tax collection is to play a transparent and standardized role in taxation, forcing companies to make the green transformation, improve production efficiency while reducing pollution emissions, and realize the "double dividend" of environmental tax. However, in practice, there are some deviations in the realization of

the "double dividend". For example, the cost of high tax burden may have an "extrusion effect", reduce the production efficiency of the enterprise or suppress the environmental protection investment and innovation of the enterprise, or promote the adoption of the enterprise. The tax burden is passed on by "tax for fees". What is the impact mechanism of China's current environmental protection tax system on the green transformation of Beijing-Tianjin-Hebei enterprises? How to optimize the environmental tax system and supporting measures to encourage and support the green transformation of enterprises to promote green development has become a key issue for regulators and enterprises at this stage. This study conducted a survey of 52 companies in the Beijing-Tianjin-Hebei region by way of questionnaires to obtain the impact of an environmental tax on enterprises and their attitudes, countermeasures, and suggestions on environmental taxes. The conclusion of the survey will provide empirical data for the green transformation mechanism and path optimization of Beijing-Tianjin-Hebei enterprises under the environmental tax system, and promote green development in China.

## **2. Research Background and Literature Review**

### **2.1. Evolution of the Environmental Tax in China: Policy, Experience, and Macro Effects**

Before the introduction of environmental taxes, the collection of pollutant discharge fees from polluting enterprises was one of China's main economic measures to control environmental pollution. Domestic and foreign researches on environmental taxes mostly revolve around Pigovian taxes and the "double dividend" theory. Pearce(1991) <sup>[1]</sup>and Chen(2013) <sup>[2]</sup> found that the implementation of environmental taxes raises the costs of polluters by taxing the actions that pollute the environment, promotes the advancement of more environmentally friendly production technologies and pollution treatment technologies, and reduces pollutant emissions, that is, "green dividends"; Structural adjustments to the country's taxation system will improve the environment while increasing output, economic efficiency, and employment, or the "blue dividend". Since China's environmental tax was only fully levied in 2018, domestic scholars mostly used theoretical derivation or CGE model simulation research methods, Zheng et al(2016) <sup>[3]</sup> discuss the macro-levels of environmental tax implementation on regional environmental governance, economic growth, industrial structure, trade, investment, and employment. However, due to the lack of real data support after the implementation of environmental tax, domestic scholars have some controversy on whether environmental tax collection can achieve double dividends in China.

### **2.2. The Impact Mechanism of an Environmental Tax on the Green Transformation of Enterprises**

One of the purposes of the implementation of environmental protection tax is to force enterprises to make green transformation by increasing the cost of sewage discharge. Existing literature finds that environmental tax can promote the green transformation of enterprises through mechanisms such as green R & D and innovation, environmental protection investment, products, and labor market.

Green technology research and development and innovation. One of the important influence mechanisms for environmental regulation to promote the green transformation of enterprises is environmental technology research and development and innovation based on the "Porter Hypothesis". Porter believes that the strengthening of external environmental regulations can promote investment in environmental protection research, and environmental technology innovation is also an important way to solve the dilemma of economic development and environmental sustainability. However, there is still some controversy in the academic community on whether the "Porter Hypothesis" can be realized and the conditions for its realization. Jie et al(2014) <sup>[4]</sup> found

that environmental regulation will have a relatively obvious promotion effect on the environmental protection R & D investment of Chinese enterprises in the short and medium-term. However, higher governance costs or environmental taxes and fees will increase the cost of the enterprise, squeeze out the enterprise's production and operation investment and profitable investment, and reduce the enterprise's operating performance. This crowding - out effect will in turn inhibit the enterprise's environmental innovation investment. Research in recent years has found that the "Porter Hypothesis" will also be affected by the regional location of the enterprise, the development period of the industry, and environmental regulations and policies, and will be heterogeneous.

Environmental protection investment. Tang(2013) <sup>[5]</sup> pointed out that the intensity of environmental regulations currently faced by most companies in China is relatively low, which means that further enhancement of the intensity of environmental regulations is conducive to increasing corporate environmental protection investment; At this stage, the environmental regulations in many provinces have exerted an inhibitory effect on corporate green investment.

Product market. Under the multi-enterprise analysis framework, the environmental protection behavior of an enterprise will be affected by various factors such as product market competition. In the short term, an increase in the cost of pollution control by enterprises will crowd out productive investment and affect output and income, but the productivity of enterprises will increase as the capacity of pollution control increases. When the sewage charge is low, the enterprise will reduce the output to reduce emissions. Only when the sewage charge levy intensity exceeds a certain level can the "down" Force "the improvement of enterprise productivity. Consumers, suppliers, and competitors' attention to green environmental protection will strengthen the impact of environmental taxes on corporate green upgrading and transformation. Menguc (2010) <sup>[6]</sup> found that environmental pollution will prompt consumers to buy cleaner and environmentally friendly products, and suppliers will also choose companies with a better environmental reputation to supply; at the same time, highly competitive industries will regard green transformation as a way to gain competitive advantage. Market competition as an external mechanism can strengthen the implementation of environmental regulations.

