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The Impact of the Environmental Protection Tax on the Export Scale of Heavily Polluting Enterprises—A Quasi-Natural Experiment Based on the Implementation of the Environmental Protection Tax Law

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Abstract: The reform from environmental protection fees to an environmental protection tax represents a key initiative in China's environmental taxation reform. How does this policy affect the export scale of energy-intensive and high-emission enterprises (referred to as “two high” enterprises)? Based on a quasi-natural experiment following the implementation of the Environmental Protection Tax Law, this study employs data from A-share industrial listed companies on the Shanghai and Shenzhen stock exchanges between 2015 and 2020. A difference-in-differences model is applied to empirically analyze the impact of the environmental protection tax on the export scale of heavily polluting enterprises. The results reveal that the environmental tax policy significantly reduces the marginal output of firms' production factors through the "compliance cost effect," thereby inhibiting the growth of their export scale. Based on these findings, policy recommendations are proposed to better balance environmental protection with economic performance, aiming for a synergistic development of both.

1. Introduction

1.1. Background

As China enters a new phase of high-quality economic development, the challenge of balancing economic growth with environmental protection has become a critical issue. The formal implementation of the Environmental Protection Tax Law of the People's Republic of China on

January 1, 2018, has had profound implications for promoting environmental protection, reducing pollutant emissions, and supporting sustainable development. By leveraging economic instruments, this tax regime aims to foster sustainable development, providing institutional safeguards for achieving the dual goals of ecological improvement and economic growth.

In the face of mounting cost pressures, particularly under environmental regulations, firms are burdened with various costs related to pollution control, environmental assessments, and energy audits, exacerbating their operational challenges, especially in heavily polluting industries [1]. Export-oriented enterprises, compared to those focused on domestic sales, face additional "iceberg costs." Therefore, the implementation of environmental protection policies is expected to have a significant impact on the export performance of energy-intensive and high-emission enterprises.

1.2. Contributions

1.2.1. Expanding Research on Environmental Regulation and Export Behavior

This study enriches the existing literature by examining the impact of the Environmental Protection Tax Law, which was officially enacted in China in 2018, on corporate export behavior. Specifically, it explores the effect of environmental taxes on firms' compliance costs and investigates how such policies influence the export scale of enterprises.

1.2.2. Improved Identification of Heavily Polluting Enterprises

In empirical analyses, the treatment group is often identified based on industry-level classification. To enhance the precision of identification, this study adopts a more granular approach, drawing on the methodology used by Li Ling et al. (2012) to calculate industry-level pollution indices. Enterprise-level pollution emission data are utilized to construct a comprehensive pollution emission index through linear standardization, allowing for a more accurate identification of heavily polluting enterprises. This method improves the assessment of the policy's impact and enhances the precision of evaluating the effects of environmental tax policies.

2. Introduction

In the research on environmental tax policies, scholars have primarily focused on the evolution of its definition and its potential positive and negative effects. Although there is a growing consensus on the concept of environmental tax policies, the actual impact of such policies remains contested. Due to the opposing mechanisms of the "compliance cost effect" and the "double dividend effect," it remains unclear whether environmental taxes can effectively promote technological upgrades in firms. Some empirical studies suggest that environmental taxes may distort factor markets, increase cost pressures on firms, and lead to reduced investment and weakened competitiveness, offsetting the short-term social welfare gains from environmental protection [3] [4] [5] [6].

On the other hand, research supporting the positive effects of environmental taxes argues that such taxes internalize the externalities of pollution, shifting part of the social costs to highly polluting enterprises. This expands the scope of fiscal regulation and implements the "polluter pays" principle through price mechanisms. Within the framework of environmental taxes, firms are given the flexibility to adjust their investment strategies, gradually shifting towards green investments, thereby achieving maximum profitability at the lowest social cost. In the long term, environmental tax policies are expected to generate dual benefits of environmental protection and economic growth [7] [8] [9].

