LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S6(2025)

ENVIRONMENTAL PROTECTION TAX LAW AND ESG PERFORMANCE: THE MEDIATING EFFECT OF GREEN INNOVATION AND FINANCING CONSTRAINTS

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Abstract
The ESG performance of Chinese enterprises is important for addressing sustainability challenges. This study uses Stakeholder Theory, the Theory of Economic Externality, and Signalling Theory to explore the influence of the Environmental Protection Tax Law on ESG performance, along with the mediating roles of green innovation and financing constraints. It adopts a recursive system of equations and uses data from 9,831 A - share main - board listed companies in China for empirical validation. The research findings show a positive correlation between the Environmental Protection Tax Law and ESG performance through baseline results, endogeneity analysis, and robustness analysis. The impact is more obvious on state - owned or small and medium - sized enterprises. Green innovation and financing constraints are respectively positively and negatively correlated with ESG performance. The Baron and Kenny four - step method is used to examine their mediating effects, both of which are significantly associated with ESG performance. This research advances Stakeholder Theory by exploring the government's influence on ESG via the Environmental Protection Tax Law. It also provides implications for governments and enterprises to formulate targeted measures for sustainable development.

Keywords: Environmental Protection Tax Law, ESG Performance, Green Innovation, Financing Constraints, Stakeholder Theory.

1. INTRODUCTION

ESG, covering environmental, social responsibility, and corporate governance, is a key indicator of sustainable development. With the wide recognition of sustainable development, companies are urged to take responsibility (Hussain, Yang, Zahid, & Maqsood, 2023). ESG emphasizes long - term value and sustainable growth, materializing sustainability in business and allowing monitoring and evaluation of a company's efforts (Miralles-Quirós, Miralles-Quirós, & Redondo-Hernández, 2019). Assessing ESG performance examines a company's environmental impact, social welfare commitment, and corporate governance compliance, helping to evaluate the financial value of companies pursuing sustainable expansion. In many economies, listed companies must disclose ESG performance as governments, investors, and regulators allocate more resources to sustainable businesses (Yang & Han, 2023). Policies such as China's "dual - carbon" goal and the EU's CSRD force companies to disclose ESG information, promoting the green transformation of polluting industries. However, current environmental regulations face problems such as weak implementation, inconsistent standards (e.g., carbon accounting differences), and lagging technology (e.g., SMEs can't afford emission - reduction costs)(Liang & Li, 2023). Corporate ESG also has difficulties like the "greenwashing" controversy (e.g., H&M's false promotion), opaque data (rating agency score differences over 30 points), and a lack of a social dimension (e.g., child labor in the battery supply chain).

In recent years, reforms have emphasized the need for research. The ISSB has issued global ESG disclosure guidelines. China is exploring localized ESG indicators, and the EU's carbon tariffs force companies to transform. In the future, it's crucial to optimize regulatory instruments, standardize ESG criteria, help SMEs upgrade green technologies, and enhance

social responsibility to (Bao, Sun, Han, Mai, & Lin, 2024)achieve balanced development and address human survival and economic development challenges. China's ESG research is advancing rapidly, attracting regulatory attention. The country has implemented policies to encourage ESG management and sustainable development information disclosure (Luo, Tian, Fang, & Deng, 2024). As global ecological pressures grow, ensuring companies balance financial performance and ESG responsibilities under China's sustainable development goals has become an urgent research issue. (Jung & Yoo, 2023)

Nonetheless, international research on ESG primarily centers on micro - level corporate factors, including firm scale, female presence on the board of directors, board size, and the combination of dual roles. In contrast (Bao, Sun, Han, Mai, & Lin, 2024), scholars have given relatively scant attention to the macro - level government perspectives on ESG influencing factors. To construct a sustainable development system spearheaded by the government with the active participation of enterprises and society as a whole, the Chinese government has formulated Environmental Protection Tax Law to optimize green development (Fan, Qiao, Zhang, & Huang, 2021). Through these initiatives, the government actively fosters green development throughout society. Therefore, does the implementation of the Environmental Protection Tax Law by the Chinese governments have an impact on companies' ESG Performance? This represents the first research gap explored in this study.

Existing literature focuses on the economic impact of ESG performance on enterprises (Imperiale, Pizzi, & Lippolis, 2023), but there's a lack of empirical research on strategies to improve corporate ESG performance in academia. Many studies show current research centers on government regulation as a key driver of green (Zhu & Huang, 2023) innovation. When enterprises lack green - innovation motivation, the government's role, mainly through the Environmental Protection Tax Law, becomes more prominent and crucial in promoting green innovation (Madison & Schiehll, 2021). Research in ESG performance drivers (Fan et al., 2021) indicates that green innovation significantly contributes to ESG performance. However, researchers need to focus on the mediating effect of green innovation between the Environmental Protection Tax Law and ESG performance, which is the second research gap this study addresses.

Existing research shows that the formation of financing constraints is influenced by multiple factors, including corporate governance, financial market efficiency, and the policy environment. The government's Environmental Protection Tax Law through national development strategies can reshape the corporate financing environment at the institutional level. Based on the pollution fee standard adjustment experiment, scholars found that under the law, enterprises with lower financing constraints are more likely to reduce emissions through technology upgrading rather than production reduction, suggesting that alleviating financing constraints can enhance the technological incentive of environmental regulation. In the literature on ESG (F. Wang & Sun, 2022) performance driving factors, easing financing constraints enhances ESG performance. However, the mediating role of financing constraints between environmental policy tools and ESG performance is still of interest to researchers, which this study addresses as the third research gap.