Labor market. Yip (2018) <sup>[7]</sup> and Karydas (2019) <sup>[8]</sup> pointed out that the tax reform will bring about changes in the company's business model that will induce changes in the company's employment and division of labor. For example, after the "camp reform", manufacturing companies will conduct more business outsourcing, and will also operate the original self-sufficient business to the outside world, promoting a specialized division of labor. Firms can also introduce more highly educated people and R & D personnel responding to green transformation <sup>[9-10]</sup>.

Existing policy changes and literature evolution provide rich theoretical and practical experience for the subject. In general: ① Domestic research is mostly focused on the macro level, and there is relatively little research on the enterprise level that is also the main body of pollution emissions and the collection of environmental taxes. There is a lack of "financial and tax policy implementation-micro-subject behavior changes-ecological governance and economic growth" Discussion on the transmission mechanism of micro-subjects; ② At the enterprise level, a small amount of literature discusses the impact of environmental taxes on green investment and environmental innovation, less involving product markets and labor markets, and the research perspective needs to be broadened; ③ research methods and data are not representative. Since China's environmental tax began to be formally levied in 2018, previous studies have used theoretical derivation, model simulation, or the use of sewage charges as an alternative variable to environmental tax, and were unable to obtain first-hand receipts after the implementation of the environmental tax system.

### 3. Questionnaire survey

#### 3.1. Survey Objects and Questionnaire Distribution

To understand the impact of environmental tax collection on Beijing-Tianjin-Hebei enterprises, we selected 54 Beijing-Tianjin-Hebei enterprises with a large scale and long operating time to conduct questionnaires and interviews to ensure the stability and credibility of the research results. During the survey, a total of 54 questionnaires were distributed and 52 questionnaires were recovered, with a recovery rate of 96%. The questionnaire issuance and recovery are shown in Table 1.

Table 1: Questionnaire distribution and recovery

Region	Beijing	Tianjin	Hebei
Number of questionnaires issued	23	11	20
Questionnaire recovery	23	11	18
Questionnaire recovery rate	100%	100%	90%
Proportion of total effective sample	44.23%	21.15%	34.62%

#### 3.2. Questionnaire Design

The questionnaire consists of 31 questions in three parts. The first part is the basic situation of the enterprise, including the basic information of the company's business nature, industry and scale; the second part investigates the basic situation of the enterprise's environmental tax payment; the third part investigates the impact of the environmental tax collection on the enterprise and the company's attitude and attitude Responses.

### 4. Basic Information of the Enterprise

The companies surveyed involved multiple industries, including financial smelting, papermaking, steel, building materials, mining, chemical, petrochemical, pharmaceutical, light industry, textile and leather, and others. The sample industry distribution is shown in Figure 1. Among them, 53.85% of the surveyed enterprises lasted for more than 10 years, 36.54% of the surveyed enterprises for more than 4 years; 21.15% of the total assets of the enterprises exceeded 5 million, 30.77% of the total assets of the enterprises exceeded 10 million, and 36.54% of the total enterprises The asset scale exceeds 50 million, and the sample has certain representativeness.

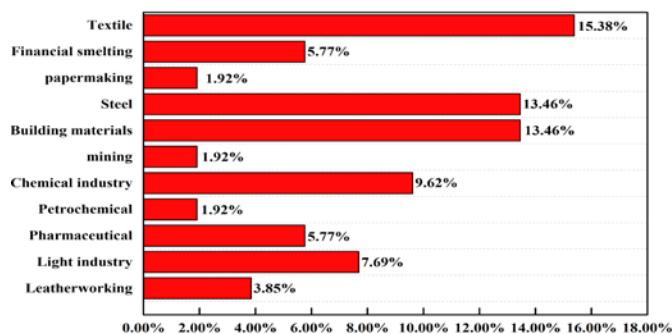


Figure 1: Industry distribution of sample companies

#### 4.1. Enterprise's Attitude towards Environmental Tax Burden

Figure 2 tabulates firms' attitude towards environmental taxes. 76.93% of the sample companies believe that the implementation of environmental taxes will help companies achieve green development, 21.15% of companies believe that the implementation of environmental taxes has little impact on enterprises, and only 1% of companies believe that the implementation of environmental taxes will increase the economic burden on enterprises. It can be seen that generally speaking, enterprises take a positive attitude towards the collection of environmental taxes.