The literature on environmental regulation and exports can be categorized into three main perspectives: the "traditional school," the "Porter Hypothesis school," and the "uncertainty school." These perspectives offer theoretical and empirical analyses at different levels regarding the impact of environmental tax policies. Many studies have employed the difference-in-differences (DID) model to analyze the mechanisms through which environmental taxes affect firms, often using heavily polluting or environmentally friendly firms as the treatment group [10] [11] [12]. However, existing research commonly identifies heavily polluting enterprises at the industry level, which may challenge the parallel trends assumption. To improve identification accuracy, this study defines the treatment group based on firm-level pollution emissions. Furthermore, most of the existing literature focuses on a closed economy perspective, with limited attention to the context of an open economy. Therefore, exploring the impact of environmental taxes on corporate export behavior requires further analysis from an open economy standpoint.

3. Theoretical Analysis and Research Hypotheses

3.1. The Impact of Environmental Tax Policy on Firms' Exports

The Environmental Protection Tax Law of the People's Republic of China mandates that all enterprises and business operators within China's jurisdiction, including its territorial waters, are required to pay an environmental protection tax if they directly discharge taxable pollutants. As a critical tool for environmental governance, the environmental protection tax aims to reduce emissions and raise environmental awareness among heavily polluting enterprises through economic incentives. Specifically, by increasing operational costs, this tax compels firms to invest more in clean technologies to reduce their tax burden. Under the pressure of heightened taxation, heavily polluting enterprises may prioritize environmental technology upgrades when making export decisions, thereby limiting the expansion of their export scale [13]. Additionally, the increased tax burden may lead firms to adjust their market strategies, relying more on the domestic market to avoid higher export costs, which could influence the overall export structure. Based on this analysis, the following hypothesis is proposed:

H1: The implementation of the environmental protection tax restricts the export scale of heavily polluting enterprises and promotes the adjustment of China’s export trade structure.

3.2. Mechanisms Through Which Environmental Tax Policy Affects Export Scale

The environmental protection tax exerts significant influence on the production and export decisions of polluting enterprises by increasing their tax burden and forcing them to internalize the negative environmental externalities they generate [14]. According to externality theory, firms in pursuit of profit maximization tend to overlook the social costs their production imposes on the environment. As tax obligations rise, firms must balance between environmental management and production expansion, leading to increased expenditures on environmental protection while reducing funds available for research, development, and production. This "compliance cost effect" may reduce the efficiency of resource allocation, thereby weakening the export capacity and scale of enterprises. Based on this reasoning, the second hypothesis is proposed:

H2: The environmental protection tax suppresses the export expansion of heavily polluting enterprises through the "compliance cost effect," thereby reducing their export scale.

4. Empirical Model Design

4.1. Baseline Regression

The baseline regression in this study utilizes a difference-in-differences (DID) model, specified as follows:

$$\begin{aligned} \text{Levalue}_{it}(\text{Exportsacle}_{it}) = \beta_0 + \beta_1 \text{Treat}_i * \text{Post}_t + \gamma_0 \text{Controls}_{st} + \gamma_1 \text{Controls}_{it} \\ +\lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \end{aligned} \tag{1}$$

The dependent variable in the baseline regression is the logarithm of firms' annual export value (in USD) Levalue_{it}. For robustness checks, the proportion of export delivery value to main business income Exportscale_{it} is used as an alternative measure to further validate the robustness of the results. The key explanatory variable is the interaction term between the treatment group variable and the policy variable (Treat_i*Post_t), where the treatment group consists of heavily polluting enterprises. Control variables include four-digit industry-level controls Controls_{st} and firm-level controls Controls_{it}. Fixed effects include time fixed effects λ_t, firm fixed effects λ_i, industry-time interaction fixed effects λ_{jt}, and province-time interaction fixed effects λ_{pt}. Clustered robust standard errors at the firm level ε_{it} are used.

4.2. Parallel Trend Test

The parallel trend test model is specified as follows:

$$\begin{aligned} Levalue_{it} = \beta_0 + \sum_{m=2015}^{2020} \beta_m * D_{i,m} + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} \\ +\lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \end{aligned} \tag{2}$$

The interaction term $D_{i,m}$ represents the interaction between the treatment group dummy and yearly dummies, with β_m assessing the yearly differences between the treatment and control groups before and after policy implementation. The year 2017, prior to policy implementation, is set as the baseline.