This study makes a contribution to the development of Stakeholder Theory by investigating the influence of the government, as a crucial stakeholder, on corporate ESG performance via market incentive mechanisms. It incorporates government regulation and corporate ESG performance into a comprehensive theoretical framework from the government's perspective.

The research explores the impact of the Environmental Protection Tax Law on ESG performance, analyzes their effects to deepen the understanding of the factors affecting corporate ESG performance, and also examines the mediating relationships between the Environmental Protection Tax Law and ESG performance when Green Innovation and Financing Constraints serve as mediating variables.

2. THEORY AND HYPOTHESES

This research investigated three fundamental theories: Stakeholder Theory, Theory of Economic Externality, and Signalling Theory. Stakeholder Theory functions as the primary framework for explicating the relationship between Environmental Protection Tax Law and ESG Performance. The Theory of Economic Externality is applied to expound the association between Green Innovation and ESG Performance. Finally, Signalling theory is used to clarify the relationship between Financing Constraints and ESG Performance. Based on relevant literature and appropriate theoretical underpinnings, this study puts forward three hypotheses.

2.1. Environmental Protection Tax Law and ESG Performance

Enterprises pursue their own profits while assuming environmental and social responsibilities for sustainable development. To maximize corporate governance, they continuously enhance development strategies and governance (Zhang, Zhang, & Sun, 2023) structures. Thus, optimizing ESG Performance is crucial for enterprises' long - term development. According to Stakeholder Theory(Kumar, 2023), enterprise ESG construction no longer just focuses on value maximization, but integrates internal and external resources, balancing economic and social values while considering stakeholders' interests. The challenge in sustainable development is defining property rights of public environmental resources, which need government intervention as market mechanisms can't spontaneously adjust them. (He, Guo, & Yue, 2024)Governments, as key stakeholders, use administrative instruments like the Environmental Protection Tax Law to influence corporate decision - making (Jia, Li, Cao, Hu, & Xu, 2022). Implementing the law helps stakeholders understand ESG Performance, motivating companies to meet multiple stakeholders' needs, creating a harmonious relationship between economic development and environmental protection, positively incentivizing ESG Performance and achieving sustainable development. Accordingly, Hypothesis 1 is proposed.

Hypothesis1: Environmental Protection Tax Law can improve corporate ESG Performance.

2.2. Environmental Protection Tax Law, Green Innovation and ESG Performance

According to Stakeholder Theory, Green Innovation mediates the relationship between Environmental Protection Tax Law and corporate ESG Performance. Enterprises should consider stakeholders' interests in decision - making (Assef & Mangold, 2022). The Environmental Protection Tax Law helps firms cut pollution and adopt sustainable technologies (Yao, Fei, Wang, Yao, & Yang, 2023). Under government pressure, businesses must prioritize Green Innovation to meet regulations and reduce non - compliance risk. Green Innovation aims to develop new technologies or products for reducing environmental impacts and optimizing resource use.(Chen et al. 2022) It is not only a response to the law but also a key strategy for improving ESG Performance(Chen et al. 2022). Companies can boost their environmental ESG score through Green Innovation (Yao et al., 2023). The implementation of the law promotes Green Innovation, which directly improves the environmental aspect of ESG and indirectly benefits society and corporate governance, leading to overall ESG improvement. In conclusion,

Green Innovation is a crucial link between the law and ESG Performance for businesses. Therefore, the following mediating hypothesis is proposed:

Hypothesis2: Green Innovation mediates the relationship between Environmental Protection Tax Law ESG Performance.

2.3. Environmental Protection Tax Law, Financing Constraints and ESG Performance

Based on the Stakeholder Theory, Environmental Protection Tax Law can alleviate corporate Financing Constraints. Fulfilling environmental responsibilities cuts penalties and claims, improves investor perception, and lowers risks (G. Yang et al., 2023), leading to a lower required return and reduced financing costs. It also offers insurance- like protection for investors, reducing their risk assessment. The government enforces the law to encourage firms to ease Financing Constraints (Geng et al., 2021). Since government departments have more experts and scholars, they can assess technological prospects more accurately and have an information advantage over external investors (Li & Zhu 2021). The government's market - based incentives prompt companies to respond to regulations. Companies then disclose non - financial information, creating positive expectations for future (Dutta & Mallick, 2023) operations, increasing their chance of external financing for green development and promoting ESG Performance. Therefore, the following mediating hypothesis is postulated:

Hypothesis 3: Financing Constraints mediates the relationship between Environmental Protection Tax Law and ESG Performance.

2.4. Conceptual Framework

In this context, ESG functions as the dependent variable. As a result, based on these concepts, a conceptual framework (Figure 1) has been constructed, which encompasses one independent variable, one dependent variable, and two mediating variables.