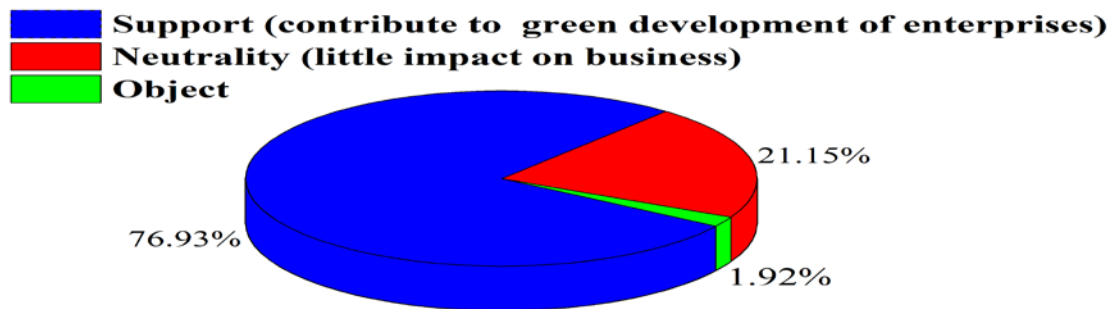


Figure 2: Attitudes of enterprises towards the implementation of environmental taxes

From the perspective of the tax burden, 23.08% of the companies believe that the tax burden is lighter, which has no pressure on the company's pollution emissions. 65.38% of the companies believe that the tax burden is moderate, and enterprises can balance production and environmental requirements. Will affect enterprise production. The implementation of environmental taxes has not brought excessive pressure on enterprises. Most enterprises still think that the actual environmental tax burden set by the state is relatively reasonable.

#### 4.2. Impact of the Environmental Tax Burden on Enterprises

After the implementation of the environmental tax, the payment of environmental tax has caused tremendous pressure on the cash flow of enterprises. The increase in raw materials has led to an increase in the initial cost input. The payment of environmental tax has also brought greater pressure on the cash flow of enterprises. The rise in profits of most companies is mainly due to the rise in sales prices. Figure 3 shows the impacts of environmental tax on enterprises. The results of the survey and research show that after paying the environmental tax, more than 67% of the company's overall tax burden is the same as before, and 69% of the companies believe that the environmental tax does not affect the company's productivity. After the implementation of the environmental tax, about 95% of the company's raw material prices rose or remained flat. Due to the increase in raw material prices, the cost of products produced by more than 30% of the companies increased, and the sales price of the company's products increased. But at the same time, more than 95% of consumers tend to buy more environmentally friendly products, so even if the product cost is provided, the company's sales have not been greatly affected. At the same time, due to the price increase, 80% of the company's profits have increased or remained flat. About 20% of enterprises and profits have declined. The reasons for the impact of environmental tax implementation on company profits are that the tax burden level has changed compared to the

period of payment of sewage charges. The price change of upstream companies 'products has led to changes in the company 's product costs and the company 's production level Adjustment, the employment structure of enterprise employees has changed, product prices have been adjusted, and changes in market demand have had an impact on sales. But more than 40% of companies believe that paying environmental taxes will put pressure on companies to cash flow.