4.3. Placebo Test

Using sample data from 2015 to 2017, with 2016 as the baseline year, the model is designed as follows:

$$\begin{aligned} Levalue_{it} = \beta_0 + \sum_{m=2015}^{2017} \beta_m * D_{i,m} + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} \\ +\lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \end{aligned} \tag{3}$$

Assuming a hypothetical policy implementation year of 2015, the estimation equation is as follows:

$$Levalue_{it}(Exportsacle_{it}) = \beta_0 + \beta_1 Treat_i * Post2_t + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} + \lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \quad (4)$$

Using sample data from 2015 to 2017, a regression is performed only on the treatment group dummy variable, with the regression model as follows:

$$Levalue_{it}(Exportsacle_{it}) = \beta_0 + \beta_1 Treat_i + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} + \lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \quad (5)$$

4.4. "Compliance Cost" Effect Test

The marginal productivity of capital and labor are used as proxies for cost measures. The dependent variables in this model are the marginal output of firms' capital and labor, respectively, and the regression model is specified as follows:

$$LMPT_{it} = \beta_0 + \beta_1 Treat_i * Post_t + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} + \lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \quad (6)$$

$$LMPK_{it} = \beta_0 + \beta_1 Treat_i * Post_t + \gamma_0 Controls_{st} + \gamma_1 Controls_{it} + \lambda_t + \lambda_i + \lambda_{jt} + \lambda_{pt} + \varepsilon_{it} \quad (7)$$

5. Data Sources and Variable Descriptions

5.1. Data Sources

This study selects A-share industrial listed companies from the Shanghai and Shenzhen stock exchanges between 2015 and 2020 as the research sample. The dataset for empirical analysis is constructed by combining data from the customs database and the China Research Data Service Platform (CNRDS).

5.2. Variable Descriptions

5.2.1. Explanatory Variables

The explanatory variables include the interaction term of the treatment group variable and the policy variable ($Treat_i$*$Post_t$), where the treatment group is represented by a dummy variable for heavily polluting enterprises.

5.2.2. Dependent Variables

The dependent variable is the natural logarithm of firms' annual export value (in USD). For robustness checks, the ratio of export delivery value to main business income is used as an

alternative measure. In the analysis of the "compliance cost effect" mechanism, the explanatory variables include the marginal capital output and marginal labor output of firms.

5.2.3. Control Variables

At the firm level, control variables include the quick ratio (Quick), leverage ratio (Lev), fixed asset ratio (Fxpro), and sales growth rate (Salesgrowth). At the industry level (four-digit industry), control variables include the logarithm of the capital-labor ratio (lnKL), the average fixed cost (Fixind), and industry concentration (HHI).

To improve model accuracy, time fixed effects λ_t, firm fixed effects λ_i, industry-time interaction fixed effects λ_{jt}, and province-time interaction fixed effects λ_{pt} are incorporated. The descriptions and definitions of the key variables used in this study are presented in Table 1.

Table 1: Variable Definitions

Variable Type	Variable Symbol	Variable Name	Variable Meaning
Explanatory Variables	Treat	Treatment group dummy variable	Treat = 1 for heavily polluting enterprises, 0 for non-polluting enterprises
	Post	Policy dummy variable	Post = 1 for years after the implementation of the environmental tax policy, 0 for years before
Dependent Variables	Levalue	Firms' export scale indicator	The natural logarithm of firms' export value (in USD)
	Exportscale	Alternative export scale indicator	Export delivery value / firms' main business income
"Compliance Cost Effect" Mechanism Analysis	LMPL	Firms' marginal labor output	The natural logarithm of firms' marginal labor output
	LMPK	Firms' marginal capital output	The natural logarithm of firms' marginal capital output
Control Variables	Fxpro	Proportion of firms' fixed capital	Fixed assets / total assets
	Lev	Firms' leverage ratio	Total liabilities / total assets
	Salesgrowth	Firms' sales growth rate	Sales revenue growth rate
	Quick	Firms' quick ratio	(Total current assets - inventory) / total assets
	Fixind	Industry average fixed cost	(Operating costs + other costs) / total assets
	InKL	Industry capital-labor ratio	Net fixed assets of firms at the industry level / average number of employees per year
	HHI	Industry concentration	Measured by firms' main business income

5.3. Descriptive Statistics

The descriptive statistics for the relevant variables in the empirical analysis are presented in Table 2.