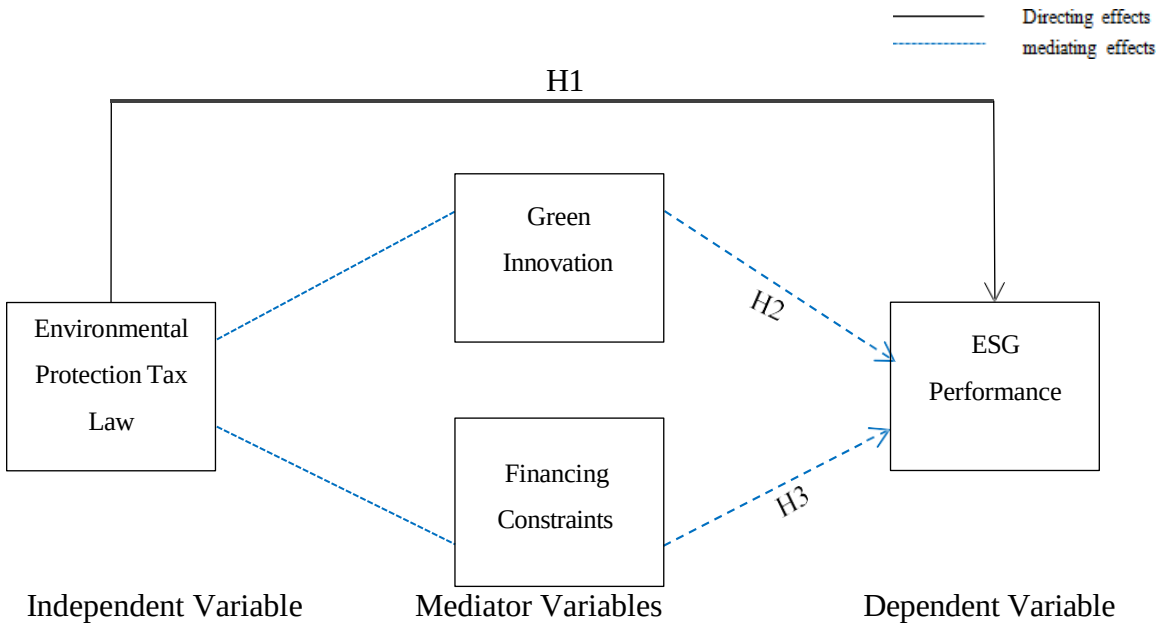

Figure1: Conceptual Framework

3. METHODOLOGY

3.1. The Operationalization of the Variables

This study uses secondary data (information collected and archived by previous parties) to investigate variable (Johnston, 2014) relationships. It's readily available for emerging scholars. The research sample is data from A - share listed companies in Shanghai and Shenzhen Stock markets from 2011 - 2020. To ensure result accuracy and reliability, adjustments are made to the initial samples: (Pu, 2023) exclude financial - industry companies, ST, *ST, and PT firms during the sample period, removes data samples with a debt ratio outside 0 - 1 and abnormal financial indicators. Also, one percent is trimmed off both ends of continuous variables. The final sample has 9831 observations. The data are from Bloomberg, China Statistical Information Network, and CSMAR database, and Stata17.0 is used for data processing and model estimation.

3.1.1. Dependent Variable

In this study, the independent variable is ESG Performance. In an effort to improve the ESG framework, a growing number of enterprises are choosing to actively disclose their ESG Performance. Currently, there are more than 600 specialized agencies globally that concentrate on offering ESG Performance ratings for companies(Hussain et al., 2023). Among them, Bloomberg emerges as the leading ESG rating agency. Compared with most ESG rating agencies, Bloomberg has a longer disclosure time for ESG scores and maintains a relatively comprehensive scoring index system(Atayah, Najaf, Ali, & Marashdeh, 2024). Bloomberg ESG scores are customized to the Chinese context and industry characteristics. Based on previous research(Wang et al., 2022), this study utilizes the ESG score provided by the well - established Bloomberg database to evaluate the ESG Performance of enterprises. This scoring system ranges from 0.1 to 100, where higher scores signify better performance in terms of ESG factors.

3.1.2. Independent Variable

The Environmental Protection Tax Law was promulgated by the Chinese government on December 25, 2016 (Zheng & He 2022). It defined the experimental period of the introduction of the Environmental Protection Tax Law as 2017 to 2020. In order to ensure the consistency of the observation interval before and after the implementation of the law, this research defines from 2017 to 2023 as the experimental period of the introduction of the Environmental Protection Tax Law. Environmental Protection Tax Law, the variable definition is 1 from 2017 to 2023 and 0 from 2011 to 2016. If the year of the sample company is 2017 or later, the variable takes the value of 1; otherwise, it is 0. The data for the Environmental Protection Tax Law are 0, 1 variables.