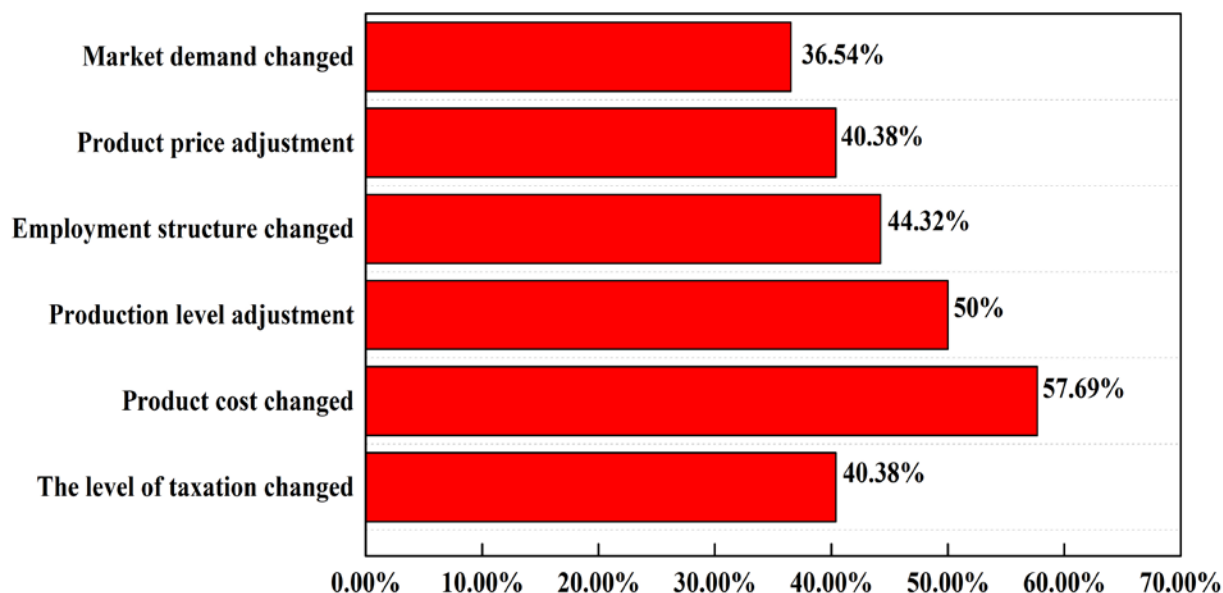


Figure 3: Reasons for the impact of environmental tax implementation on company profits

### 4.3. Enterprise Response Measures

The survey results in Figure 4 show that, in response to the collection of environmental taxes, 69.23% of companies responded to the implementation of environmental taxes by increasing investment in environmental protection projects and equipment, and 59.62% of companies responded to the implementation of environmental taxes by increasing investment in green R & D and innovation, 48.08% Enterprises implemented green marketing strategies to deal with environmental tax implementation, 42.31% of enterprises responded to environmental tax implementation by adjusting production and product structure, 26.92% of enterprises responded to environmental tax implementation by hiring highly educated personnel and green R & D personnel to deal with green transformation, 26.92% Enterprises transfer environmental tax burdens to product costs and raise product prices to cope with environmental tax implementation. 19.23% of companies choose not to make any adjustments and pay environmental taxes following the standard to cope with environmental tax implementation. 13.46% of companies transfer production sites to links Countries or regions with relatively low regulations have responded to the implementation of environmental taxes. 21.15% of companies have responded to the implementation of environmental taxes by reducing production and emissions and reducing the amount of taxes paid. Only 5.77% of companies have evaded environmental tax obligations by stealing pollutants. Response to the implementation of environmental taxes. In general, about 75% of enterprises have taken active measures to deal with the implementation of environmental taxes. Among them, increasing the investment in environmental protection projects and equipment and increasing investment in green R & D and innovation are the most extensive measures