Table 2: Descriptive Statistics

Variable Symbol	Variable Meaning	Sample Size	Mean	Standard Deviation	Minimum	Maximum
Treat	Treat = 1 for heavily polluting enterprises, 0 for non-polluting enterprises	9420	0.4122	0.4921	0	1
Post	Post = 1 for years after the implementation of the environmental tax policy, 0 for years before	9420	0.6102	0.4866	0	1
Levalue	The natural logarithm of firms' export value (in USD)	9420	15.01	2.543	4.7210	26.0345
Exportscale	Export delivery value / firms' main business income	9420	0.432	0.301	0.0011	1.307
LMPL	The natural logarithm of firms' marginal labor output	9420	-0.0401	1.1170	-2.6689	2.9301
LMPK	The natural logarithm of firms' marginal capital output	9420	1.250	1.980	-1.923	7.107
Fxpro	Fixed assets / total assets	9420	0.3512	0.212	0.0217	0.853
Lev	Total liabilities / total assets	9420	0.5776	0.2607	0.0434	1.271
Salesgrowth	Sales revenue growth rate	9420	0.2561	0.6506	-0.6742	4.112
Quick	(Total current assets - inventory) / total assets	9420	0.380	0.1912	0.031	0.841
Fixind	(Operating costs + other costs) / total assets	5012	0.3644	0.0512	0.2507	0.5312
InKL	Net fixed assets of firms at the industry level / average number of employees per year	5012	4.1026	0.7023	0.5217	6.012
HHI	Measured by firms' main business income	5012	0.0315	0.0498	0.0016	1

6. Empirical Results Analysis

6.1. Baseline Regression Results

Columns (1) through (6) in Table 2 present the detailed results of the baseline regression model. Specifically, in columns (1) and (2), where the logarithm of export value (in USD) is used as the dependent variable, the regression results show that the interaction term between the policy dummy variable and the pollution enterprise dummy variable (Treat*Post) has a significant negative effect at the 1% significance level. This indicates that, following the implementation of the environmental tax policy, the export value of polluting enterprises decreased significantly. Even after controlling for firm-level variables and introducing four-digit industry fixed effects, this negative correlation remains statistically significant and robust.

One plausible explanation for this result is that the implementation of the environmental tax has significantly increased the production costs of enterprises, particularly those with high pollutant

emissions during production [15]. As these firms are required to bear the additional costs imposed by the environmental tax, their overall operational expenses rise. Moreover, in the export process, firms often face sunk costs, such as marketing expenses for entering international markets and transportation costs. Facing the dual pressure of increased costs, firms tend to reduce their export scale to maximize profits, shifting their focus more toward the domestic market. By reducing their export scale, firms can lower hidden export-related costs, such as market uncertainty and exchange rate volatility, and seek more stable revenue streams from the domestic market.

Additionally, columns (4) to (6) of Table 2 use the ratio of export delivery value to main business income (Exportscale) as an alternative measure of export scale. This indicator not only reflects changes in export value but also shows the degree to which a firm depends on exports in its overall business operations. The regression results similarly demonstrate a significant negative relationship between the environmental tax policy and the interaction term for polluting enterprises, indicating that the implementation of the environmental tax also led to a reduction in the export delivery ratio. This result further validates the robustness of the baseline regression model.

More importantly, the decline in the export delivery ratio suggests that the environmental tax policy not only increased firms' production and operational costs but also prompted adjustments in their business strategies. Specifically, firms reallocated more resources and attention to the domestic market to mitigate rising costs, thereby reducing their exposure to international competition and export activities. This strategic shift can be understood as a response to the pressures of the environmental tax, aimed at minimizing uncertainties and potential risks associated with the export process.