3.1.3. Mediating Variables

a. Green Innovation

This research utilizes the quantity of corporate green patent applications as a proxy variable to measure corporate green innovation. Reexamining the measurement methods adopted by previous scholars in their studies (B. Li, 2023), this research first sums up the amounts of green invention patent applications and green utility model patent applications submitted by enterprises. Then, it computes the total number of green patent applications and uses the natural logarithm of this total plus one as the dependent variable to assess the level of enterprises' green innovation. The data regarding green innovation are obtained from the China Research Data Service Platform (CNRDS), (B. Li, 2023)which is a leading, open - access, and platform -

based comprehensive data resource specifically designed for economic, financial, and business research in China (Xie et al., 2012).

b. Financing Constraints

Currently, the WW index, KZ index, and SA index are widely employed both domestically and internationally to evaluate the degree of financing constraints (Lu et al. 2022b). The WW index mainly considers the financing options available to a company in the capital market. Conversely, the KZ index assesses whether a company is subject to financing constraints by examining the correlation between its investment activities and capital structure (J. Guo, Fang, Liu, Wang, & Wang, 2023). The SA index focuses on examining the degree of internal information asymmetry within a company, serving as a means to evaluate the impact of incomplete information on the financing market. Such asymmetry can increase the costs associated with external financing, potentially restricting the firms' ability to obtain funds(Bai, Han, Ma, & Zhang, 2022). Therefore, the SA index is used in this study to evaluate corporate financing constraints. For the purposes of this study, the information on financing constraints is sourced from the CSMAR Enterprise database.

3.1.4. Control Variables

To conduct a comprehensive evaluation of the influence exerted by independent variables, it is essential that control variables exert a consistent impact on the dependent variable. Based on extant research (Zhang et al., 2023), the control variables are sourced from the CSMAR database, including firm size, asset - liability ratio, return on total assets, cash flow ratio, growth rate of operating income, shareholding ratio of the largest shareholder, whether the enterprise is state - owned, and enterprise age. The information provided includes the variable type, name, symbol, and measurement, as elaborated in Table 1.

Table 1. Alignment of Variables

Variable name	Variable symbol	Variable measurement	Unit
ESG Performance	ESG	ESG scores published by Bloomberg database (Yu et al. 2019)	Score
Environmental Protection Tax	Law	2011-2016 is 0, 2017-2020 is 1 (Zheng & He 2022)	0 or 1
Green Innovation	GI	ln (Green patent applications +1) (Li 2023)	Value
Financing Constraints	FC	SA Index (Bai et al. 2022)	Index
Firm size	Size	ln (Annual total assets) (Bai et al. 2022)	Value
Asset-liability ratio	Lev	Total liabilities at the end of year /	Ratio

		Total assets at the end of the year (Chen 2022)	
Return on total assets	ROA	Total corporate profits / Average total corporate assets (Guo et al. 2023)	Ratio
Cash flow ratio	Cash Flow	Net cash flow from operating activities / Operating income (Song et al. 2022)	Ratio
Growth rate of operating income	Growth	The current year's operating income / The previous year's operating income – 1 (Feng et al. 2022)	Ratio
Shareholding ratio of the largest shareholder	Top1	The number of shares held by the largest shareholder / The total number of shares (Feng et al. 2022)	Ratio
State-owned enterprise or not	SOE	1 for state-owned holding enterprises and 0 for others (Zhang et al. 2020)	0 or 1
Enterprise Age	Age	ln (The year of the current year - The year of establishment of the company + 1) (Fan et al. 2021)	Value

3.2. Research Models

This research estimates fixed - effects models to investigate the relationship between the Environmental Protection Tax Law and ESG Performance, and examines the mediating roles of Green Innovation and Financing Constraints. To test the mediating effect, a recursive equation system is used following the four - step method by Baron and Kenny (1986). First, it validates a significant correlation between Y and X. Second, it validates M is significantly correlated with X. Third, it validates a significant correlation between M and Y. Fourth, it validates M impacts Y when Y is regressed on both X and M.

The following model (1) is developed to test the relationship between Environmental Protection Tax Law and ESG Performance, which means to test H1:

$$ESG_{it} = \beta_1 + \beta_2 Law_{it} + \Sigma\beta_n Control_{it} + \mu_i + v_t + u_{it} \quad \ldots (1)$$

The following model (2) is developed to the mediating effect of Green Innovation and Financing Constraints on the relationship between Environmental Protection Tax Law and ESG Performance, which means to test H2 and H3:

$$ESG_{it} = \beta_1 + \beta_2 Law_{it} + \beta_3 M_{it} + \Sigma\beta_n Control_{it} + \mu_i + v_t + u_{it} \quad \ldots (2)$$

In these seven models, i is the enterprise; t is the year; ESG_{it} is the ESG Performance of enterprise i in year t; M_{it} is the Green Innovation of enterprise i in year or the Financing Constraints of enterprise i in year t; Law_{it} is the Environmental Protection Tax Law of enterprise i in year t; $Control_{it}$ is the relevant control variables of enterprise i in year t; μ_i is the individual fixed effect, and v_t is the time fixed effect; u_{it} is the residual term.

4. RESULTS

4.1. Descriptive Statistics

Based on the descriptive statistics presented in Table 2, the current average ESG level in China surpasses the mean, indicating a trend towards the upper-middle range. Moreover, the notable disparity among companies' ESG levels implies that a multitude of firms hold untapped potential for future improvement.