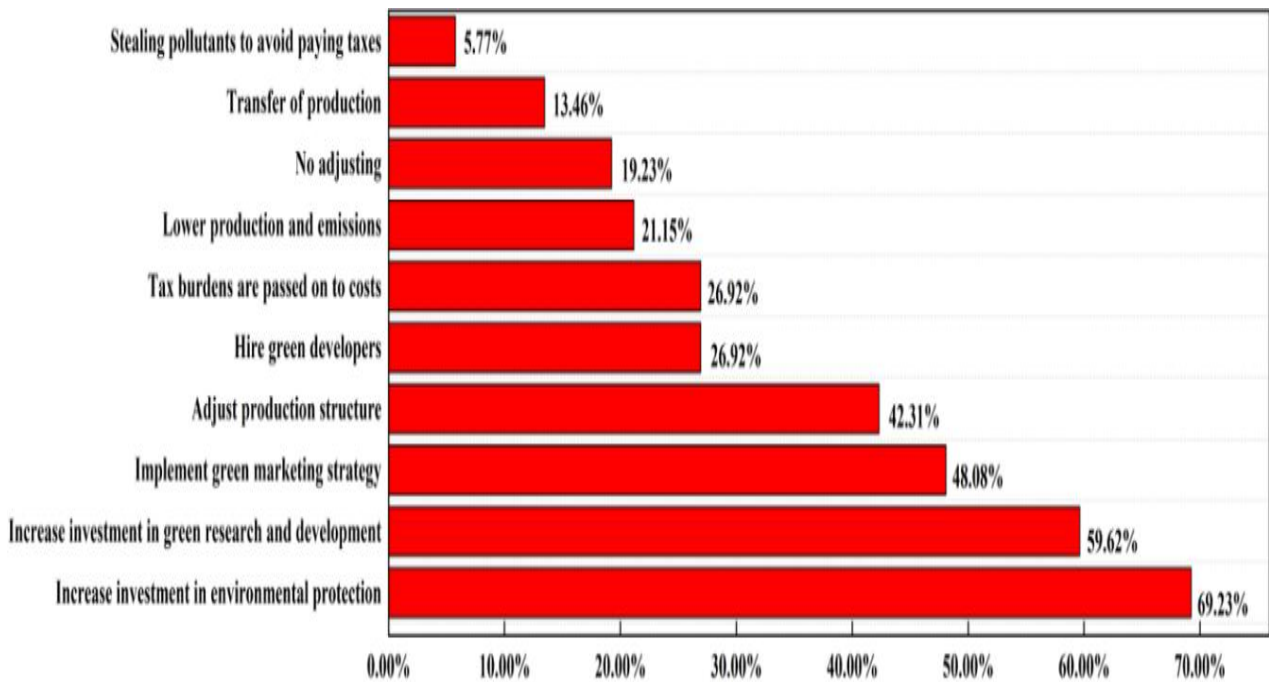


Figure 4: Enterprises' response to environmental tax measures

From the perspective of the scale of social investment in environmental protection as shown in Figure 5, 36.54% of companies invested 100,000-500,000 yuan, 26.92% of companies invested 500,000-100,000 yuan, and 21.15% of companies invested more than 1 million yuan in environmental protection equipment.

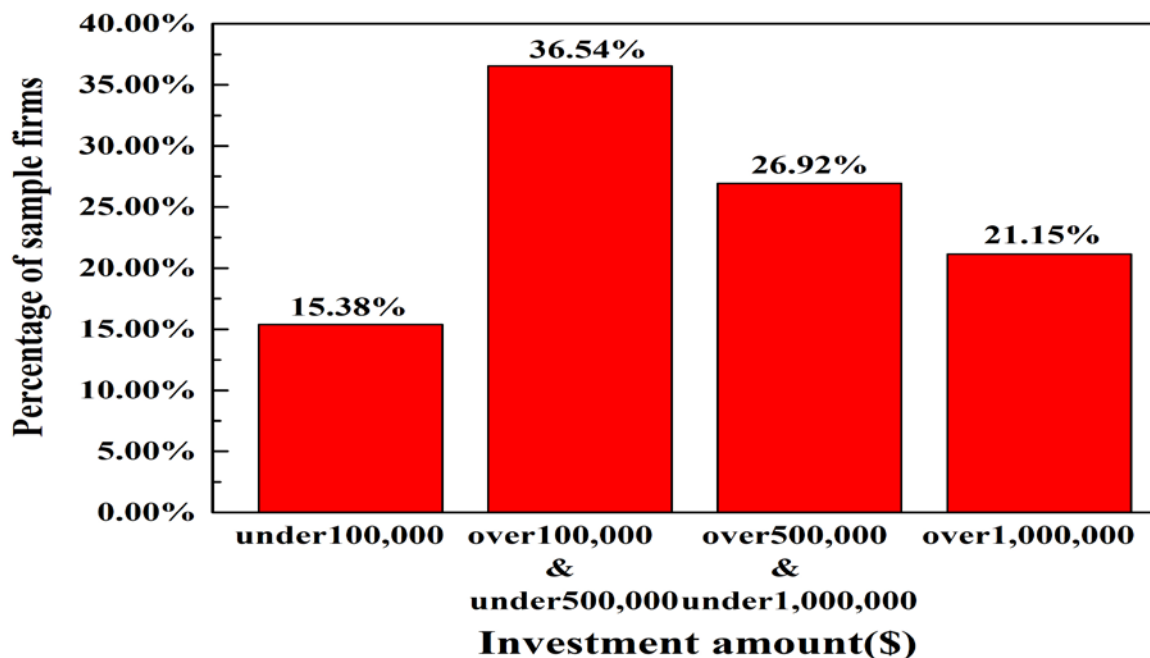


Figure 5: Enterprises invest in environmental protection equipment

Figure 6 presents the green investment of firms after the tax implementation. Enterprises not only invested in protection projects and environmental protection equipment but also vigorously

invested in green R & D and innovation. The survey showed that 44.23% of companies invested 200,000-500,000 yuan, 21.15% of companies invested 500,000-100,000 yuan, and 13.46% of companies invested 100 more than 10,000 yuan is invested in green R & D innovation.