Table 3: Baseline Regression of the Environmental Tax Policy's Impact on Firms' Export Scale

	(1) Levalue	(2) Levalue	(3) Levalue	(4) Exportscale	(5) Exportscale	(6) Exportscale
Treat*Post	-0.0917***	-0.0891***	-0.0981***	-0.00997***	-0.0101***	-0.00562**
	(0.0311)	(0.0311)	(0.0311)	(0.00267)	(0.00266)	(0.00272)
Controls	No	Yes	Yes	No	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes
Industry2*Year	Yes	Yes	Yes	Yes	Yes	Yes
Province*Year	Yes	Yes	Yes	Yes	Yes	Yes
Indusrty*year	No	No	Yes	No	No	Yes
Constant	16.14***	16.22***	16.09***	0.498***	0.537***	0.506***
	(0.0042)	(0.167)	(0.0416)	(0.000428)	(0.0142)	(0.00652)
Observations	9420	9420	9420	9420	9420	9420
Adjusted R^2	0.874	0.874	0.894	0.924	0.924	0.932

6.2. Parallel Trend Test

Figure 1 illustrates the dynamic annual effects of the environmental tax policy on the export scale of firms. The results indicate that, prior to 2018, the interaction terms between the year dummies and the treatment group dummy were not significant, suggesting that the environmental tax had no substantial impact on firms' export behavior before the policy's implementation. However, following the formal implementation of the environmental tax policy in 2018, a significant negative correlation emerges for that year, indicating an immediate and pronounced negative effect on the export scale of firms.

Specifically, this negative relationship demonstrates the pressure that the environmental tax policy placed on the production and export decisions of polluting firms, prompting rapid adjustments. In response to rising costs and regulatory constraints, firms adopted various strategies to mitigate the increased production costs imposed by the environmental tax. Some firms likely opted to reduce production and export volumes to quickly secure short-term financial relief, while others may have shifted their focus to the domestic market, minimizing dependence on international markets and reducing risks associated with exports.

Interestingly, from a dynamic perspective, no significant lag effects were observed after the policy's implementation. This suggests that firms responded immediately to the policy, indicating that the impact of the environmental tax was felt promptly rather than gradually over time.

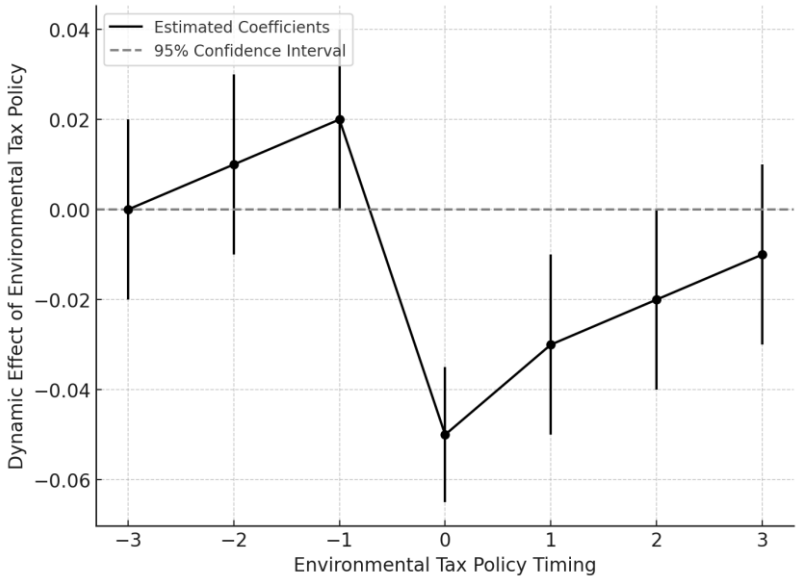

Figure 1: Dynamic Effect of Environmental Tax Policy on Export Scale

6.3. Placebo Test

First, the sample data from 2017 and earlier were retained to validate the effectiveness of Equation (3). As shown in Column (1) of Table 3, the regression coefficients for Treat2015 and Treat2017 were not statistically significant. This indicates that prior to the implementation of the green credit policy in 2018, no other policy shocks affected the regression results. In other words, there were no relevant policies in 2015 and 2017 that interfered with this study's findings, ensuring that the green credit policy was the primary driver of changes in firms' export scale, rather than other policies or external variables.

In Column (2) of Table 3, further regression analysis was conducted based on Equation (4), and the results similarly show that the regression coefficient for Treat*post2 was not statistically significant. This result suggests that the hypothetical policy year had no significant impact on the export scale of polluting firms, further supporting the conclusion that no anticipatory effects were present. In other words, firms and the market did not react prematurely before the formal implementation of the green credit policy, and export behavior remained stable prior to the policy. This conclusion helps to rule out the possibility that firms adjusted their strategies in advance in anticipation of future policy changes, ensuring the accuracy of the policy impact analysis.