Table 2. Descriptive Statistics

Variables	Obs	Mean	SD	Min	Median	Max
ESG	9831	20.702	7.01	1.24	19.835	64.115
Law	9831	0.658	0.474	0	1	1
GI	9831	0.406	0.866	0	0	6.701
FC	9831	3.779	0.282	2.113	3.797	4.71
Size	9831	23.099	1.303	19.552	22.992	26.398
Lev	9831	0.476	0.201	0.031	0.487	0.925
ROA	9831	0.046	0.062	-0.398	0.039	0.244
Cash Flow	9831	0.056	0.069	-0.2	0.054	0.257
Growth	9831	0.161	0.416	-0.66	0.1	4.33
Top1	9831	0.369	0.16	0.083	0.355	0.758
SOE	9831	0.5	0.5	0	1	1
Age	9831	2.897	0.339	1.386	2.944	3.555

4.2. Results for Environmental Protection Tax Law and ESG Performance

4.2.1. Main Results

Following the implementation of the Hausman test and F test, and after addressing the endogeneity problems stemming from individual and time effects, this paper utilizes the fixed - effects model for regression analysis to improve the reliability of the results. The hypothesis is further verified through stepwise regression to confirm the robustness of the findings. The results presented in Column (1) of Table 3 indicate that all the estimated coefficients of the

independent variable, the Environmental Protection Tax Law, are positive and statistically significant at a level greater than 1%. This validates that the Environmental Protection Tax Law significantly enhances the ESG performance of firms in the current period, thus validating Hypothesis 1. The F - statistic of the equation is statistically significant, suggesting a strong overall coefficient for the model regression. Additionally, an R - squared value exceeding 0.7 demonstrates a robust fitting effect and considerable explanatory power.

4.2.2. Endogeneity Analysis

This paper adopts the instrumental variable method (IV) to conduct an endogeneity test, introduces relevant instrumental variables to measure the independent variable, and applies two - stage least squares (2SLS) estimation. In this research, the first - order lag of the endogenous variable is employed as the instrumental variable.

The results presented in Table 3 indicate that testing with an instrumental variable (L.Law) is reasonable. In the first - stage regression (Column (2)), there is a significant positive correlation coefficient of 0.381 between the instrumental variable (L.Law) and the Environmental Protection Tax Law (Law), at a significance level of 1%. Moreover, in the second - stage regression analysis (2SLS results), a significantly positive regression coefficient of 2.160 is observed for the impact of the Environmental Protection Tax Law on ESG Performance, also at a significance level of 1%. Notably, this coefficient is considerably larger than that when instrumental variables are not introduced, as shown in Column 1 of Table 3 where it is only equal to 0.811. Consequently, after addressing endogeneity issues within the analysis framework of this paper, it can be firmly asserted that there exists a valid positive effect of the Environmental Protection Tax Law on ESG Performance.

Table 3. Regression Results

	-1	-2	2SLS results
Variables	ESG	Law	ESG
L.Law		0.381***	
		(25.19)	
Law	0.811***		2.160***
	(6.46)		(6.18)
Size	1.667***	0.071***	1.433***
	(13.63)	(7.59)	(10.92)
Lev	-2.567***	-0.294***	-1.598***
	(-5.30)	(-7.14)	(-2.93)
ROA	1.393	-0.513***	2.116**
	(1.63)	(-6.98)	(2.15)
Cash Flow	0.202	0.052	0.47
	(0.29)	(0.87)	(0.61)
Growth	-0.251***	0.043***	-0.272***
	(-2.88)	(4.97)	(-2.58)
Top1	2.237***	-0.201***	3.660***
	(3.2)	(-3.57)	(4.72)
SOE	0.29	-0.064***	0.311

	(0.89)	(-2.77)	(0.97)
Age	6.639***	1.213***	3.994***
	(14.26)	(31.43)	(4.87)
Constant	-37.362***	-4.444***	
	(-14.57)	(-21.53)	
Under identification test			1260.728***
Weak identification test			1284.423***
Observations	9,826		
company	0.78	8,642	8,642
year	YES	0.698	0.218
F	238	YES	YES

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

4.2.3. Robustness Analysis

To evaluate the stability of the research model's results under diverse settings, this study performed first - order and second - order lag analyses on the "Law" variable and control variables. The detailed results are presented in Table 4. Column (1) displays the outcomes of the first - order lag analysis. In this column, the coefficient of the "Law" variable is 1.003, with a significance level of 1%, indicating that the "Law" variable exerts a significant positive influence on the ESG variable. Column (2) shows the results of the second - order lag analysis. In this column, the coefficient of the "Law" variable is 1.215, with a significance level of 1%, suggesting that the "Law" variable still has a significant positive effect on the ESG variable. The F - statistics are 187 and 143.8 respectively, indicating that the models are significant overall. The results of the robustness test corroborate the significant positive impact of the "Law" variable on the ESG variable, thereby enhancing the credibility of the research conclusion.