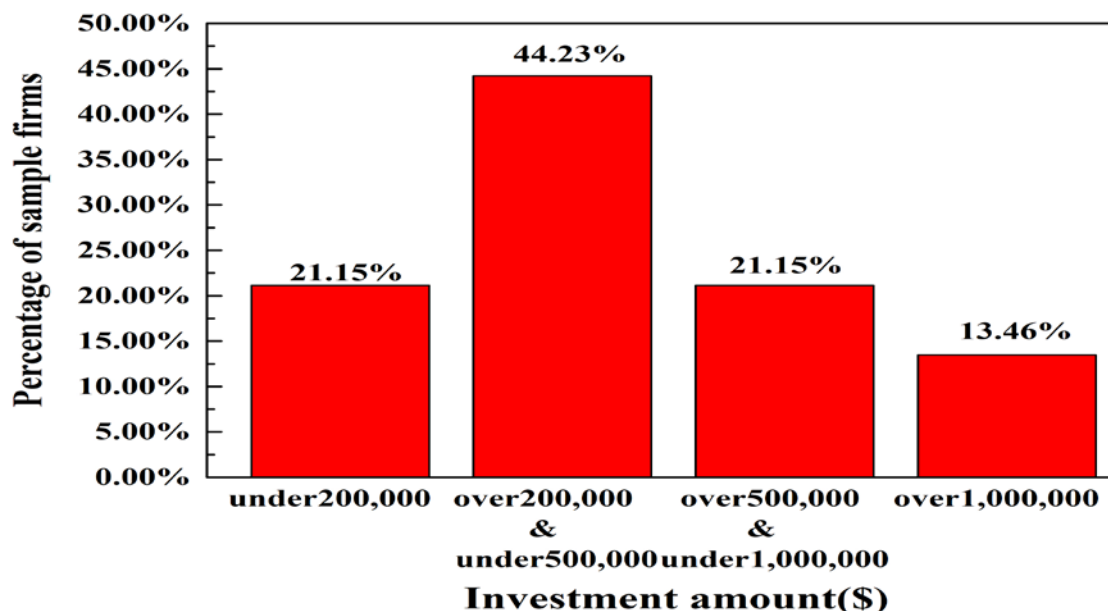


Figure 6: Enterprise green R & D innovation investment

#### 4.4. The Company's Motivation for Energy Saving and Emission Reduction after Environmental Tax

This question is a sorting question. The average comprehensive score of options reflects the comprehensive ranking of the options. A higher score indicates that the overall ranking is higher. The calculation method is the average comprehensive score of the option =  $(\sum \text{frequency} \times \text{weight}) / \text{the number of times to fill in this question}$ . The ranking results in Table 2 show that the factors that have the greatest impact on energy conservation and emission reduction of companies come from the strengthening of national environmental regulations and the requirements of local governments. The motives for companies to achieve green development rank third; followed by external stakeholders, For example, the influence of competitors, industry associations and consumers on the operation of the enterprise, but the management of the enterprise from the perspective of the operation of the enterprise itself does not promote the enterprise to save energy and reduce emissions. The driving force for enterprises to save energy and reduce emissions is still to meet compliance requirements, not for their development.

Table 2: The company's ranking of the drivers of energy conservation and emission reduction after environmental tax

Option	Average composite score
National environmental regulation has been strengthened	7.48
Local government requirements	7.1
Achieve green development of enterprises	5.35
Competitors develop green r&d/achieve cleaner production	4.83
Industry association requirements	4.77
Consumers are sensitive to environmental products	4.65



Corporate management attaches importance	3.96
Reduce manufacturing cost	3.87
Reduce the tax burden	3

#### 4.5. Problems in the Transformation

Figure 7 lists the difficulties encountered by enterprises in the process of energy conservation and emission reduction. Among them, 73.08% of enterprises believe that the biggest difficulty is the lack of support for green and innovative talents, more than half of enterprises lack the necessary technical support, and 40.38% of enterprises believe that At present, there are insufficient external pressures on enterprises to save energy and reduce emissions. About 20% of companies believe that a lack of funds and the lack of attention from corporate management also hinder the energy-saving and emission reduction of enterprises.

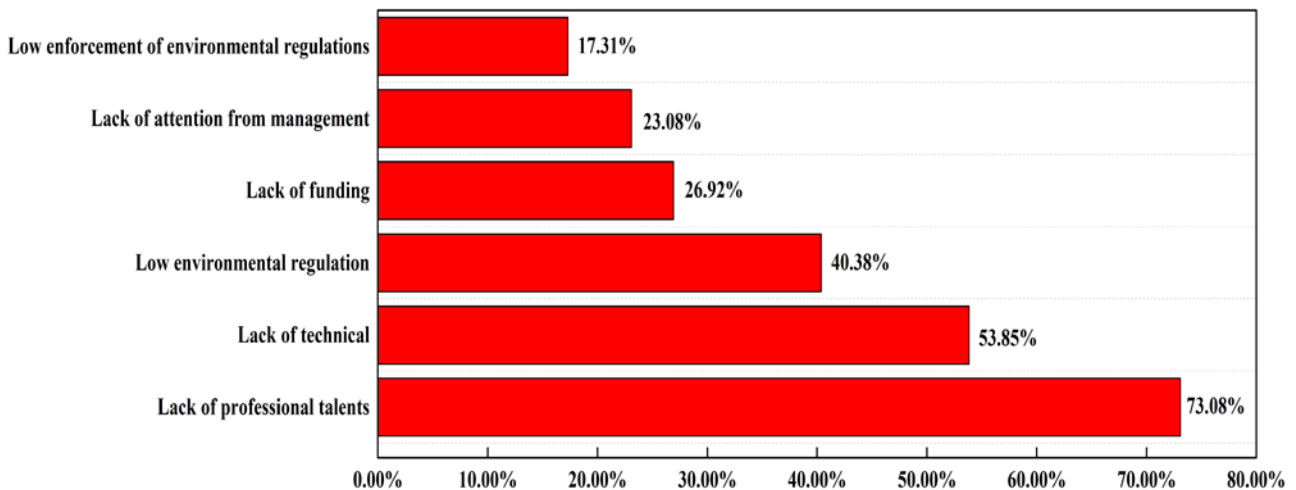


Figure 7: The resistance encountered by the company in carrying out energy conservation and emission reduction