Finally, a further regression analysis was conducted on the pre-2018 sample, focusing on the dummy variable for polluting firms (Treat) to validate Equation (5). According to Column (3) of Table 3, the regression coefficient for Treat was found to be nearly zero before the policy was

implemented, indicating that the export scale of polluting firms was not significantly affected prior to the policy's introduction. This finding further confirms the validity of the placebo test.

Table 4: Placebo Test of the Environmental Tax Policy's Impact on Firms' Export Scale

	(1)	(2)	(3)
	Levalue	Levalue	Levalue
Treat			-0.169
			(0.0254)
Treat*Post2		-0.0378	
		(0.0265)	
Treat2004	-0.0198		
	(0.0413)		
Treat2006	0.00856		
	(0.0541)		
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Industry2*Year	Yes	Yes	Yes
Province*Year	Yes	Yes	Yes
Industry4*Year	Yes	Yes	Yes
Constant	14.14***	14.14***	14.14***
	(0.0712)	(0.0712)	(0.0717)
Observations	3617	3617	3617
Adjusted R^2	0.812	0.812	0.812

6.4. Mechanism Test—The "Compliance Cost" Effect of the Environmental Tax Policy

This study follows the work of He et al. (2020) to analyze the cost effects of the environmental tax policy on firms' export scales, with a focus on its impact on the marginal productivity of capital (LMPK) and labor (LMPL). Through regression analysis of Equations (6) and (7), the results presented in Table 4 show that, regardless of the fixed effects included, the environmental tax policy significantly reduced the marginal productivity of both capital and labor. This policy increased the operating costs of polluting enterprises, leading to a decline in production efficiency, which in turn constrained export scale and weakened the international competitiveness of these firms.

Table 5: The Cost Effect of the Environmental Tax Policy on Firms' Export Scale

	(1)	(2)	(3)	(4)
	LMPK	LMPK	LMPL	LMPKL
Treat*Post	-0.0378***	-0.0438***	-0.325***	-0.0312***
	(0.00756)	(0.00762)	(0.00756)	(0.00781)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Industry2*Year	Yes	Yes	Yes	Yes
Province*Year	Yes	Yes	Yes	Yes
Industry4*Year	No	Yes	No	Yes

Constant	4.987***	5.031***	0.976***	1.025
	(0.0745)	(0.0124)	(0.0567)	(0.0231)
Observations	8365	8365	8365	8365
Adjusted R^2	0.932	0.943	0.955	0.962

7. Conclusions and Policy Recommendations

7.1. Conclusions

This study examines the impact of the Environmental Protection Tax Law as an exogenous shock on the export scale of heavily polluting enterprises. The findings suggest that the environmental protection tax policy significantly increases firms' "compliance cost" effect, thereby suppressing the export scale of heavily polluting enterprises. This impact is reflected in several aspects: first, the implementation of the environmental tax increases production costs, directly affecting profitability and market competitiveness. Second, the increase in taxes reduces the marginal productivity of capital and labor inputs, meaning that the additional output generated from these inputs decreases, which diminishes the firm's capacity to expand exports [16] [17]. Overall, while the environmental protection tax policy aids in achieving environmental governance objectives, it also significantly undermines the international competitiveness of heavily polluting enterprises, challenging their position in the global market.

7.2. Policy Recommendations

Based on the conclusions of this research, the following policy recommendations are proposed to help the government better balance environmental protection and economic development during the implementation of the environmental protection tax.

First, the government should integrate environmental protection taxes with technological innovation and cleaner production practices. It is recommended to provide economic incentives, such as R&D subsidies and interest subsidies on loans, to encourage heavily polluting enterprises to transition toward greener operations. Supporting firms in adopting cleaner production technologies and innovative processes can effectively reduce the cost of environmental management, thereby alleviating the financial burden imposed by the environmental tax. This would not only improve firms' environmental performance but also enhance their market competitiveness.

Second, although the environmental protection tax has positive effects on achieving environmental goals, its impact on corporate exports, especially for heavily polluting enterprises, should be given special attention. The government should consider industry-specific characteristics in its tax policy and provide targeted support for affected firms, such as financial subsidies, tax incentives, or technical training, to help these companies improve their technological capabilities and competitiveness. Such policies could mitigate the short-term economic pressure caused by the environmental tax and promote stable development in international markets.