Table 4. Robust Test

	-1	-2
Variable Symbol	F.ESG	F2.ESG
Law	1.003***	1.215***
	(8.00)	(9.67)
Size	1.346***	0.991***
	(10.5)	(6.98)
Lev	-1.241**	-0.291
	(-2.42)	(-0.53)
ROA	3.645***	3.129***
	(3.62)	(2.69)
Cash Flow	0.028	-0.366
	(0.04)	(-0.49)
Growth	-0.219**	-0.164*
	(-2.53)	(-1.89)

Top1	3.047***	2.747***
	(4.31)	(3.64)
SOE	0.339	0.304
	(1.01)	(0.72)
Age	5.856***	5.332***
	(11.67)	(9.31)
Constant	-28.158***	-18.268***
	(-10.37)	(-6.19)
Observations	8,642	7,525
R-squared	0.808	0.828
company	YES	YES
F	187	143.8

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

4.2.4. Heterogeneity Analysis

a. Property Rights Heterogeneity Analysis

To analyze the disparities in the influence of variables in Model 2, this study conducts a heterogeneity analysis by comparing the ESG performance of state-owned enterprises and non-state-owned enterprises. The specific findings are presented in Table 5. Column (1) displays the results for the state-owned enterprise group. In column (1), the coefficient of Law is 0.902, with a significance level of 1%, suggesting that Law exerts a significant positive influence on ESG. Column (2) shows the results for the non-state- owned enterprise group. In column (2), the coefficient of Law is 0.427, with a significance level of 5%, indicating that Law has a significant positive effect on ESG. Through comparing the ESG performance of state-owned and non-state-owned enterprises, this study conducts a heterogeneity analysis. The results demonstrate that Law has a significant positive impact on the ESG of both types of enterprises, yet the extent of influence differs.

Table 5. Property rights heterogeneity Test

	SOE	Non SOE
Variable symbol	ESG	ESG
Law	0.902***	0.427**
	(4.65)	(2.48)
Size	1.410***	2.045***
	(7.06)	(12.03)
Lev	-1.117	-2.744***
	(-1.39)	(-4.29)
ROA	3.561**	-0.464
	-2.21	(-0.46)
Cash Flow	-0.003	1.101
	(-0.00)	(1.18)

Growth	-0.179	-0.301***
	(-1.28)	(-2.64)
Top1	-1.946**	5.230***
	(-2.00)	(4.76)
Age	8.211***	5.350***
	(10.40)	(9.55)
Constant	-34.353***	-43.218***
	(-8.40)	(-11.80)
Observations	4,902	4,902
R-squared	0.781	0.776
company	YES	YES
F	147.7	109.3

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

b. Scale Heterogeneity Analysis

To investigate disparities in variable relationships across enterprises of different scales, this study uses the median of enterprise scale as the demarcation. Enterprises larger than the median are large-scale, and those below are small and medium-sized. The findings are in Table 6. Column (1) shows results for large-scale enterprises, where the "Law" coefficient is 1.006 with a 1% significance level, indicating a significant positive influence on ESG. Column (2) shows results for small and medium-sized enterprises, with a "Law" coefficient of 0.480 and a 1% significance level, also indicating a significant positive impact on ESG. This research conducts a heterogeneity analysis by comparing ESG performance between the two enterprise types. The results show that "Law" has a significant positive effect on the ESG of both, with a 1% significance level. However, the coefficient magnitudes differ: 1.006 for large-scale enterprises and 0.480 for small and medium-sized ones, suggesting "Law" may have a greater impact on large- scale enterprises' ESG performance.

Table 6. Scale Heterogeneity Test

	Large-scale Enterprises	**Small and medium-sized Enterprises**
Variable symbol	ESG	ESG
Law	1.006***	0.480***
	(4.95)	(3.3)
Size	1.701***	1.456***
	(8.92)	(9.51)
Lev	-1.157	-1.907***
	(-1.20)	(-3.55)
ROA	6.309***	-1.316
	(3.24)	(-1.48)
Cash Flow	-1.768	1.357*
	(-1.53)	(1.67)
Growth	-0.149	-0.313***

	(-1.06)	(-2.97)
Top1	0.343	4.365***
	(0.34)	(4.82)
SOE	-0.085	0.565
	(-0.13)	(1.61)
Age	9.645***	4.255***
	(11.85)	(8.44)
Constant	-46.657***	-26.908***
	(-11.72)	(-8.40)
Observations	4,907	4,919
R-squared	0.786	0.729
company	YES	YES
F	167.6	79.58

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

4.3. Results for Environmental Protection Tax Law, Green Innovation and ESG Performance

This study employed a four - step approach put forward by Baron and Kenny (1986) to validate the mediating effect of Green Innovation variables. First, the correlation between the independent variable, Law, and the dependent variable, ESG, was determined. The aforementioned baseline results have demonstrated that Law is positively correlated with ESG at the 1% significance level, as presented in Table 3. The second step involved examining the significant correlation between the independent variable Law and the mediating variable GI. As can be observed from Column (1) of Table 7, the independent variable Law is positively correlated with the intermediate variable GI at the 1% significance level, and a significant relationship is established. The third step was to investigate whether there exists a significant correlation between the mediating variable GI and the dependent variable ESG. The results from Column (2) of Table 7 indicate that GI is positively correlated with ESG at the 1% significance level, and a significant relationship is established. In the fourth step, based on the first step, the mediating variable was incorporated to conduct regression once again. If the mediating variable is significant, it suggests the existence of a mediating effect. From Column (3) of Table 7, it is clear that the mediating variable GI shows a positive correlation with ESG at the 1% significance level, indicating the presence of a mediating effect. This validates that H2 holds true.