Figure 8 shows the support companies hope to obtain further energy conservation and emission reduction work. The survey results show that 73.08% of companies need to obtain support for environmental tax deduction measures for the production and purchase of green raw materials and products. 57.69% of companies believe that It is necessary to increase the intensity of environmental protection innovation subsidies. Half of the companies believe that it is very necessary to improve the environmental tax incentives and reduction measures and provide technical support for energy conservation and emission reduction through organizations such as industry associations. 48.08% of enterprises need financial support from the state to provide financial support for the green development of enterprises by broadening green financial channels; at the same time, they regularly provide training support for the green development of enterprise management and production personnel.

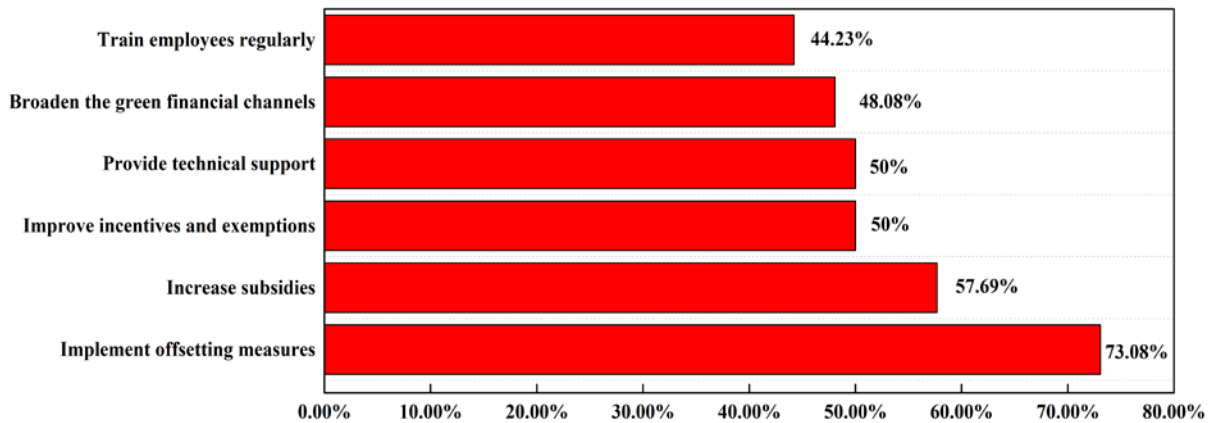


Figure 8: The company hopes to obtain support in the process of energy-saving and emission reduction

## 5. Conclusion

Combined with the survey results, the study can draw the following conclusions: ① The implementation of environmental taxes has little impact on the tax burden of most industries, basically the same as the sewage charges stage, but the rigidity of tax payment and preferential efforts have been strengthened; ② environmental tax Although negative has not caused a large degree of impact, it has increased the cost of upstream raw materials of the enterprise, which has led to an increase in the price of products produced by the enterprise. Due to the increased emphasis on green environmental protection by consumers at this stage, the increase in product prices has not affected efficiency. The impact of profits is flat, but due to the increased rigidity of law enforcement, the payment of environmental taxes still brings a cash flow burden to companies; ③ In response to the collection of environmental taxes, most companies choose to invest in environmental protection equipment, environmental protection innovation, etc. Active energy saving and emission reduction, but the motives for enterprises to implement energy-saving and emission reduction mainly come from the strengthening of national environmental regulations and the requirements of local governments. Their motivation is insufficient, and the management does not pay enough attention to this; There are mainly problems such as lack of talent and technology, and Strength levy environmental taxes is not enough to "Forced" saving energy and work; ⑤ future, companies need to further implement the appropriate regulatory measures to offset green products, improve innovation subsidies, while improving environmental tax relief measures.