Finally, to better achieve environmental protection goals, it is recommended to strengthen the regulation and evaluation of corporate environmental performance. Firms should regularly disclose environmental information to enhance transparency, allowing the public and stakeholders to effectively monitor corporate environmental behavior. The government can establish a comprehensive environmental performance evaluation system to track and assess the effects of the environmental tax, ensuring fair tax collection and maximizing environmental benefits. Additionally, the government could use this opportunity to encourage firms to adopt environmental management system certifications and environmental responsibility reports, fostering greater

environmental awareness and social responsibility, and driving the entire industry toward sustainable development.

References

[1] Yu, L., Zhang, W., Bi, X. (2021) Did the Reform of Environmental Protection Fees to Taxes Promote the Green Transformation of Heavily Polluting Enterprises? Evidence from a Quasi-Natural Experiment of the Implementation of the Environmental Protection Tax Law. China Population, Resources and Environment, 31(05), 109-118.

[2] Li, L., Tao, F. (2012) The Optimal Intensity of Environmental Regulation in China's Manufacturing Industry: A Perspective Based on Green Total Factor Productivity. China Industrial Economics, (05), 70-82.

[3] Bosquet, B. (2000) Environmental Tax Reform: Does It Work? A Survey of the Empirical Evidence. Ecological Economics, 34(3), 19-32.

[4] Brett, C., Keen, M. (2000) Political Uncertainty and the Earmarking of Environmental Taxes. Journal of Public Economics, 75(3), 315-340.

[5] Dresner, S., Jackson, T., Gilbert, N. (2006) History and Social Responses to Environmental Tax Reform in the United Kingdom. Energy Policy, 34(8), 930-939.

[6] Fullerton, D., Heutel, G. (2007) The General Equilibrium Incidence of Environmental Taxes. Journal of Public Economics, 91(3), 571-591.

[7] Bovenberg, A. L., Heijdra, B. J. (1998) Environmental Tax Policy and Intergenerational Distribution. Journal of Public Economics, 67(1), 1-24.

[8] Farzin, Y. H., Kort, P. M. (2000) Pollution Abatement Investment with Environmental Regulation is Uncertain. Journal of Public Economic Theory, 2(2), 183-212.

[9] Hong, L., Peng, S., Chen, H. (2022) Can Strategic Environmental and Trade Policies Promote Environmental R&D Innovation in Export Enterprises?—Theoretical and Empirical Research Based on China. International Trade Issues, (08), 85-102.

[10] Ren, L., Huang, C. (2015) The Impact of Domestic and Foreign Environmental Regulations on China's Export Trade. World Economy, 38(05), 59-80.

[11] Zhang, C. (2019) Technology-Based Environmental Regulation and Enterprise Export Dynamics—A Natural Experiment Based on Clean Production Standards. International Trade Issues, (12), 32-45.

[12] Wang, J., Duan, R., Sun, X. (2019) Environmental Regulation, Product Quality, and the Upgrading of China's Enterprises in the Global Value Chain. Industrial Economics Research, (02), 64-75+101.

[13] Ma, Y., Yu, M., Yue, Z. (2022) Research on the Impact of Green Credit Policy on Enterprise Exports. Economic Horizons, 39(05), 56-66.

[14] Yu, M., Ma, Y. (2021) Does Environmental Regulation Suppress Firms' Financialization?—A Quasi-Natural Experiment Based on the New Environmental Protection Law. Journal of Beijing Institute of Technology (Social Science Edition), 23(02), 30-43.

[15] Chen, Y., Zhang, R., Li, P. (2020) Does the Double Dividend of Environmental Regulation Really Exist?—Evidence from a Key Survey of China's Industrial Pollution Sources. Contemporary Economic Science, 42(06), 96-107.

[16] Wang, J., Liu, B. (2014) Environmental Regulation and Total Factor Productivity of Enterprises—An Empirical Analysis Based on Chinese Industrial Enterprise Data. China Industrial Economics, (03), 44-56.

[17] Wang, B., Wu, Y., Yan, P. (2008) Environmental Regulation and Total Factor Productivity Growth: Empirical Research on APEC. Economic Research, (05), 19-32.