Table 7. Results of Mediator GI

	-1	-2	-3
Variable Symbol	GI	ESG	ESG
Law	0.034***		0.797***
	(3.78)		(3.69)
GI		0.412***	0.400***
		(8.64)	(8.29)

Size	0.057***	1.736***	1.645***
	(8.02)	(13.38)	(12.52)
Lev	-0.172***	-2.919***	-2.498***
	(-6.21)	(-7.28)	(-9.15)
ROA	-0.172***	1.000*	1.461***
	(-3.02)	(1.8)	(2.67)
Cash Flow	-0.099***	0.263	0.241
	(-4.07)	(0.82)	(0.65)
Growth	-0.027***	-0.190***	-0.240***
	(-3.82)	(-2.88)	(-3.45)
Top1	-0.238***	2.113***	2.332***
	(-8.00)	(6.2)	(7.3)
SOE	-0.014	0.245	0.295*
	(-0.75)	(1.39)	(1.78)
Age	0.214***	8.098***	6.554***
	(8.24)	(22.7)	(9.14)
Constant	-1.361***	-42.571***	-36.818***
	(-7.35)	(-17.26)	(-10.38)
Observations	9,831	9,831	9,831
R-squared	0.0356	0.259	0.262
Number of groups	1,123	1,123	1,123
company	YES	YES	YES
year	0.034***		0.797***

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

4.4. Results for Environmental Protection Tax Law, Financing Constraints and ESG Performance

The mediation effect of the Financing Constraints variables is investigated using the Baron and Kenny four - step method (1986). First, the relationship between "Law" (independent variable) and "ESG" (dependent variable) is verified. Table 3 shows a significant positive correlation at the 1% significance level. Second, the correlation between "Law" and "FC" (mediator variable) is examined. Column (1) of Table 8 shows a significant negative correlation at the 1% significance level, establishing a significant relationship. Third, the correlation between "FC" and "ESG" is examined. Column (2) of Table 8 indicates a significant negative association at the 1% significance level, confirming a significant relationship. Fourth, a mediator variable is introduced based on the first - step analysis and regression analysis is

redone. The significance of the mediator variable implies a mediating effect. Column (3) of Table8 shows that the mediator variable "GI" has a significant negative correlation with "ESG" at the 1% significance level, confirming the mediating effect and supporting Hypothesis 3.

Table 8. Results of Mediator FC

	-1	-2	-3
Variable Symbol	FC	ESG	ESG
Law	-0.005***		0.948***
	(-5.11)		(3.82)
FC		-2.560*	-3.412***
		(-1.73)	(-2.80)
Size	-0.064***	1.700***	1.570***
	(-159.29)	(13.4)	(15.36)
Lev	-0.002	-3.168***	-2.721***
	(-0.66)	(-7.96)	(-9.39)
ROA	0.004	0.706	1.185*
	(0.5)	(1.15)	(1.88)
Cash Flow	0.001	0.211	0.182
	(0.12)	(0.65)	(0.47)
Growth	0	-0.193***	-0.251***
	(-0.43)	(-2.84)	(-3.61)
Top1	0	2.018***	2.284***
	(0.02)	(5.49)	(6.42)
SOE	-0.002**	0.288*	0.364**
	(-2.55)	(1.8)	(2.43)
Age	0.763***	9.584***	8.200***
	(578.58)	(8.64)	(6.28)
Constant	3.094***	-36.061***	-26.809***
	(307.33)	(-10.60)	(-13.84)
Observations	9,830	9,831	9,831
R-squared	0.981	0.259	0.263
Company	YES	YES	YES
Number of groups	1,123	1,123	1,123

Note: *, **, and ***indicate significance at the 10%, 5%, and 1% levels, respectively, with robust standard errors in parentheses.

5. CONCLUSION

This research employs a sample of Chinese A-share main board listed companies spanning from 2011 to 2020 to empirically investigate the relationship between the Environmental Protection Tax Law and corporate ESG performance. By examining the influence of the government, as a crucial stakeholder, on corporate ESG through the Environmental Protection Tax Law, this study contributes to the development of Stakeholder Theory. Specifically, this research explores the relationship between the Environmental Protection Tax Law and ESG

performance. The results indicate a positive correlation between the Environmental Protection Tax Law and ESG performance, thus deepening the understanding of the factors affecting corporate ESG performance. The findings from the baseline results, endogeneity analysis, and robustness analysis consistently demonstrate a significant positive correlation between the Environmental Protection Tax Law and corporate ESG performance. Furthermore, this study probes into the underlying mechanism by which the Environmental Protection Tax Law affects corporate ESG performance, aiming to further examine the heterogeneity of this relationship. Specifically, it reveals that state-owned enterprises or small and medium-sized enterprises are more significantly affected in enhancing their ESG performance by the Environmental Protection Tax Law.

The findings on the mediating effect of green innovation confirm this study's hypothesis. The Environmental Protection Tax Law improves enterprises' ESG performance through green innovation. Stronger government enforcement of the law benefits green innovation implementation. The growth of green innovation promotes enterprises' green development and ESG performance. On one hand, enterprises should consider stakeholders' interests in decision - making. The government, a major stakeholder, has issued the Environmental Protection Tax Law. Under government pressure, enterprises must focus on green innovation, reduce pollution, and use sustainable technologies to meet regulations and avoid non - compliance risks. On the other hand, enterprises show their commitment to environmental protection through green innovation, which indirectly boosts social welfare and corporate governance, enhancing their environment - related ESG scores. Therefore, green innovation mediates between the Environmental Protection Tax Law and enterprise ESG performance.