## 6. Discussion

Combined with the above survey results, the research proposes policy recommendations to optimize the green transformation mechanism of Beijing-Tianjin-Hebei enterprises from the following aspects

### 6.1. Strengthen the Guidance of the State and Local Governments

Although the collection of environmental taxes at this stage emphasizes "shifting tax burden" and does not want to increase the burden on enterprises too much, from the survey results, the existing environmental tax rate still has insufficient rigid constraints on enterprises. As the main driving force for energy saving and emission reduction of enterprises, national policies and local governments need to further play the regulatory role of the tax system. For example, the method of

combining stepped tax rates and tax reduction and exemptions is used to reduce and exempt low-emission enterprises. Increase the collection of high-pollution-emitting enterprises, achieve the difference collection, increase the intensity and rigidity of law enforcement, strengthen the binding force of environmental taxes on corporate pollution emissions, and at the same time actively carry out publicity and training of environmental tax policies to increase corporate awareness, Guiding enterprises to achieve green development from a policy level.

## **6.2. Improve Environmental Tax Supporting Measures**

The purpose of environmental tax collection is to internalize externalities through fiscal and taxation methods and solve ecological problems from the source of emissions. However, environmental taxes have just landed in China, and the corresponding tax system design and supporting measures have yet to be improved. The current environmental tax law is more about formulating the details of emissions and taxation, focusing on the "green dividend" generated by the "constraint" effect of environmental tax, and how to "incentive" and "support" companies for green transformation needs further improvement. Combined with the survey results, the government should launch tax system innovation as soon as possible, develop corporate production and purchase of green products, and social tax deduction policies to reduce corporate environmental protection input costs; at the same time, use environmental protection taxes paid by high-pollution and high-emission enterprises to improve corporate environmental innovation Subsidies to alleviate the cash pressure faced by enterprises; at the same time, the design of environmental tax reduction and exemption and reimbursement will be continuously optimized to provide environmental protection for corporate green development.

## **6.3. Give Play to the Active Role of Industry Associations and Other Third-Party Organizations**

From the survey results, although companies have the willingness to support environmental tax collection through energy conservation, the lack of relevant professional talents, technology, and talent support has become a real factor hindering the green development of enterprises. To solve this problem, under the guidance of the state, it is necessary to play the active role of third-party rents such as the financial system and industry associations. First, the state can vigorously support the green financial system of financial institutions, solve the problem of corporate green investment funds; at the same time, actively play the role of industry associations, regularly carry out personnel and technical training, and vigorously cultivate and provide enterprises with Deliver talents who master green innovation technology; Finally, improve corporate environmental information disclosure and rating, and combine it with environmental tax policy preferences and incentives to better evaluate and encourage corporate green development, realize the green transformation of Beijing-Tianjin-Hebei enterprises in all aspects.

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## References

- [1] D. Pierce, "The Role of Carbon Taxes in Adjusting to Global Warming", *Economic Journal*, vol. 101, no. 407, pp. 938-948, 1991.
- [2] SY. Chen, "What is the potential impact of a taxation system reform on carbon abatement and industrial growth in China?" *Economic systems*, vol.37, no. 3, pp. 369-386, 2013. (in Chinese)
- [3] YE. Zheng, HX. Zheng, XY. Ye, "Using Machine Learning in Environmental Tax Reform Assessment for Sustainable Development: A Case Study of Hubei Province, China", *Sustainability*, vol. 8, no. 11, pp. 1124-1144, 2016. (in Chinese)
- [4] MH. Jie, J. Wang, DM. Liu, "Environment regulation, technological innovation and corporate performance", *Nankai business review*, vol. 17, no. 6, pp. 106-113, 2014. (in Chinese)
- [5] GP. Tang, LH. Li, and DJ. Wu, "Environmental Regulation, Industry Attributes and Corporate Environmental Investment", *Accounting Research*, vol. 6, no. 83, pp. 8, 2013. (in Chinese)
- [6] B. Menguc, S. Auh, L. Ozanne, "The Interactive Effect of Internal and External Factors on a Proactive Environmental Strategy and its Influence on a Firm's Performance", *Journal of Business Ethics*, vol. 94, no. 2, pp. 279-298, 2010.
- [7] Yip, "On the labor market consequences of environmental taxes", *Journal of Environmental Economics and Management*, vol. 89, pp. 136-152, 2018.
- [8] C. Karydas and L. Zhang, "Green tax reform, endogenous innovation, and the growth dividend", *Journal of Environmental Economics and Management*, vol. 97, pp. 158-181, 2019.
- [9] AL. Bovenberg and LH. Goulder, "Optimal Environmental Taxation in the Presence of Other Taxes: General-Equilibrium Analyses", *American Economic Review*, vol. 86, no. 4, pp. 985-1000, 1996.
- [10] Q. Bi and LC. Yu, "Relationship between environmental taxes and enterprise green investment behavior: a panel quantile regression approach", *China Population, Resources and Environment*, vol. 26, no. 3, pp. 76-82, 2016. (in Chinese)