The findings on mediating effects of financing constraints validate the study's hypothesis. The Environmental Protection Tax Law promotes ESG performance by alleviating financing constraints. More active implementation of the law by enterprises is more conducive to reducing financing constraints. Alleviating financing constraints helps enterprises sustainably develop and promotes their ESG performance. On one hand, fulfilling environmental responsibilities reduces administrative penalties, stakeholder claims, and business risks. Consequently, investors demand lower returns, and funding costs decrease. The government's implementation of the law has helped industries ease financing restrictions. On the other hand, by alleviating financing constraints, companies can access more financial resources for ESG - related initiatives. This enables them to continuously improve ESG performance. Thus, financing constraints mediate between the Environmental Protection Tax Law and ESG performance.

5.1. Contributions

5.1.1. Theoretical Contributions

Firstly, literature review shows scholars have studied various micro - level factors affecting corporate ESG Performance(Shahzad, Ghaemi Asl, & Tedeschi, 2023), but few have taken a macro - level approach to the government - corporate ESG Performance relationship. This study expands Stakeholder Theory by investigating the influence of the government, as a key stakeholder, on corporate ESG through the Environmental Protection Tax Law. It integrates government regulation and corporate ESG Performance in a unified theoretical framework from the government's perspective.

By examining the impact of the government's Environmental Protection Tax Law on ESG Performance, this study clarifies both the internal mechanisms of government regulation and its external effects, thus enhancing our understanding of factors influencing corporate ESG Performance and making an original theoretical contribution to the existing literature.

Secondly, existing literature mainly focuses on studying the economic impacts of ESG performance on firms (Chen et al. 2022). However, there is relatively little empirical research by academics on strategies to improve corporate ESG performance. This study contributes to the development of Stakeholder Theory by examining the influence of the government, an important stakeholder, on corporate ESG performance through the Environmental Protection Tax Law. By considering the mediating role of green innovation in the relationship between the Environmental Protection Tax Law and ESG performance, this study deepens the understanding of corporate ESG performance determinants and further extends Stakeholder Theory, which is the second theoretical contribution of this research.

Thirdly, existing literature mainly explores the economic implications of firms' ESG performance (Chen et al. 2022). However, empirical research by academics on strategies to further enhance firms' ESG performance is limited. This study contributes to Stakeholder Theory by examining the influence of the government, a key stakeholder, on corporate ESG performance through the Environmental Protection Tax Law. By considering the mediating role of financing constraints in the relationship between the law and ESG performance, it deepens the understanding of factors affecting corporate ESG performance and promotes the development of Stakeholder Theory. This is the third theoretical contribution of this research.

5.1.2. Practical Contribution

In the distinctively characterized Chinese socialist market economy, the enforcement of government regulations plays a pivotal role in shaping the economic behaviors of various market participants, thereby significantly enhancing the Environmental, Social, and Governance (ESG) performance of (Lu & Cheng 2023) corporations. To actively encourage and foster corporate investment in areas of environmental sustainability and social responsibility, the Chinese government has rigorously implemented the Environmental Protection Tax Law(X. Wang, Wang, Guan, & Taghizadeh-Hesary, 2023). This comprehensive study delves into the profound impact that the Environmental Protection Tax Law has on the ESG performance of companies, specifically within the nuanced context of the Chinese socialist market economy, which is marked by its unique characteristics.

The research findings emerging from this investigation are poised to provide the Chinese government with invaluable insights and perspectives. These insights are crucial for the government to effectively harness and utilize regulated tools and mechanisms aimed at substantially improving the ESG performance of firms. This enhancement can be systematically achieved by laying down a robust and solid theoretical foundation, meticulously refining and perfecting the pertinent legal framework, and offering comprehensive, well-rounded theoretical guidance and practical suggestions to both enterprises and investors. By addressing these critical aspects, this research not only bridges gaps in existing knowledge but also makes a significant and meaningful contribution to the field. Its contextual implications are particularly noteworthy, as they offer actionable insights that can drive policy formulation and corporate strategy in the realm of ESG, thereby fostering a more sustainable and responsible business environment within the unique framework of the Chinese socialist market economy.

5.2. Limitations and Future Research Directions

This paper examines the correlation between the Environmental Protection Tax Law and ESG performance, with Green Innovation and Financing Constraints serving as mediating variables, drawing on theories including Stakeholder Theory, the Theory of Economic Externality, and

Signalling Theory. Nevertheless, owing to objective factors and limitations in the research level, there are aspects in the paper that require enhancement.

Owing to the continuous development and refinement of the ESG concept, at present, there exists no universally acknowledged definition or unified measurement standards for ESG. Moreover, there are numerous external rating agencies in society that conduct research on corporate ESG performance. The rating methods primarily encompass grading systems and scoring systems. When constructing an ESG evaluation system, each rating agency's selection of key indicators and weight allocation exhibits strong subjectivity. The relevant scoring criteria may vary, and there are also differences in calculation methods. Although this paper selects the ESG scores from Bloomberg's database, which quantifies the degree using a percentage scale and features relatively comprehensive data, there remains a possibility of issues in sample data selection. In the future, it would be advantageous to further validate the existing conclusions by leveraging the evaluations of corporate ESG performance provided by more authoritative rating agencies.

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